21st National
9th International
Congress on Biology

Animal Biology

Semnan University, Semnan, Iran

16-19 Feb. 2021

Semnan University

Iranian Biology Society

FIRBS
Federation of Iran Bioscience Societies

United Nations Educational, Scientific and Cultural Organization

UNITWIN Network in Global Pharmacy Education Development

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IPPCTC
Iranian Association for Plant Cell and Tissue Culture

IPPA
AltitudeClinic

IBIS
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Iranian Bioinformatics Society (IBIS)

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انجمن ژنتیک جمهوری اسلامی ایران ۱۳۷۶

ABU ALI SINA UNIVERSITY

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Iranian Society of Microbial Sciences

Welcome to

Semnan University

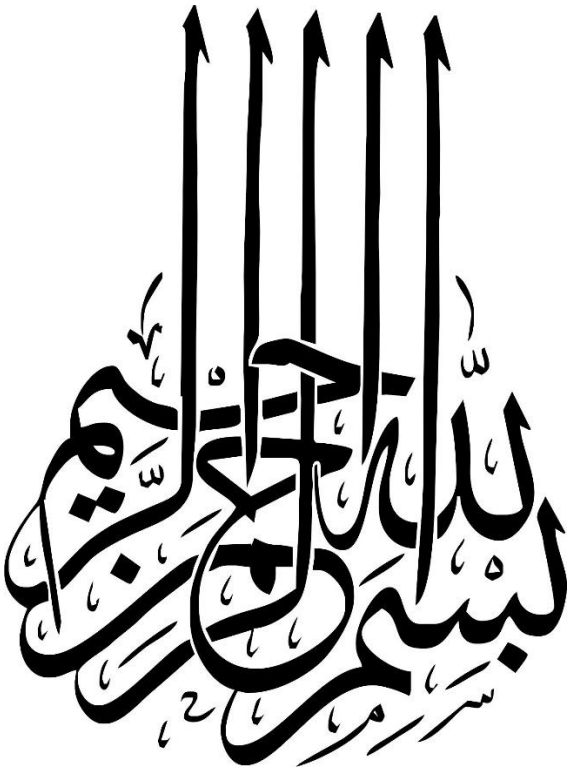
IBS

Iranian Biology Society

2021

Conference On
Animal Biology

21st National & 9th International
Congress On Biology


بسم الله الرحمن الرحيم

Abstracts

of

21st National and 9th International Congress on Biology

Conference on Animal Biology

16-29 Feb. 2021

Semnan

IRAN

Websites: http://ibs2020.semnan.ac.ir/en/; https://ibs.org.ir/; https://semnan.ac.ir/; https://biology.semnan.ac.ir/

Edit, Layout and Preparation by Darvishalipour A. Shakiba and Golestaninasab Mehdi

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This congress was indexed by ISC (# 99200-22082) and CIVILICA (# BIOCONF21).

Preface

The Iranian Biology Society and Semnan University are honored to held the **21st National and 9th International Congress on Biology** on 16th to 19th February 2021 inclusive, in Semnan, Iran. The main aim of the event is to present frontline bioscience helping to acknowledge sever challenges dealing with global environmental treats in our planet. Also, we aimed to provide a way of communication among peers of young scientists and students locally and internationally. It also intends to provide an interdisciplinary platform to present and discuss the most recent innovations, trends, and concerns along with practical challenges surrounding biological sciences. The congress consists of four concurrent conferences on major Biology disciplines (Plant Biology; Animal Biology; Cell and Molecular Biology; and Conservation and Environmental Biology). Meanwhile, a prominent event includes a special panel on coronavirus disease 2019 (COVID-19) concerning molecular and cellular approaches. In the amid of the current global pandemic, Semnan University and Iranian Biology Society hold on an *International Virtual Symposium on the Biological, Clinical and Basic Science approaches to Covid-19*, at the 21st National and 9th International Congress on Biology in Semnan University, Semnan, Iran.

This proceeding is one the six abstract books, including abstract books for Plant Biology, Animal Biology, Cell and Molecular Biology, and Conservation and Environmental Biology conferences and a Persian version of the content of the abstracts altogether, and one last booklet for COVID-19 symposium. We hope the knowledge and experience of biologists to be shared during the 21st National and 9th International Congress on Biology benefits all parties involved and beyond.

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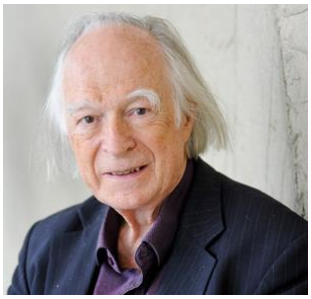

Prof. Denis Noble; CBE, PhD, FRS

Emeritus Professor of Cardiovascular Physiology
https:/www.dpag.ox.ac.uk/team/denis-noble

Denis Noble developed the first mathematical model of cardiac cells in 1960 using his discovery, with his supervisor Otto Hutter, of two of the main cardiac potassium ion channels. These discoveries were published in Nature (1960) and The Journal of Physiology (1962). The work was later developed with Dick Tsien, Dario DiFrancesco, Don Hilgemann, Yung Earm, Ten Tusscher & Panfilov, and others to become the canonical models on which more than 100 cardiac cell models are based today. All are available on the CellML website.

More recently he has focussed on developing skeletal muscle models, with articles published in the ground-breaking PHYSIOME journal: formulation of the model and its use in the relief of muscle cramp. More information on this project on https://www.denisnoble.com/systems-biology/

He was elected President of the International Union of Physiological Sciences (IUPS) at its Congress in Kyoto in 2009. He was then elected for a second term at the 2013 Congress in Birmingham, UK. He also delivered the opening plenary lecture at the Congress (see Music of Life link) which is also published as an article in Experimental Physiology (2013). He is the author of the first popular book on Systems Biology, The Music of Life, and his most recent lectures concern the implications for evolutionary biology. To follow the debate on this see the FAQ (Answers) pages on the www.denisnoble.com website.His book, Dance to the Tune of Life. Biological Relativity, extends the systems approach to biology, including evolutionary biology.

KN1 Why does the world need an integrative system approach to biology

Denis Noble -Department of Physiology, Anatomy & Genetics, University of Oxford, Oxford, UK.
E_mail: nobleoxford@gmail.com

It is now 20 years since the first human genome sequence was announced in 2001. The expectation was that, by now, we would have cures for cancer, heart disease, and for most of the major diseases of the organs and systems. We have made *incremental* progress, but nothing like the *major change* that was predicted. WHY? We got genetic causation the *wrong way round*, Genes are *used* by organisms, not the reverse. The organism activates, controls, and modifies its genome. What is the evidence and what are the implications for Biology in the 21st century? Those are the topics of this Lecture. I will then address the question of sustainable development.

Prof. Ali A. Moosavi – Movahedi

Professor of Biophysical Chemistry
UNESCO Chair on Interdisciplinary Research in Diabetes, University of Tehran, Tehran, Iran
Institute of Biochemistry and Biophysics, University of Tehran, Tehran, Iran
https://www.researchgate.net/profile/Ali-Moosavi-Movahedi

Ali A. Moosavi-Movahedi is currently Professor of Biophysical Chemistry in IBB, University of Tehran. Born in Shiraz, Iran, in 1953, graduated from National University of Iran (NUI) with a BSc in Chemistry, 1975, from Eastern Michigan University (EMU), USA, with a MSc in Chemistry (Bioanalytical Chemistry), 1979 and from University of Manchester, UK, with a PhD in Biophysical Chemistry, 1986. His research career has been mostly marked on thermodynamics of protein folding/unfolding. In recognition of his outstanding research in the field of science, he was awarded International Khawrazmi Prize, 1990, National Distinguished Professor, 1997, the first class medal for research, University of Tehran, 2003, National Eminent Character 2003, first rank medal for basic science research in Razi Medical Science National Festival 2005, Elsevier-Scopus International Award for Top Researcher in the Field of Biochemistry, Genetics & Molecular Biology 2007, Avicenna Festival First Rank Award for Top Researcher-2008, Member of Iran Academy of Sciences, 2009 and first rank award and national eminent researcher 2009 is conferred in National Research Festival by Ministry of Science, Research and Technology of Iran, selected as Eminent Professor of University of Tehran 2010, prominent Professor appointed by Iran National Elites Foundation 2012 and Essential Science Indicators (ESI) 1% citation scientist in the field of Biology and Biochemistry, TWAS (The World Academy of Sciences) Fellow 2015, IAS (The Islamic Academy of Sciences) Fellow 2016 . He has supervised PhD and MSc students and guides postdoctoral researchers in the cited area. He is the author of 17 books and numerous research full papers published in mostly international research journals mainly in the area of structural elucidation of protein, enzyme and DNA. He is a member of Biophysical Society (USA), Protein Society (USA), Iranian Chemical Society, Iranian Biochemical Society, and is currently the president of Iran Society of Biophysical Chemistry. He is already the president of National Member Committee of International Council for Science (ICSU) at University of Tehran.

KN2 Wisdom-based Outlook on Biological Sciences

Ali Mosavi-Movahedi -. *UNESCO Chair on Interdisciplinary Research in Diabetes, University of Tehran, Tehran, Iran. Institute of Biochemistry and Biophysics, University of Tehran, Tehran, Iran. E.mail: moosavi@ut.ac.ir*

Today, the planet Earth suffers from the man-made technology and industry and this planet is under pressure and suffers from various diseases.

Since the principles and rules of nature and existence have been made correctly, so It should be bio-modeled the science and technology in order to have a prosperous and comfortable life. Therefore, Biomimetic and Bioinspiration should be emulated and scientific and technology centers should be developed on this basis. Biological phenomena must be discovered through basic and fundamental science and interdisciplinary knowledge. This approach should be disciplined in universities and scientific centers towards bio-modeling of nature, and extended in social life.

To discover biological phenomena, it is necessary to educate the knowledge-man scientists with high potential in basic, biological and interdisciplinary sciences.

Prof. Alastair Summerlee

professor emeritus *biomedical* science
University of Guelph, UOGuelph, Department of Biomedical Sciences
https://www.researchgate.net/profile/Alastair_Summerlee

A passionate humanitarian, dedicated teacher, and internationally renowned researcher, Alastair Summerlee served as president and vice-chancellor of the University of Guelph (2003-14), interim president and vice-chancellor Carleton University (2017-2018) and professor of Biomedical Science (1989-2017). He is currently an adjunct professor in the Sprott Business School at Carleton and a professor emeritus biomedical science at Guelph.

Summerlee spent six years on the board of the World University Service of Canada where he became involved in humanitarian issues in the refugee camps in Kenya. His work to raise funds to support education and women and girls in the campus attracted international investment from the governments of Canada and the United Kingdom and from private individuals. Summerlee is part of the international movement to unite universities worldwide in fighting hunger and poverty known as the PUSH Initiative (President's United to Solve Hunger) and was the International Quality of Life Laureate at the United Nations in 2012.

Summerlee has published numerous scientific articles and book chapters, written about teaching and teaching practice, advocated in the media for better conditions for people in refugee camps and is regularly invited to speak on teaching, research, accountability, fund-raising and sustainable business. His current research focuses on iron deficiency and a simple innovation, known as the Lucky Iron Fish®which has the capacity to alleviate the condition for almost 2 billion people worldwide. He is also serving as a Special Advisor to Carleton on the capital campaign and the interim leader of Education City– an initiative to provide educational innovation in the Ottawa region.

KN3 The imperative to develop a sustainable solution to iron deficiency

Alastair JS Summerlee - *Department of Biomedical Sciences, University of Guelph, Guelph, Canada.*
E-mail: alastair@luckyironfish.com

Prof. Ian Adcock

Professor of Respiratory Cell & Molecular Biology
Faculty of Medicine, National Heart & Lung Institute
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Ian Adcock graduated from St Thomas' Hospital Medical School in 1987 with a PhD in Molecular Pharmacology. After MRC-funded spells in Edinburgh and at St Georges' Hospital in London he moved in 1990 to the National Heart and Lung Institute to work with Professor Peter J Barnes on the molecular mechanisms of glucocorticoid action in the lung. In 2004 he became Professor of Respiratory Cell & Molecular Biology at Imperial College London. Dr Adcock serves on the Editorial Board of several Journals including the AJRCCM and ERJ, is a former Head of Assembly 5 (Airway Diseases) (2014-2017) within the ERS and on the ERS and ATS Programme Committees. Dr Adcock is a PI and WP Leader in the EU/EFPIA IMI UBIOPRED initiative to determine biomarkers of severe asthma using integrated 'omics and clinical features; PI in the MRC-ABPI COPD MAP initiative; PI in the MRC-Asthma UK Centre for Asthma and Allergy and a PI in the CRF at the Royal Brompton and Harefield Hospitals.

KN4 Immune cell types in severe asthma

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Asthma is a chronic inflammatory disease of the airway associated with the recruitment and activation of a large number of diverse immune cells including eosinophils, macrophages, mast cells, neutrophils and T cells. These play divergent roles in the various sub-types of asthma that exist and make excellent potential therapeutic targets for specific patients. The advent of single cell sequencing and associated bioinformatics tools has enabled the interrogation of immune cell subtypes in asthma samples that were previously difficult to either access or isolate sufficient immune cells from such as bronchial biopsies, BAL and sputum. The presentation will highlight how distinct we can use information from single cell analysis to identify groups of severe asthmatics associated with key cell-types that are driven by specific driver mechanisms. This has implications for personalised medicine.

Prof. Fatemeh Maghuly

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https://forschung.boku.ac.at/fis/suchen.person_uebersicht?id_in=5595&menue_id_in=101&sprache_in=en

She holds a habilitation in Plant Functional Genomics at BOKU, Vienna. She is the author and co-author of more than 40 peer-reviewed papers and monographs. She was/is the PI or team member of several national and international projects supported by FWF, FFG, EU. As Principal Investigator, F.M. was responsible for the genetic characterization of an extensive collection of apricot accessions and several hundred transgenic stone fruits and grapevine plants. Since 2005, F.M. joined the allergen research efforts, intending to develop improved detection methods for traces of food allergens in fresh and processed plant-derived products. Since 2009, F.M. was responsible for targeted genotyping of a bioenergy plant (J. curcas), to discover SNPs using TILLING and EcoTILLING approaches, as well as GBS and double digest GBS sequencing (ddGBS). The whole transcriptome of different developmental stages of J. curcas seed was studied using NGS. Technical expertise in population genetics, molecular marker development, and NGS allows her to handle the diverse bioinformatics approaches. She is familiar with all resources, genomics, phenomics, and gene editing (CRISPR/Cas) to study gene function. F.M. has also stayed as a visiting professor at several institutions abroad.

KN5 Multi omics approaches to improve none-domesticated Jatropha curcas: Challenges to counteract land degradation

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With increasing human activities, the most significant challenges are facing energy demand, fuels and CO2 emission from fossil fuel, which resulted in the release of the high amount of greenhouse gases. To solve this problem, it is necessary to design and use more efficient machines, processes and alternative fuels.

In the last years, biofuel crops received more attention in transferring crude fossil oil to more sustainable resources. Among different oil-rich seeds plant, *J. curcas* is considered a promising source of non-edible oil, which can be used for biodiesel production. It is an extremely drought-tolerant plant that can grow in places where other plants fail to be cultivated. Jatropha thrives on almost any soil and can prevent soil erosion and therefore can be considered an effective option for rehabilitating wasteland. It has also been found as a suitable plant for cultivation, not interfering with food crop agricultural production. Its seeds contain 20% to 50% oil and 22to35% proteins, even higher than soybean. Thus, the wish to take this plant into culture has been steadily increasing. However, *Jatropha* has not really been domesticated. Its seeds contain a range of toxins and anti-nutritional compounds, which render the seedcake and oil unsuitable for animal feed and human consumption. Besides, the lack of knowledge of the quantitative genetic variations and gene expression patterns makes it difficult to predict its seeds' oil and toxin levels.

Therefore, optimizing *Jatropha* yield and seed quality to identify key enzymes invoking in the seed maturation process is important. Moreover, in-depth knowledge of the *J. curcas'* genomic approaches needs to be complemented by qualitative and quantitative analyses at several omic levels to obtain functional genomics information, which will accelerate breeding efforts in this biofuel crop.

Prof. Abdolhassan Kazemi

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Administrative experience: Research vice-chancellors, Tabriz University of Medical Sciences (2004-2006); Director of International Relation Affairs, Tabriz University of Medical (2002- 2004); Dean of Medical Mycology Dept., Tabriz University of Medical Sciences (2003-present); Dean of Medical Ethics Research Team - Tabriz Uni. of Med. Sci.(2007-present); Dean of Medical Ethics & History Research Center - Tabriz Uni. of Med. Sci.(2009-present), Dean of Bio-Medical Ethics Dept. - Tabriz Uni. of Med. Sci.(2011 –present).
Award: National Selected Lecturer & Academic Staff (Iranian Ministry of Health, Treatment & Medical Education-2005); National Selected Lecture in Educational Motahhary Award (2009); National Selected Lecture in Educational Motahhary Award (2011)

KN6 Biological supertrends, futures studies and futures perspectives of human society and civilization

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The subjects like Synthetic biology, Mimic biology, Artificial biology, and Virtual biology actually refer to the realization of "second nature, new nature" or the attempt to recreate nature.

Forms the basic super-framework in the field of life and medicine sciences and with synthetic synthesis or genomic manipulation; A minimal genome called the “Biological chassis” and then the “Cell chassis”; the back cell creates the desired or ideal base for specific defined purposes.

These initial steps (bio-chassis, cellular chassis) eventually lead to the final step, the Homosyber human (Techniqueno species), which is the descendant of Homo sapiens, the product of natural evolutionary processes, natural selection, and evolutionary pressures over species evolution during billions years. Is alive, transforms into a homosyber human being who in his realization and belly; of course, the concept of Trans Humanism follows and also leads to the objectivity of genetic doping, genetic fabrication, trait selection, infant design, and so on. The objectivity of the above concepts, of course, leads to the realization of live machines, which in turn blurs the line between the non-living machine, the robot, and the human free agent, especially since living machines have a Dignity identity and are considered citizens. Therefore, along with human dignity, human dignity is the subject of machine dignity and of course, consequently, the discussion of machine ethics and the values and moral norms related to the interaction of human and human society with the society of living machines with identity and dignity. The combination of the above ideas will lead to a change in the structure and basic concepts related to human civilization, culture, society, education, moral and legal values, the concept of normative and moral virtues and ugliness, idolatry and the perception of human beings as the end of creation. All familiar concepts in the history of civilization will advance human societies, as in the case of non-human species of living organisms, the emergence of chimer species, microorganisms with no history of vacuolar life chain and biological cycles, new equilibrium and unknown areas in biology. One of the most important issues to consider is the manner of communication and interaction without the biological and ecological background of this "secondary nature or new nature" with each other and with the "primary nature" or existing nature, and in the meantime, of course, the possibility or impossibility Symbiosis is a point of contention between these two areas, because the establishment of “Biological apartheid” is not considered a solution to the dilemma of this area.

Keywords: Biological Supernatants, Secondary Nature, Biological Synthetics, Biological Apartheid, Human Dignity

INVITED SPEAKERS

IS1 Pneumolysis in COVID-19: pathophysiology and high altitude implications

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Severe lung compromise in COVID-19 patients often evolves to life-threatening hypoxemia. The mechanisms involved are not fully understood. Their understanding is crucial to improve the outcomes. Initially, past-experience lead to the implementation of standardized protocols assuming this disease would be the same as SARS-CoV. Impulsive use of ventilators in extreme cases ended up in over 88% fatality. Medical and physiological high altitude acute and chronic hypoxia experience with COVID-19 hypoxemia grants a new insight. A pathophysiological analysis is performed based on literature review and histopathological findings. Application of the Tolerance to Hypoxia formula = Hemoglobin/$PaCO_2$ +3.01 to COVID-19, enlightens the critical hypoxemia. ***Pneumolysis*** is an acute infectious disease marked by ***inoculation of the Coronavirus-2 RNA or other viruses within the pneumocytes, viral*** intra-cellular replication and ***pneumocyte destruction (***generally not compromising the bronchioles), accompanied by ***inflammation, edema,*** capillary vasodilatation, the formation of hyaline membranes, and micro-abscesses, nuclear atypia, characterized by non-productive cough, initial silent hypoxemia, and sudden onset of difficulty in breathing, fatigue, tachycardia and rapid progression to a reduced lung gas exchange area and subsequent fibrosis. First known use: Jun 13, 2020.

The adequate interpretation of the histopathological lung biopsy photomicrographs reveals these alterations. The three theoretical pathophysiological stages of progressive hypoxemia (silent hypoxemia, gasping, and death zone) are described. At high altitude, normal low oxygen saturation (SpO_2) levels (with intact lung tissue and adequate acid-base status) could be considered *silent hypoxemia*. Several factors influence a lower incidence of COVID-19 at high altitude. At sea level, in COVID-19, the *silent hypoxemia* starting at SpO_2 =< 90% (comparable to a normal SPO_2 {88-92%} at 3,500m) suddenly evolves to critical hypoxemia. This, as a consequence of progressive *pneumolysis* + inflammation + overexpressed immunity + HAPE-type edema resulting in pulmonary shunting. The proposed treatment is based on the improvement of the Tolerance to Hypoxia (Hemoglobin factor), inflammation reduction, antibiotics, rehydration and anticoagulation if required. Understanding the pathophysiology of COVID-19 may assist in this disease's management.

IS2 Applying behavioral insights to control COVID-19 epidemic in I.R. of Iran

Seyed Abbas Motevalian -*Professor of Epidemiology, Iran University of Medical Sciences . E-mail: amotevalian@iums.ac.ir*

The trend of epidemic changes in COVID-19 is influenced by the trend of changes in people's behavior. Understanding the process and planning properly to control the epidemic requires correct and accurate information about people's behaviors and the trend of its changes. In the COVID-19 Population Survey of Iran (COPSIR study), the trend of changes in the behavior of the Iranian adults in relation to COVID-19 has been examined. Serial cross-sectional studies in 9 consecutive waves with telephone interviews have been carried out on Iranian adults aged 18 years or older. The survey instrument is adapted from German COSMO (COVID-19 Snapshot MOnitoring) study. In each wave, 515 individuals and 4605 in total participated in the study. Knowledge about COVID-19 symptoms, routes of transmission, and its preventive measures among Iranian adults was high and stable in all nine waves of the study, with little increase in knowledge about the symptoms. Risk perception and severity perception of Iranians was generally lower than expected, with a little increase in waves 7 to 9 (July 2020 to February 2021). Preventive behaviors were high and constant in the first four waves (April to May 2020) with a decrease in 5th to 7th waves (May to July 2020). The most trusted and mostly used media for receiving COVID-19 related information was national television channels. Low perceived risk caused people to downplay the risk of COVID-19. So, by easing social restrictions, Iranians quickly put aside their preventive behaviors which led to the second and third waves of COVID-19 epidemic in Iran. Risk communication strategies and public health measures must be strictly followed to prevent the fourth wave or reduce its severity.

IS3 Emission, effects and mitigation of greenhouse gases (GHGs) in agriculture

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The main sources of Green House Gases (GHGs) emission are burning of fossil fuels (for industrial use, transportation, electricity etc.), clearing the land to produce wood (domestic, industrial, or crop husbandry etc.), industrial developments, energy sector and agriculture. *Carbon dioxide*, *methane*, *nitrous oxide*, *ozone* and Chlorofluorocarbons (CFCs) are the primary GHGs in our atmosphere. GHGs absorb and emit the solar radiations within thermal infrared range which is the basic cause of greenhouse effects. It is reported that since pre industrial, there is an increase of 31%, 151% and 17% in CO_2, CH_4 and N_2O, respectively.

Land clearing for crop husbandry is responsible for high CO_2 in atmosphere. Land clearing disturbs the soil and increases the organic matter decomposition which results in release of high quantity of CO_2. It enhances the soil erosion which limits the soil's ability to uptake carbon. Crop husbandry includes the slash and burning the residues which further add up CO_2 in the atmosphere. Methane (CH_4) is produced as by product in several agricultural activities. Rice culture, livestock and termite mounds are the main sources of methane emission while biomass burning also contributes significantly. Standing water with a lot of organic water creates anaerobic conditions where anaerobic bacteria utilize CO_2 as source of O_2 and release huge amount of methane. In traditional rice culture, rice crop is submerged for four months a year. This practice adds 50-100 million tons of methane in atmosphere and reported to be the largest anthropogenic source of methane. Termite mounds are a significant methane release process in tropics due to abundant plant residues. The bacterial activity in the animal's stomach and intestine (particularly the cows and buffalos) is another source of methane emission (about 100 million tonnes per year) to atmosphere. Further the decomposition of livestock wastes is another significant source of methane emission. N_2O is the third important GHG released by agriculture. Bacteria in low/zero-oxygen environments convert nitrite (NO_3) to nitrogen gas (N_2) and nitrous oxide (N_2O) under anaerobic conditions. Inorganic fertilizers and animal manure are the main source of N_2O release in the soil.

Among the cereals, rice is the main staple food more than half of world population, mainly in Asia and Africa. To feed 9 billion world population, 25 % increase in rice yield is required in 2050. Tropics contribute 75 % of world rice production. The effects of climate change are expected to be more severe in tropics. Intergovernmental Panel on Climate Change (IPCC) reported an increase in global temperature (0.6 °C) during last century and predicted a further increase about 5 °C during this century. This climate change will affect the rice productivity severely due to sensitivity of critical stages of rice crop. The optimum temperatures for germination, tillering, pollination and ripening are 18-40 °C, 25-31 °C, 30-33°Cand 20-29 °C, respectively. The current temperatures are already approaching critical levels in different countries e.g. Pakistan/ India (September, October), South India (April, August), East India/Bangladesh (March–June) in subcontinent. Several researchers reported negative effects at different growth stages which resulted poor rice productivity due to low germination, poor tillering, high panicle sterility etc. Water shortage, increased soil salinity, flooding, increased risk of disease infestation and pest attack and enhanced rice-weed competition are the others outcomes of climate change. These factors will affect the rice productivity severely. To face the future challenges in rice productivity, development of tolerant varieties to environmental stresses (temperature, salinity, lodging, and drought) and biotic stresses (disease and insect-pest resistance) is only option either through hybridization or genetic transformation. Climate smart agriculture (CSA) is an integrated approach to manage landscapes, croplands, livestock, forests, and fisheries that address the interlink challenges of food security and climate change with aim to achieve simultaneously achieve three outcomes; increased productivity, enhanced resilience and reduced emissions. Emission of methane may be reduced by keep low numbers of animals with high productivity of milk and meat, establishment of rangelands for grazing, generation of biogas and biofertilizer form the animal wastes. Similarly, dry rice culture may be adopted by introducing the climate resilient varieties with tolerance to biotic and abiotic stresses. The nitric oxide emission may be reduced by intruding the organic fertilizers, optimum dose and right time for application of chemical fertilizers, increasing the soil organic matter, use of slow-release fertilizers. However, CO_2 may be managed by AGRO FORESTORY, encouraging the home gardening, rooftop gardening, urban farming etc. Last but foremost, a comprehensive awareness campaign may be initiated worldwide to raise such a generation who can be CLIMATE GUARDIANS, as mindset and attitudes would be the key elements in mitigation process.

IS4 Characterization of the complete chloroplast genome sequence of the IRLC species and its phylogenetic implications

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Fabaceae (legumes) are the third largest family of angiosperms which have shown the most structural variation. Currently accepted classification of the legumes based on plastid gene *mat*K includes six subfamilies: Caesalpinioideae, Cercidoideae, Detarioideae, Dialioideae, Duparquetioideae, and Papilionoideae. Gene order and gene content in plastomes of all subfamilies except Papilionoideae are highly conserved and similar to the ancestral angiosperm genome organization. Papilionoideae exhibit numerous rearrangements and gene/intron losses and have smaller genome. The remarkable loss of the one of the plastid inverted repeats in the inverted repeat lacking clade (IRLC), a largest legume lineage, is an example of genome variation in papilionoids. This clade comprises 52 genera (e.g., *Wisteria*, *Glycyrrhiza*, *Astragalus, Colutea, Trifolium, Lathyrus, ...*) and ca 4000 species divided into eight tribes. Furthermore, plastome in IRLC show other rearrangements of gene order and gene content. For example, *ycf*4 in some species of *Lathyrus* and *Pisum* (both from the tribe Fabeae) is either absent or a pseudogene. Comparative analysis of the chloroplast genomes across the IRLC revealed that *ycf*1 gene, which is located in the IR region, is more variable than *mat*K in many taxa and thus suitable for molecular systematics at low taxonomic levels. Furthermore, the monophyly of the IRLC and all its tribes is in accordance with all previous studies.

IS5 DNA Barcoding: An Effective Molecular Tool to Identify Gene Expression Host Organisms

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Lemnaceae family members (commonly called as duckweed) are characterized as the world's smallest and fastest growing flowering plants. It consists of monocotyledonous aquatic members, representing a vast range of potential applications like production of feed and food, biofuel and biogas alongside the molecular biotechnology, because of possessing a noteworthy capacity of huge biomass production. The first stage of all of the above-mentioned approaches is to obtain the appropriate species selected based on suitable strategies. Since a high degree of reduction in their anatomical complexity and minimalization of the morphological units make it hard to identify the closely related species of duckweeds based on morphological markers, different molecular taxonomic tools are introduced to require a solution of the problem. DNA barcoding is one the molecular taxonomy techniques using sequences of plastidic DNA fragments. Till now, there is no evidence on molecular identification of the Iranian native duckweed species based on sequence polymorphisms. In this study, we collected some Iranian samples and applied divergent marker categories such as non-coding spacers to achieve reliable successful identification based on direct sequence comparison. Our final goal in this project is to present identified optimal and sustainable strains of the duckweed with acceptable relative growth rate and doubling time in which recombinant pharmaceuticals can expressed in additional related studies.

IS6 The fate of silver nanoparticles in *Lycopersicon esculentu*

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The advancement of nanotechnology has resulted in the application of nanomaterials in a diverse area including medicine, industry, or agriculture. The vast application of nanomaterials and their potential release into the environment can affect soil and water quality, plants, and subsequently human health through the food chain. Silver nanoparticles (AgNPs) are among the most commonly used nanomaterials. AgNPs released into the environment can be oxidized and be transformed into the ionic form (Ag^+) which is more interactive than the particulate form. This study investigated the molecular and physiological responses in tomatoes (Lycopersicon esculentum) exposed to 30 mg/L AgNPs (20nm) for seven days. Plants exposed to $AgNO_3$ and Hoagland media were subsequently used as positive and negative controls. To determine the concentration of Ag and to distinguish between the particulate and the ionic form of Ag in plant tissues an ICP-MS (NEXION

350X) equipped with a nano-detector was used. The concentration of H_2O_2 and MDA, as well as the activity of antioxidative enzymes catalase and peroxidase, were investigated to determine the level of oxidative stress in plants. The expression of membrane transporters H^+-ATPase and V-ATPase as well as the expression of enzymes catalase and mitochondrial IDH were studied using RT-q-PCR. Immunofluorescent labeling was used to study the expression of proteins. The analytical analysis showed that both particulate and ionic forms of silver were accumulated in plant tissues confirming that AgNPs can be oxidized in the environment. The physiological analysis showed that the oxidative stress caused by Ag^+ was more significant than the particulate form. The expression of H^+-ATPase was significantly upregulated upon exposure to AgNPs and $AgNO_3$ compared to the control group. This study suggests that the higher concentration of Ag^+ in plants exposed to all forms of silver changed the electrochemical potential of cells and resulted in the upregulation of H^+-ATPase to send more H^+ out of cells. This study provides invaluable information to better understand the fate of metal-based nanomaterials and their effects on plants.

Keywords: Analytical analysis, Membrane transporters, Nanoparticles, Oxidative stress

IS7 Plant life on gypsum: living at the edge

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The occurrence of special substrates such as saline, serpentine, dolomite or gypsum soils, with a distinct flora associated to them, has puzzled naturalists for centuries. Some of these substrates, and the adaptations displayed by plants to cope with them, are quite well understood. Such is, for example, the case of saline and serpentine soils, where distinct traits have been identified as characteristic of plants adapted to them. However, other substrates like gypsum soils are still poorly understood, and the mechanisms displayed by plants to survive on them pose intriguing questions to ecologists. Gypsum ($CaSO_4 \cdot 2H_2O$) is a rock-forming mineral that also occurs in soils. Gypsum outcrops are widespread throughout the Earth, being present in the five continents. They are particularly prevalent in arid and semi-arid regions of Africa, Western and Central Asia, where they account for ca. 40%, 75% and 25% of the total surface, respectively. Gypsum is also a key water-holding mineral of Mars, and a targeted substrate in the search of extra-planetary life. Due to its particular physical and chemical properties and the aridity typical of the areas where gypsum soils develop, this type of soil poses very restrictive conditions to plant life, yet it hosts a highly diversified flora, rich in endemic and rare species. This talk is an invitation to discover the most recent advances on the ecology and evolution of gypsum plants throughout the world. We will take a closer look at the diversity of gypsum plant communities, examine the different limitations that restrict plant growth on gypsum soils, explore the various mechanisms displayed by plants to cope with them and analyze the dangers that threaten the conservation of these unique environments.

IS8 Using Protected Areas to Secure Forest Tree Genetic Diversity in Hyrcanian forest (Application to the endemic and endangered *Populus caspica*

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The planning of the protected areas and their effectiveness in maintaining the genetic diversity of species remain challenging. The severe degradation and anthropogenic activities in plain regions of the Hyrcanian forest and designing several national parks that have been proceeding for at least three decades provide an opportunity to assess the role of protected areas in conserving genetic diversity. *Populus caspica* Bornm. is an endemic species from Hyrcanian forests and classified as endangered in Iran. For this study, 359 trees from 20 populations (including three national parks from eastern, central, and western parts) distributed throughout the plain region of the Hyrcanian forest, were selected to evaluate the genetic diversity parameters using 14 microsatellite markers. The highest allelic richness, private alleles, and gene diversity were observed in populations located

within national parks, i.e. Ashrafieh, Noor and Loove. Significant reduction in effective population size and a genetic bottleneck were not observed in popualtions in national parks, while about 50 percent of other populations (8 from 17) are under bottleneck effect. STRUCTURE analysis showed the existence of at least two genetic clusters with strict geograohic background but estimated average gene flow was low - the average proportion of the migrants detected among populations was 0.008. We concluded that designing a protected area for the maintenance of the genetic diversity of *Populus caspica* is a very good strategy to reduce the risk of the extinction of this species in the near future.

Keywords: Caspian poplar, endemic species, Genetic conservation, Protected area, Hyrcanian forests

IS9 Molecular Biophysics of SARS-CoV-2 virus and its susesepibiliy

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SARS-CoV-2 corona virus that caused the Covid-19 Pandemic, is composed of the lipid bilayer membrane and several constituent antigenic proteins including; Spike, Orf3a, and other envelope (E) proteins that can be used as potential targets for treating the virus in a non-clinical and genetically manner. The known atomic structure of the mentioned molecules at atomic level has made it possible to take biophysical approaches focusing on the charges, intra and intermolecular electrostatic interaction and forces, as well as their physico-chemical interactions with the medium co-ions and counter-ions, pH, temperature and water status as the neutralizing, destructing and treating agents. Furthermore, due to the atomic and molecular characteristics and configuration of virus, it can be considered likewise solid state materials and expect to affect its electrical status by exposing it to external electrical, magnetic and elecromagnetic fields for the detection and inactivation purposes. The conformation of the spike protein and its functional antigenic status is achieved and stabilized by intra-molecular and inter-molecular forces that are susceptible to the external fields. Here, the ultrastructure of the virus will be discussed and different approaches considered to study and treat its membrane and constituent proteins for detection and inactivation purposes are presented. Our voltage clamp experiments have shown EMF effect on the lipid membrane integrity and voltage-dependent channel activities leading to pore formation and ultimate destruction of the membrane. Furthermore, the applied EMF caused decreased voltage sensitivity and long lasting inactivation of the voltage dependent OmpF voltage gated channel. Accordingly, although, the actual contribution of the voltage-gated rectifier OrfA channel is not fully known yet, we expect that exposing it to the external EMF can interfere with its activity and possible deviation of the virus functionality and ingrity and corresponding response be used for detection purposes.

Keywords: Biophysics, SARS-CoV-2, Covid-19, EMF, Membrane, Voltage Clamp, Virus

IS10 Role of HMGB1 and decorin in preeclampsia

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Preeclampsia (PE) is a common, pregnancy-specific disease that belongs to the family of “hypertensive disorders in pregnancy” and is characterized by hypertension, proteinuria and other systemic disturbances at or after 20 weeks of gestation. PE is a major contributor to maternal and fetal morbidity and mortality. Eventhough the precise mechanisms of PE pathogenesis remains unknown, it is widely acknowledged that the placenta is the central organ in its pathogenesis, and PE is caused by maternal responses to abnormal placentation and associated with an increased inflammatory state. Pre-eclampsia is closely related to maternal malfunction of the vasculature and is a major cardiovascular risk for the duration of the pregnancy, post-parturition and in later life. Also, endothelial dysfunction may contribute to elevate the peripheral resistance of blood vessels, which forms an essential component of the maternal syndrome. This study is aimed at the study of sterile immunomodulatory profile of normal-pregnant versus pre-eclamptic subjects and focuses on the identification of potential biomarkers for the early detection of PE and the changes in the hemodynamic parameters leading to the pathophysiology of PE. There have been a lack in the proper understanding of the pathophysiology of PE & hence, no effective therapy or treatment is available so far. The levels of NO were significantly decreased in PE as compared to healthy pregnant subjects. As NO is a potent vasodilator, when its level in circulation

decreases, the contraction of blood vessels increases which leads to elevation in the blood pressure. In our study, we observed that there is a marked increase in the expression level of SI markers (DAMPs) such as HMGB1, HSP90, vWF and DCN in plasma as well as in the placental tissue. From these observations, we can conclude that these inflammatory markers play an important role in the commencement of the pathophysiology of PE. We observed a decreasing trend in all SI markers when the pre and post-delivery samples of PE patients were compared, however significant reduction was seen only in the case of DCN for the SI markers. Therefore, it can be deduced that the DCN is one of the most important molecules which plays a significant role in the pathophysiology as well as progression of PE. On comparing the biochemical reports of the PE and normal subjects we have found that there is statistically significant increase in the biochemical parameters of the patients versus normal subjects. We observed that certain biochemical parameters such as S. Alkaline phosphate, SGOT, SGPT and protein concentration were significantly increased in PE as compared to healthy controls while no significant change was observed in blood urea and serum creatinine levels. We also analysed the blood parameters from the CBC (complete blood count) reports of patients. On comparing both the reports we observed that the NLR (neutrophil to lymphocyte ratio) was significantly increased in PE as compared to healthy pregnant subjects. On combining all the observations, we can conclude that low levels of NO lead to placental hypoxia which induces DAMPs expression. Increased expression of DAMPs in turn acts as a stimulus for neutrophil activation in increasing the NLR in PE patients

IS11 Oxygen sensing and Lead (Pb) toxicities: Molecular interactions, cell signaling & antioxidant defense

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Hypoxia is one of the most serious factors that can directly impair the function of metabolic pathways in the cell. Cellular hypoxia causes an initiation of hypoxia-response genes responsible for angiogenesis, oxygen transport, and metabolism. Hypoxia leads to alter intracellular chemical microenvironment by increasing calcium concentration ([Ca2+]i), 5-lipoxygenase, lipid peroxidation, cycloxygenase (COX), constitutive nitric oxide synthase (cNOS), leukotriene B4 (LTB4), prostaglandin E2 (PGE2), interlukins, tumor necrosis factor-α (TNF- α), caspases, complement activation heat shock protein 70 kDa (HSP-70), and hypoxia-inducible factor-1α (HIF-1α). Another key molecule within this hypoxia-induced response is the presence of nitric oxide (NO). It is synthesized by nitric oxide synthases (NOS) and its release can be stimulated as a result of inflammatory responses, sympathetic activation and drop in oxygen levels. Interestingly hypoxia and divalent heavy metal like lead (Pb) generates ROS and disturbed oxidant/antioxidant balance which is linked to the transcriptional factor hif- 1α. The results from the author's study showed both divalent cationic heavy metal (Pb) or chronic sustained hypoxia stimulates the production of hif-1α transcription factor and VEGF gene expression in metabolically active tissues in similar molecular mechanism.

IS12 Proteomic dissection of signaling pathways in cancer cells

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Protein interaction networks underlie most cellular processes, and in many diseases, including many cancers, protein networks that mediate signal transduction pathways are inappropriately activated or rewired. We are interested in how mutations alter protein interaction networks, and we are focused on understanding the role of the Wnt signaling pathway in solid tumors using both proteomic and bioinformatics techniques. In this presentation, I will describe our contributions to developing proteomic and bioinformatics approaches as well as our identification of novel protein-protein interactions that drive oncogenesis.

IS13 Integrated Biorefineries

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Biorefineries are industrial plants, which are based on the use of biomass, instead of fossil fuels, for production of fuels, chemical base materials and energy. These are comparable with petrochemical refineries in many aspects of their operations and products. It is said that the era of the fossil fuels is at its end, not because of its ending resources, but because of finding new technologies that are more environmentally friendly and economic. Biorefineries are not yet fully operational but are in the midway. Many exhibition pilot-plants are made and working, while a lot of experimental tests are yet on the way. The carbon is the essential material for production of the organic substances and products. We have an enormous source of carbon in the biosphere in the form of CO_2 of the atmosphere and carbonates of the earth crust. Both of these sources are continuously adsorbed by plants, algae and autotrophic microorganisms by the use of solar energy. The biomass of these organisms has an amount of carbon around 50% percent of its weight. This carbon can be converted into a wide spectrum of useful products like biofuels, bioplastics, organic acids, solvents, etc. Different processes are used for these conversions: physical, chemical and biological. Biological processes are more advanced and produce less environmental problems. The diverse metabolic power of microorganisms is used here to produce the products. Nearly, all of the routine refinery's products can be produced by the biorefineries. In this lecture specifications of the biorefineries and some examples of working ones in the world and Iran will be presented.

IS14 Antimicrobial resistance (AMR) and Role of the laboratory in AMR control

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IS15 Survey of Microorganisms' World in Kerman Desert

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Microorganisms have a crucial role in soil processes. Information about soil microbiota in arid and semiarid area, especially in Iran is limited. The aim of study was to determine microbial diversity of soil biological crusts (SBC) of Khabr and Ruchun National Park. First, microorganisms of SBC were identified through culture-dependent and culture-independent techniques. Then, microbial diversity was tested by Next Generation Sequencing (NGS) technique. After that, nitrogenase activity of the isolated Cyanobacteria strains was determined *via* acetylene reduction and expression of *nif*H gene by using real time-PCR. Next, desiccation stress was performed on the isolated Cyanobacteria and the superior strain was selected. Whole genome of the tolerance strain of Cyanobacteria to the desiccation stress was sequenced. Afterward, its transcriptional response to the desiccation stress was assayed. Finally, by lab modelling of the desert soil inoculated with the selected Cyanobacteria concerning to the nitrogen fixation, the growth of model plant was evaluated. The results indicated that this area has vast diversity of different phylum of microorganisms. Furthermore, changes in the composition of microbial communities due to the climate fluctuations or other stresses can be shown before any changes in chemical and biochemical properties of soil. The soil treated with Cyanobacteria especially when accompanied with chemical fertilizer showed well increasing of model plant growth and improving soil properties as well. The comparative genome analysis showed the presence of genes involved in the biosynthesis of mycosporines, trehalose and phycobilisome. Transcriptomics and comparative genome analysis showed that 397 genes such as genes encoding catalase and chaperons were differentially expressed in response to the desiccation stress. Transcriptomics and comparative genomic studies can open a new window to the adaptation mechanisms of cyanobacteria studies in terrestrial ecosystems.

Keywords: Cyanobacteria, Acetylene Reduction, Real Time-PCR, Nitrogenase Activity, *nif*H, Khabr and Ruchun Park

IS16 The resulting experience of wildlife management and biodiversity conservation to maintain quality habitat in Semnan province

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According to the Koppen-Geiger climate classification, the world is divided into five major climatic regions. Iran's biodiversity is the result of the aggregation of three of these five climatic zones. Dry, temperate and continental climates. The result of this climatic diversity is 197 species of mammals, 535 species of birds, 227

species of reptiles, 21 species of amphibians and 160 species of fishes. Thirteenth century Hijri was a century of rapid development and extensive land use, especially in the plains of Iran. Contrary to the explosive growth of hunting equipment and prolonged droughts, this phenomenon has pushed large populations of the country's biodiversity to the brink of extinction. Semnan province is the only province in the country that has all three major climatic regions of Iran. For this reason, the fate of many animal species, especially in the category of mammals, is tied to the habitats of this province. The Asian cheetah is the rarest cat species in the world. It is the flagship species, the umbrella species, the flag species and the focal species of Iran. Unfortunately, the evidence shows that during these twenty years, the reproduction of the Asian cheetah to the protected area of Turan in Semnan province in other habitats of the world and six of the seven provinces of Iran has been lost and the hope for the return of this species to those habitats is very low. The Asian cheetah is now at the top of the ecological pyramid of Iranian steppe animals, and the removal of such blows will inflict severe blows on the body of this pyramid. Therefore, any effort that leads to the conservation of the remaining population of this species will play an effective role in the population dynamics of other species in the food chain ecosystem. This presentation demonstrates the successful results of the efforts made by the General Department of Environmental Protection of Semnan Province, which has led to the conservation of Asian cheetah regeneration and thus the conservation of other species of the ecological pyramid in three areas and its experiences for use in other habitats. Iran and the world consider it usable.

IS17 Regulatory mechanisms of sperm motility initiation in fishes – a review

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Fish spermatozoon is differentiated into a head, a midpiece and a flagellum. The head does not have the acrosome, and contains nucleus which transferring haploid set of the chromosome into the next generation. Mitochondria, proximal centriole and distal centriole are located in the midpiece. Mitochondria supply energy for the flagellar beating. Both proximal and distal centrioles consist of nine peripheral triplets of microtubules. The distal centriole organizes formation of *the sperm motility apparatus called "axoneme" with "9+2" microtubules structure. Fish spermatozoa are immotile in the sperm duct due to osmolality or presence of high potassium (K^+) ions in the seminal plasma. Spermatozoa motility is triggered in* hypo-osmotic and hyper-osmotic environments in freshwater and marine fishes, respectively. Duration of spermatozoa motility is generally limited to a short period due to adenosine triphosphate (ATP) content. After initiation of motility, percentage of motile spermatozoa, spermatozoa velocity and beating frequency of the flagellum decrease due to rapid depletion of ATP stores. *When motility of spermatozoa activated by a change in the environmental osmolality*, K^+ and water effluxes occur in freshwater and marine fishes, respectively, which trigger spermatozoa motility signaling. Generally, initiation of axonemal beating is associated with an increase in intracellular calcium (Ca^{2+}) ions and pH in spermatozoa of both freshwater and marine fishes, while cyclic adenosine monophosphate (cAMP) remains unchanged. However, it has been shown that axonemal beating is cAMP-dependent in demembranated spermatozoa of salmonid and sturgeon fishes. Extracellular or intracellular stores of Ca^{2+} supplies required Ca^{2+} concentration for axonemal beating. Several axonemal proteins have been so far identified that are activated by Ca^{2+} and cAMP, directly or mediated by protein kinase C and protein kinase A, respectively. The present study reviews differences and similarities in complex regulatory signals controlling spermatozoa motility initiation in fishes, and notes physiological mechanisms that await elucidation.

Keywords: ATP, Axoneme, cAMP, Ions, pH, Osmolality, Seminal plasma

IS18 Making Meaningful Decisions for Life: Epigenetic Monoallelic Gene Expression in Mammals

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Monoallelic gene expression or allelic exclusion, once known to be restricted to random X chromosome inactivation in female mammals, seems to be more common than thought with crucial effects in embryonic development, apparently as a way to increase the repertoire of variations in gene expression patterns. Monoallelic expression of immunoglubin genes and T-cell receptors is responsible for huge diversity of

antibody production and antigen recognition, respectively, through DNA rearrangements. However, other patterns of monoallecic gene expression all come in effect via epigenetic mechanisms employ on similar genetic backgrounds. Among these phenomena, *mammalian X chromosome inactivation* in female tissues and the parent-specific *genomic imprinting* considered as classic paradigms for epigenetic gene regulation. While X chromosome inactivation occurs via "*random choice*", however, genomic imprinting exhibits a *deterministic choice* for the expression/repression of the respective genes through a parent- of- origin specific pattern during gametogenesis. Interestingly, X chromosome inactivation shows both patterns of random choice in mammalian somatic tissues, the paternally imprinted form of X chromosome inactivation occurs in marsupials, and also in rodents and human placentas. The last category encompasses stochastic allelic exclusion of a plethora of different autosomal genes, including genes for odor sensing in olfactory sensory neurons, as it seems the rule of one neuron-one receptor gene is essential for odor perception. All kind of epigenetic monollelic gene expression share similar epigenetic signatures, including the expression of long noncoding RNAs, DNA methylation and extensive chromatin modifications, polycomb protein bindings, etc. Also, their organization along the genome and mechanisms involved show considerable parallels. In current lecture, along with a brief introduction of various instances of epigenetic allelic exclusion, its various roles in growth and development of embryos and its some evolutionary implications are discussed.

Keywords: Allelic exclusion, Monoallelic gene expression, X-chromosome inactivation, Genomic imprinting, olfactory receptor genes

IS19 Consequences of Simulated Microgravity in Biosystems: Structural Effects and Cellular morphology

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Enhancements in technology have offered extraordinary opportunities for the human to travel more rapidly on or near the surface of the Earth. The primary goals of space travel are the search for life, planetary exploration, and more significantly safe return to Earth. Humans on Earth are adapted to the constant gravitational force (9.8 m/S2). Nevertheless, in space, gravity is much weaker than on Earth which is known as microgravity. Presently, investigations on the growth and development of cells as well as bio-macromolecules structure exposed to microgravity, as biophysical force, is a hot topic in cell biology and astronauts' health. Consequently, we first investigate the probable impacts of simulated microgravity on the structure of human serum albumin (HAS), histone H3, and DNA by multiple spectroscopic techniques. Subsequently, we analyzed the effects of simulated microgravity on the growth of MCF7 and T47D breast cancer cell lines. Our results exposed that the structure of HAS, histone H3, and DNA subjected to simulated microgravity changed significantly. Furthermore, our results showed that microgravity simulation did not have a remarkable effect on the viability of cells, but cells were grouped and linked to each other making multicellular spheroids. The findings achieved from this investigation can open fascinating research lines in biophysics, astrobiology, and biology and can be utilized to enhance survivability and life quality for space travelers.

Keywords: Astrobiology, Cell viability assay, DNA structure, Protein structure, Microgravity

IS20 Bone Tissue Engineering; Advances and Challenges

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Tissue engineering is a multifaceted, interdisciplinary discipline that uses the principles of engineering sciences and natural sciences to repair the structurally and functionally damaged tissues. In order to achieve satisfactory results in tissue engineering, simulation of the natural extracellular environment is essential. To achieve this goal, the development of appropriate cell differentiation protocols as well as scaffold design similar to the natural matrix should be carefully considered. Stem cell differentiation into the bone line is enhanced by many inducers, including biochemical agents, biomechanical stresses, and electrical stimuli. Based on our studies, the synergistic effects of anti-mir221, hydroxyapatite nanoparticles and electrical induction in improving the bone differentiation of mesenchymal stem cells in vivo have been confirmed. Considering the functions and positions

of markers in ossification signaling pathways, it can be concluded that hydroxyapatite cooperates in allocating stem cells to bony progenitors in the early stages of ossification while electrical stimulation to more mature cells in achieves functional phenotypes. In general, the study of synergies between different stimuli and the exploitation of interactions in an optimal way can lead to the production of efficient ossification protocols for bone tissue reconstruction and engineering.

Keywords: osteogenic differentiation, electrical stimulation, anti-mir221, hydroxyapatite nanoparticles, regenerative medicine

IS21 The importance of Bioinformatics and Computational Biology in Systems Biology

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Nowadays, a huge amount of data such as multi-omics data including gene expression, DNA sequences, and demographic information are available that need analysis in order to find latent patterns that give rise to solving biological issues. To this aim, state-of-the-arts approaches such as modeling using graph, machine learning, and deep learning can help to find novel methods for modeling biological systems. Some hot topics in this field are drug-drug interaction prediction, precision medicine, and cancer biomarker detection that can be solved by using the mentioned computational strategies. In this lecture, we going to briefly discuss aforementioned topics and explain a computational solution for some of them.

Keywords: Biological networks, Machine learning, Precision medicine, Drug recommendation, Cancer

IS22 Development of artificial enzymes with biomedical and industrial applications; Perspectives and future challenges

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Natural enzymes, most of which are proteins, are catalysts that can speed up chemical reactions rate by reducing activation energy and mediated the biological processes under mild conditions. However, these biomolecules have some drawbacks including the high cost of synthesis, purification and low stability in extreme conditions of pH or temperatures for performing catalytic functions. So, due to these disadvantages and to overcome these limitations, easily synthesized, highly stable and low cost enzyme mimetic from molecules to inorganic nanomaterials have been developed. Developing many manmade enzymes (artificial enzyme mimetics), as alternatives to natural enzymes, using non-protein molecules become an interesting field for researchers. However, the disadvantages of enzyme mimetics are that the catalytic efficiency, specificity, and selectivity are relatively low. To date, many enzyme mimetics have been prepared and have activities analogous to cytochrome P450, serine protease, dioxygenase, phosphodiesterase, lipase, acylase, ligase, hydrolase, aldolase, superoxide dismutase, and nitrile hydratases. Nanomaterials are chemical entities at least one dimension smaller than 100 nm. With such an extremely small size and large surface area per unit of volume, nanomaterials have characteristic physical, chemical, photochemical, and biological properties that are very different from those of the same material in bulk form. Nano-based materials due to their physicochemical properties relative to bulk materials including large surface/volume ratios, optically active, mechanically strong and chemically reactive have various applications in different areas, including biosensing, catalysis, textile industry, drug delivery and water treatment. Enzyme mimetic behavior of some nanomaterials is one of the most interesting features of these materials which make nanomaterials as potential alternatives for natural enzymes. Nanomaterials, with enzyme mimic activities, which are called nanozymes, have gained much more attention among the researchers during the past decades because of their unique properties such as low-cost, high stability and simple preparation. Also, nanozymes have their catalytic activity even in the harsh environmental conditions of pH and temperatures. Nanoparticles' catalytic activity and intrinsic ability in generating or scavenging reactive oxygen species (ROS) in general can be used to mimic the catalytic activity of natural enzymes. To date, many nanoparticles with enzyme-like activities have been found, potentially capable of being applied for commercial uses, such as in biosensors, pharmaceutical processes, and the food industry. The reported enzyme-like activities for nano-sized materials includes the superoxide dismutase-like (SOD like), oxidase-like, catalase-like, glucose

oxidase-like and peroxidase-like activities. Also, enzyme-mimic activity of some metal-protein complexes have been reported, too. In general, artificial enzyme mimetics have been developed by using different non-protein molecules such as metal-complexes, metal-nanomaterials, polymeric and supramolecules.
Key Words: Artificial enzymes, nanomaterials, nanobiosensors, enzyme mimetic acticity

IS23 Biophysical understanding and control of living systems

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The physical nature and biophysics of the living systems in micro-organisms, plants and animals make them very susceptible to the various external irradiation sources including; electric, magnetic and electromagnetic fields. They also possess and make use of their own intrinsic fields for functioning, healing, communication and defend purpose. This is the way we can detect and recognize their functional state and control and manipulate their activities at organ, cellular, molecular, atomic and even subatomic levels. Clinical application of these very characteristics has mad us use EEG, EMG, EKG and Squid Magnetometers to detect the functional state of brain, muscles, heart and brain by means of their bioelectric and biomagnetic activities and status in a non-invasive and real time manner in animals and human being. Dolphins, sharks, electric Eeles, bats, honey bees and others rely on their intrinsic fields potentials to communicate, detect, navigate, defend and manage their life. In plants, squeezing, cutting and burning of the leaves have caused corresponding electrical signals comparably to electrical signals in animals nervous systems to transfer the information across the plant body. Magnetoproteins in certain strains of bacteria makes it possible to navigate using Earth magnetic field in oceans. Water, forming about 70% of the biological systems, possess magnetic momentum, electrical dipole characteristics, diamagnetic nature and provides appropriate platform for polyelectrolyte charged biological macromolecules such as enzymes, pumps, channels, robotic nano-motor proteins and so on to take appropriate conformation and dynamics and function properly. Here, the importance of biophysics in understanding the structure and function of living organisms and its application in the detection, control and treatment is discussed at atomic, molecular, cellular, organ and whole body levels. It will be shown that the above knowledge is necessary for all the undergraduate and postgraduate students in various fields of biological sciences to enable them solving corresponding problems living organisms are suffering from on the Earth in an efficient manner.
Keywords: Biophysics, Zoology, Botany, Microbiology, Environment, Clinical Sciences, Electric, Magnetic, Electromagnetic fields

IS24 Signaling pathway modeling for systematic study of diseases

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Signaling pathways are a sequence of actions inside a cell, usually responsible for the transmission of a message from outside world to the nucleus. Finding disease-related signaling pathways is helpful in discovering the mechanism of the diseases, creating better drugs, and personalizing drugs for patients. Different Pathway analysis methods have been proposed to find and rank signaling pathways perturbed in a given phenotype. In this article, we review the approaches proposed by our research team to analyze the signaling pathways. These approaches are based on graphical models and formal methods for modeling signaling pathways. In the first method, a new pathway enrichment analysis method, BNrich, is introduced. This method has been applied on data related to systemic lupus erythematosus (SLE), to underscore key molecular characteristics of SLE pathogenesis, which may serve as effective targets for therapeutic intervention. After that, two formal methods are introduced, the first one models the signaling pathways using PRISM language and assign weights to gene-gene interactions, and the second uses Petri net for modeling, which have advantages over other formal methods, because of its graphical and hierarchical structure. Based on these proposed methods, two tools called FoPA and PAPet have been developed, in Python and R programming languages.
Keywords: signaling pathway, graphical model, formal method, petri

IS25 Design of antimicrobial and anticancer peptides based on membrane and peptide biophysical properties

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Peptides are a unique group of pharmaceutical compounds whose intrinsic function and nature in regulating the cellular and physiological processes of the human body have made it possible to mimic and benefit from these characteristics in the treatment and drug design. Therapeutics peptides due to their small size, ease of synthesis, ability to penetrate cell membranes, high activity, specificity and biological and chemical diversity are suitable candidates for the treatment of many diseases. Antimicrobial and anticancer peptides are a group of therapeutic peptides that in addition to antibacterial, fungal, and viral properties can affect the immune system and have an effective role in the removal of cancer cells. Due to the expansion of databases in the field of therapeutics peptides, the use of computational methods such as artificial intelligence and machine learning has made it possible to design and modify the performance of these peptides. The cell membrane is the first barrier to penetrate and binding the factors that cause cell destruction. Changing the membrane content and its physical properties determines how the therapeutics peptides interact with the membrane. The interactions between proteins and membranes play critical roles in signal transduction, cell motility, and transport, and they are involved in many types of diseases. Molecular dynamics (MD) simulations have greatly contributed to our understanding of protein–membrane interactions. In this study, the binding, penetration, and interaction of natural and designed antimicrobial and anticancer peptides with different membranes was investigated by the molecular dynamics simulation. All the simulations were run for at least 200 ns using the GROMACS package and then peptide penetration in the membrane was evaluated by different analyses. The results show that the penetration rate, mechanism of action of the peptide, and interaction peptide with membrane depends on the characteristics of the peptide such as sequence length, hydrophobicity, charge, peptide orientation on the membrane, amino acidic composition, and its concentration. The lipid composition of different membranes, the presence of cholesterol in the membrane, and fluidity and symmetry in the membrane will be important factors affecting the interaction of peptides with membrane.

Keywords: molecular dynamics, membrane, therapeutics peptides, penetration

IS26 Pan-cancer analysis of microRNA expression profiles highlights microRNAs enriched in normal body cells as effective suppressors of multiple tumor types

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MicroRNAs (miRNAs) are frequently deregulated in various types of cancer. While antisense oligonucleotides are used to block oncomiRs, delivery of tumour-suppressive miRNAs holds great potential as a potent anti-cancer strategy. Here, we aim to determine, and functionally analyse, miRNAs that are lowly expressed in various types of tumour but abundantly expressed in multiple normal tissues. By compiling all publicly available miRNA profiling data from The Cancer Genome Atlas (TCGA) Pan-Cancer Project, we reveal a small set of tumour-suppressing miRNAs (which we designate as 'normomiRs') that are highly expressed in 14 types of normal tissues but poorly expressed in corresponding tumour tissues. Interestingly, muscle-enriched miRNAs (*e.g.* miR-133a/b and miR-206) and miRNAs from *DLK1-DIO3* locus (*e.g.* miR-381 and miR-411) constitute a large fraction of the normomiRs. Moreover, we define that the CCCGU motif is absent in the oncomiRs' seed sequences but present in a fraction of tumour-suppressive miRNAs. Finally, the gain of function of candidate normomiRs across several cancer cell types indicates that miR-206 and miR-381 exert the most potent inhibition on multiple cancer types *in vitro*. Overall, our results reveal a pan-cancer set of tumour-suppressing miRNAs and highlight the potential of miRNA-replacement therapies for targeting multiple types of tumour.

Keywords: tumorigenesis, cancer cell, miRNA, cell viability, proliferation

IS27 From Birth to Birth

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Newborn screening is the practice of testing every newborn for certain harmful or potentially fatal disorders that aren't otherwise apparent at birth. With a simple blood test, doctors often can tell whether newborns have certain conditions that eventually could cause problems. Although these conditions are rare and most babies are given a clean bill of health, early diagnosis and proper treatment sometimes can make the difference between lifelong impairment and healthy development. **Child package** A successful future begins when parents understand and devote themselves to develop the potential their child possess since birth. The Inborn Talent Genetic Test (ITGT) helps parents like you to discover your child's talents that may not be obvious at a young age along with personality traits that they have. Knowing your child's genetic make-up allows you to take control of their development to nurture their talents. It also allows you to intervene in their weaknesses at an early stage before it takes root in your child. With the career profiling report that comes with the genetic test, this test package is the roadmap for you to plan your child's future towards success. **Preconception Gene Profile** is a genetic test aimed at prospective parents to determine if they are **carriers** or not for certain hereditary diseases. Preconception Gene Profile allows establishing the genetic risk of having affected offspring and, thanks to adequate genetic counselling, offering to the prospective parents the different **reproductive options** available according to their situation, in a personalized manner. **Non-Invasive Prenatal Tests (NIPT)** which allos the genetic analysis of the fetus early in pregnancy by carrying out a fetal genetic analysis using a maternal blood sample that contains cell-free fetal DNA. SG Baby Test is designed to assess the risk of the fetus of being a carrier of aneuploidy (abnormal number of chromosomes) **Multifactorial Disorders Nutrition and sport Skin and beauty Cancer Genetic ancestry** testing, or genetic genealogy, is a way for people interested in family history (genealogy) to go beyond what they can learn from relatives or from historical documentation. Examination of DNA variations can provide clues about where a person's ancestors might have come from and about relationships between families. Certain patterns of genetic variation are often shared among people of particular backgrounds. **DNA paternity** testing determines the biological father of a child. We all inherit our DNA from our biological parents — half from our mother and half from our father. A DNA paternity test compares a child's DNA pattern with that of the assumed father to determine if there is a match.

IS28 Scale-up Production of Liver Organoids

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Liver organoids (LOs), are attracting growing interest for drug screening and disease modeling or transplantable constructs for tissue regeneration. Hepatocytes, the key component of LOs, isolated from liver or generated by differentiation of pluripotent stem cells (PSCs). PSCs are preferable because of their availability, scalability, and potential for personalized treatments. However, maturation of the PSC-derived hepatocytes to functional unites in LOs has yet remained challenging. Incorporation of cell-sized microparticles (MPs) derived from liver extracellular matrix could provide a tissue-specific microenvironment for further maturation of hepatocytes inside the LOs. The MPs were fabricated by chemical cross-linking of a water-in-oil dispersion of digested decellularized liver tissue. These MPs were mixed with human PSC-derived hepatic endoderm cells, human umbilical vein endothelial cells and mesenchymal stromal cells to produce homogenous bioengineered LOs (BLOs). BELOs showed enhanced maturation of hepatocytic specific genes and function e.g., CYP activities, Alb secretion and metabolism of xenobiotics. Efficient hepatic maturation and integration resulted after *in vivo* and *ex ovo* transplantation either. Ectopic transplantation of BELOs in mice with acute liver injury improved survival rate. In conclusion, MPs incorporated in BLOs improved maturation of hepatocytes compared to LOs. BELOs represents a novel tool for drug screening, toxicology and potential translational applications. Moreover, this approach could be likely implemented as a versatile strategy to produce functional organoids from different sources.

Keywords: Liver organoid, Tissue specific Microparticle, Pluripotent stem cell, Hepatic differentiation, Tissue engineering

IS29 Structure function relationship in active and inactive Apaf-1 in apoptosome formation

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In multicellular organism, apoptosis is one of the programmed cells death pathway in which is vital for development and regulation of homeostasis. During apoptosis and other programmed cell death pathways formation of large protein complexes is one of the main hallmarks. We have used split luciferase complementary assay to monitor protein-protein interactions in mentioned complexes like apoptosome, necrosome and inflammasome. During apoptosis, apoptosome formation is the main bottleneck for cell death progress, in which Apaf-1 is an adaptor that activates caspase-9. Structural studies suggest that normally Apaf-1 is held in an inactive conformation (Latent form) by intramolecular interactions between Apaf-1's nucleotide binding domain and one of its WD40 domains (WD1). Based on molecular model of Apaf-1 activation, cytochrome *c* binds to sites in WD1 and in Apaf-1's second WD40 domain (WD2), moving WD1 and WD2 closer together that allows Apaf-1 to bind dATP or ATP and to form the apoptosome then activates caspase-9. We investigated the effect of one WD domain (Apaf-1 1-921) deletion on Apaf-1 interactions and caspase cascade activation. Trucated Apaf-1 (1-921) could not activate caspase-9, even in the presence of cytochrome *c* that suggest a single WD domain is sufficient to lock Apaf-1 in an inactive state and that this state cannot be altered by cytochrome *c*.

IS30 Applications of integrative biology to address global challenges

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As the name "Integrative Biology" reflects the belief that the study of biological systems is best approached by incorporating many perspectives like communicative and integrative biology, cellular biology, molecular biology, tissue biology, developmental biology, evolutionary biology, computational biology, structural biology, mathematical biology, and integrative and comparative biology. We bring together a diversity of disciplines that complement one another to unravel the complexity of biology. The concept includes anatomy, physiology, cell biology, biochemistry and biophysics, and covers all organisms from microorganisms, animals to plants. Our broad range of expertise includes cell biologists, geneticists, physiologists, behaviorists, morphologists, microbiologists, computational biologists, systems biologists, structural biologists, ecologists, biophysicists, and biotechnologists. IB is a multi- and interdisciplinary approach for researches using experimental or computational quantitative technologies to characterize biological systems at the molecular, cellular, tissue, and population levels. It mainly included investigations that contribute to a quantitative understanding of how component properties at one level in the dimensional scale (nano to macro) determine system behavior at a higher level of complexity. Today, more than ever, biology has the potential to contribute practical solutions to many of the significant challenges confronting the world. IB for the 21st Century recommends greater integration within biology, and closer collaboration with physical, computational, and earth scientists, mathematicians, and engineers be used to find solutions to five vital societal needs: sustainable food production, climate change, ecosystem restoration, optimized biofuel production, and improvement in human health.

IS31 Ecological Responses of Algal Community to Hydrological Changes in the MacKenzie River, Australia: Implications for River Basin Management

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Today, many rivers and wetlands have been heavily regulated to ensure adequate provision of water resources for anthropogenic uses. Aquatic ecosystems, especially those in arid and semi-arid regions, are experiencing severe stress due to the increasing demands on the ecosystem services they provide. In this study, samples of diatoms, soft algae and measurements of water quality were analysed at ten sampling sites for three years (between February 2012 and November 2014) along the MacKenzie River to understand the spatial and

temporal variation in the relationship between algal communities, water quality and stream condition. Baseline information on algal communities and water quality was collected during base flow conditions, while experiments on the effect of water releases on algal communities were based on flow regime variations (manipulated flow regimes), specifically on the algae community structure, water quality and ecosystem function. Algal species composition changed along the river under different flow regimes and different seasons. Under base flow, diatoms were more abundant upstream and filamentous green algae were more abundant downstream. The results showed that the algal composition shifted downstream after water release events. Green algae, Cyanobacteria and Chrysophyta gradually increased from upstream to downstream under base flow conditions, and before water releases, whereas diatoms were greater upstream and increased downstream after water releases. The results suggest that by tailoring the discharge and duration of the river flows, through the amalgamation of consumptive and environmental flows would improve the condition of the stream, and supplementing the positive effects of the flows dedicated to improving environmental outcomes.
Keywords: Algae, Ecology, River management, Biodiversity

IS32 Identification of Medicinal Plants Value Chain, Challenges and Opportunities (Case Study of Thyme)

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Nowadays, 80% of the world's population, especially in developing countries, are dependent on medicinal plants for treatment. According to the World Health Organization, about 25% of all medicines used worldwide are derived from plants and their derivatives. Preserving the genetic resources of plant species in natural habitats is essential. Therefore, with the aim of increasing the quality and quantity of the final product and achieving homogeneous and uniform medicinal plant to meet the growing global demand, the policy of cultivation and domestication of medicinal plants in the agricultural conditions was prioritized. Thyme species are important medicinal plants in the world due to their various valuable compounds. In this paper, the research path from identifying different thyme wild populations, studying germination needs, seedling production and establishing different populations in one place, multiple species evaluations to identifying superior and compatible ones in Semnan province as a practical example of the medicinal plant breeding program will be reported in this presentation.
Keywords: domestication, breeding, thymus spp, essential oil, thymol

IS33 15 years of taxonomic study on the genus *Silene* (Caryophyllaceae) in Iran a pattern for taxonomic studying of species rich genus in Iran

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The genus *Silene* (Caryophyllaceae) with about 118 species, is an important and problematic taxon in Iran. 15 years taxonomical studies in different aspects of the genus in Iran including; extensive new collection, herbarium specimens examination, nomenclature, morphometry, anatomy, ecology, chromosome features, Seed and pollen micromorphology, and phylogeny has led to changes in its taxonomy. During these studies, 3 new species; *S. mishudaghensis, S. oxelmanii* and *S. circumcarmanica were* described, 2 sections (*Scorpioideae* and *caespitosae*), 9 *Silene* species and *S. odontopetala* subsp. *congesta* were recorded for the first time from Iran. *S. eremicana* has been considered as distinct taxon and 3 species has been determined as synonymous of other species. At all, chromosome number information of 70 species was reported for the first time from Iran. Anatomical features of 45 species was studied and leaf and stem epidermis characteristics of 75 Iranian *Silene* species was described. Seed and pollen micromormorphology of 65 and 70 species respectively was studied and described by using scanning electron microscope. According to the available information, about 60% of species of this genus have been studied up to now, so that providing a new and complete classification at the section level and intraspecific variations requires more information. Considering the existence of about 20 genera with more than 40 species in Iran, the step by step model of taxonomic study performed in the genus *Silene* includes; Extensive sampling at population level from all natural habitats, detailed study of morphology and correct determining of taxa, resolving the nomenclatural problems of taxa, description of habitat features,

phtyogeography, anatomy, chromosome features, micromorphological studies of Seeds and pollen, embryology and reproductive systems and finally phylogenetic study can be a suitable model.

Keywords: *Silene*, Taxonomy, species rich genus, Seed micromorphology, Iran

IS34 The Value of Micromorphological Studies in Poaceae

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Poaceae is the fourth largest flowering plant family in the world that is adapted to different types of habitats. There are 12 subfamilies with 50 tribes and 81 subtribes in Poaceae. The efficiency of micromorphological data in systematic studies of the Poaceae is documented for the leaf blade epidermis, Glumes, lemmas, and paleas especially at the subfamily and tribal levels. Micromorphological features in lemma and palea as shape and distribution of silica bodies, long and short cells, different hair types as prickles, macro-hairs, and crown cells are of taxonomic importance. Intercoastal long cells are show different outlines and wall shapes. Straight wall and different undulation as curved, U-shaped, V-shaped, and especially Ω-shaped are found in Poaceae. In intercoastal zone, short cells are of diagnostic importance in form of their presence or absence and their shape. Silica bodies as an anti-feedant agent in the grasses caused enhanced strength and rigidity. By the presence of silica bodies, the water loss via cuticle is decreased. It is especially very functional in tolerance to the lodging, fluctuation in temperature, radiation, and drought stresses. Different shapes of silica are of taxonomic importance. Epicuticular wax is a functional tool in confrontation with the environmental aridity by decreasing the water loss via epidermis surface and stomata. The presence of diketone-tubules, platelets, and longitudinally aggregated rodlets types in the grass family have been documented. The micromorphological variation in different groups of Poaceae taxa in Iran will be discussed to show the taxonomic value of several micromorphological characteristics of the leaf blade, lemma, and palea.

Keywords: leaf epidermis, glume surface, diagnostic features, Iran

IS35 The phylogeny of Rosoideae (Rosaceae) in Iran, based on cpDNA and nrDNA sequenced data

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The present survey deals with phylogenetic analyses of Rosoideae from Iran. A total of 34 taxa from 6 tribes and 4 subtribes of Iranian taxa plus 36 previously sequenced data were analyzed for trnL-F, rpl32-trnL (UAG) PsbA-trnH and nrDNA ITS regions. For data analysis, both Maximum parsimony (as implemented in PAUP) and Bayesian method (using MrBayes program) was used. In all the reconstructed phylogenetic trees, the following clades are given phylogenetic definitions: Colurieae, Agrimonieae, Potentilleae and their subclades. The monophyly of Colurieae, Agrimonieae, Potentilleae were well documented.The current results support circumscriptions of the genera *Geum*, *Agrimonia* and *Aremonia* (presented in Flora of Iran). However, it displays divergence of the genus *Sanguisorba* in to two monophyletic groups (a) *Sanguisorba minor* and three subspecies b) *Sanguisorba officinalis* group) and the union of the genera *Fragaria, Alchemilla, Aphanes, Drymocallis, Sibbaldia* and *Sibbaldianthe* within *Fragariinae* and *Duchesnea, Ivesia , Horkelia* and *Argentina* within *Potentilleae*. In this study, the evolutionary trend of exin sculpturing was discussed.

Keywords: Cladistics analysis, Rosaceae, Colurieae, Agrimonieae, Potentilleae

IS36 Inhibitory effects of some mosses extracts on phytopathogenic fungi *in vitro* and *in vivo*

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Mosses are a group of simple, small and xerophyte plants that have been shown to have anti-cancer, anti-microbial and anti-fungal effects.In order to evaluate the antifungal effects of mosses, the extracts were made

using ethanol, methanol, acetone and distilled water then they were tested against four phytopathogenic fungi *Rhizoctonia solani*, *Fusarium solani*, *F. pseudograminareum*, and *Bipolaris sorokiniana* on PDA medium by using disc-diffusion method and compared with the effects of industrial fungicides Benomyl, Difenoconazole and Tetraconazole. The experiment was conducted with three replications. Finally, data were processed using SAS 9.2 software. Statistical analysis of results was based on Duncan significance test. Differences of $p<0.05$ were considered significant. The results showed that, ethanolic extracts produced significant inhibitory effects on tested fungi. In order to investigate the effect of moss extracts *in vivo*, wheat seeds of "Chamran" cultivar were implanted into moss extract and then transfered into pots containing 1: 10 mixture of soil and soil contaminated with tested fungi. After 35 days, the root and crown of wheat plants were examined. *In vivo* observations had also indicated that, ethanolic extracts can control the root and crown rot significantly.

Keywords: Mosses, Extract, Benomyl, Difnoconazole, Tetraconazole

IS37 A Survey of Moss flora of Zagros Mountains in Khouzestan Province

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Khouzastan Province is situated in South-west of Iran. It covers an area of 63633 km^2, which lies between the latitudes of 29° 57´ N and 33° 00´ N and the longitudes of 47° 40´ E and 50° 33´ E. The elevation varies between sea level in Persian Gulf beaches to 3500 m in Sefidkoh Mountain.For this study, the moss samples were collected from seven location during summer 2018-2020. Samples were collected in paper bags and field data were recorded. The samples were air-dried in room temperature and stored in the standard paper packet. For morphological observations, the samples were soaked in hot water for a few minutes for their revival. Identification of the specimen was made with the help of Smith (2004) Frey *et al*. (2006), Kürschner (2007), ،((Athertonn *et al*., 2010) and Kürschner and Frey (2011). The voucher specimen is preserved in the herbarium of the Ministry of Jihad-e Agriculture ("IRAN") at the Iranian Research Institute of Plant Protection (Tehran, Iran). After field trips in suitable seasons, 12 species belong to 11 genus and six families were identified. One species belonging to Pottiaceae namely *Dialytrichia mucronata* was new to Iran.

Keywords: Mosses, Khouzastan Province, Zagros Mountains, Acrocarpous, Pleurocarpous.

IS38 OMICS approaches towards deeper insight into cellular processes: genome projects and decoding the genomic and transcriptomic data

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Cellular processes are controlled at various levels and consequent of a series of hierarchical processes related to genome, transcriptome, proteome and metabolome ultimately determines the phenotype of an organism. The ultimate aim of genomics and transcriptomics is to identify the structure and function of all the genes of all organisms. In recent years, the emergence of new high- throughput technologies such as Next generation Sequencing (NGS) along with various OMICS approaches has revolutionized molecular biology. Complete genome sequences will provide powerful tools for biologists. The sequences will aid in understanding how gene families have been created, amplified, and diverged, resulting in the creation of new biological activities and specificities. The gene content of related species can be compared to identify which pathways are shared among many species and which are restricted to some parts of the kingdom. The new tools and approaches that are available for investigating gene structure and function have been steadily developed over the past 20 years. Today the molecular tools include various cloning systems like GateWay and TOPO cloning, micro array, high-throughput Next Generation Sequencing, and mass spectroscopy (MS) which led to a great revolution in biology along with gene and genome editing approaches like CRISPR-Cas9. The application of these methodologies results in the generation of very large amounts of data i.e. data tsunami that need to be stored, processed and analysed. On the other hand, these challenges led to the development of various bioinformatics algorithms and it has made the computational biology and big data more prominent. The wealth of data generated by high-

throughput methodologies will advance our understanding of gene structure and function. In addition, the ability to change gene expression in vivo, by using insertional mutagenesis, RNA interference, or other silencing mechanisms, will be crucial in determining the specific function of a particular gene. Therefore, at the present time, techniques are available to identify a specific phenotype. In the past the genome projects were limited to a few organisms such as Arabidopsis, human, rice and wheat, while, with the advent of Next and Next-Next Generation Sequencing technologies, complete sequences of genomes and transcriptoms of many organisms have been released in shorter intervals.

Keywords: Databases, Gene network, Big data, Computational biology, Algorithm

IS39 SARS-CoV-2: genome evolution, possible causes of divergenve and expansion of somelinage, and the pathogenic importance of different variants

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IS40 Prefrontal cortical-hippocampal-amygdala functional loop in memory formation

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The involvement of the prefrontal cortex, the hippocampus and the amygdala in learning and memory processes has been studied over the past 30 years. However, the neurotransmitter mechanisms underlying functional interactions among these brain sites in memory formation are not fully understood. Our studies using animal models suggest that the direct and indirect pathways among the prefrontal cortex, the hippocampus and the amygdala, which form a functionally important loop, may be critically involved in cognitive functions. It seems that the loop activation occurs when the hippocampus encrypts new information to store as long-term memory. The hippocampal projections to the PFC and the amygdala can change their activities to generate synaptic long-term potentiation or depression which is necessary for memory formation. The hippocampus is functionally divided into the dorsal part which is necessary for memory formation and the ventral part which is associated with both memory and emotional behaviors. The prefrontal cortex (PFC) as an important component in the central nervous system plays a key role in long-term and short-term memory. The amygdala connects with the PFC and the hippocampus through the efferent and afferent projections to create long-term emotional memory. The dysregulation of the PFC/hippocampal/amygdala neurotransmission may be a major reason for the memory loss. We found that there is an association between memory formation or impairment with the changes of BDNF/cFOS/CAMKII/CREB signaling pathways in the PFC, the hippocampus and the amygdala. Moreover, the different neurotransmitter systems including glutamatergic, GABAergic, dopaminergic and endocannabinoid systems in these brain areas have critically been involved in the reward-related memory. Taken to gather, these findings support the existence of a functional loop among the PFC, the hippocampus and the amygdala during processing learning and memory.

Keywords: Learning and memory, Neurotransmission, Signaling pathways, Animal models

IS41 Wnt signaling in dopaminergic neuron development and degeneration

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Parkinson's disease (PD) is one of the most common neurodegenerative diseases in elderlies. Degeneration of dopamine-producing cells in the midbrain nucleus of the substantia nigra during years of the disease progression results in PD. Among the signaling pathways, the Wnt pathway have been suggested to modulate the differentiation and survival of dopaminergic neurons, both during embryonic development and adulthood. Activation of the Wnt pathway requires phosphorylation and inactivation of the enzyme glycogen synthase kinase 3 beta (GSK-3β) at serine 9 which leads to the expression of Wnt target genes such as C-myc and cyclin D1. Wnt pathway is activated by variety of ligands, such as lithium and the indirubins, natural alkaloids extracted from the indigo colored plants and molluscs. While lithium is a general activator of the Wnt, the indirubin BIO is a specific inhibitor of GSK-3β, both of which lead to the expression of Wnt target genes. Using the SH-SY5Y cell line with dopaminergic differentiation potential, we showed that lithium enhanced their

dopaminergic differentiation and BIO protected them from toxicity induced by MPP+, a dopaminergic neurotoxin. We have further showed that the effect of BIO is mediated by microRNAs as novel diagnostic and therapeutic candidates for PD. Altogether, Wnt pathway efficiently modulates survival and differentiation of dopaminergic neurons.

Keywords: Parkinson's disease, SH-SY5Y, lithium, 7-BIO, MPP^+

IS42 Role of non-coding RNAs in morphine function

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Morphine is widely used in medicine to control moderate to severe pain. However, long-term administration of morphine is accompanied by unfavorable phenomena like tolerance and dependence to the drug. The exact molecular mechanisms underlying morphine tolerance and dependence have remained unclear. The effects of morphine are mediated via its binding to opioid receptors, which are distributed throughout the central and peripheral nervous systems. Further, data also indicates that alterations at other neurotransmitter receptors and downstream signaling pathways are also involved in morphine tolerance and dependence. Changes in gene expression have been reported in different brain areas, including the midbrain, striatum, hippocampus, and cortex following tolerance and addiction to morphine. However, central epigenetic changes during tolerance and addiction to morphine remain unclear. non-coding RNAs (ncRNAs) constitute the majority of the transcriptome in the brain and play essential roles in regulating cellular processes. ncRNAs are commonly linear molecules that are divided into housekeeping and regulatory subgroups. The former includes ribosomal (rRNA), transfer (tRNA), small nuclear (snRNA) and small nucleolar (snoRNA) RNAs that are ubiquitously expressed and contribute to structural and functional homeostasis. On the other hand, regulatory ncRNAs are involved in gene regulation and are typically divided into two categories based on their length. The first category includes RNAs with lengths fewer than 200 nucleotides; these RNAs include micro-RNAs (miRNAs), small interfering RNAs (siRNAs), and RNAs associated with the Piwi protein or piRNAs. ncRNAs containing more than 200 nucleotides are referred to as long ncRNAs (lncRNAs), which are involved in a variety of biological processes, including gene expression. It is also worth noting that circular RNAs (circRNAs) are a unique class of ncRNAs covalently-linked ends with having more than 200 nucleotides that are produced due to a back-splicing process. Reports during the past two decades indicate the involvement of ncRNAs in addiction to morphine, alcohol, methamphetamine, cocaine, and heroin. Our data indicate the involvement of different miRNAs, including miR-124, miR-133, miR-339, miR-365. Others and we have also shown that changes in the expression of long non-coding RNAs such as BC1, H19, MALAT1, and MIAT1 as well as circular non-coding RNAs such as CircOprm1 in different areas of the brain and spinal cord after morphine treatment in rats, which indicate the involvement of these RNAs in the effects of morphine. It can be concluded that the analgesic effects of morphine and its adverse effects such as addiction resulted from its repeated use are mediated by changes in the expression of various genes and non-coding RNAs have a significant role in the effects of morphine due to their regulatory role in regulating gene expression processes in the nervous system. Therefore, they should be given more attention in future research and their performance in morphine function needs further investigations.

Keywords: Pain management, Tolerance, Addiction, Gene regulation, non-coding RNAs

IS43 Selection of competent oocytes for assisted reproductive technologies

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Oocyte competence or quality have defined as the ability of oocyte to resume meiosis, cleave following fertilization, develop and differentiate into blastocyst stage, induce pregnancy and finally bring healthy offspring. Oocyte maturation is one of the most important processes of oogenesis, since it leads to the generation of "competent fertilizable oocytes". Oocyte maturation include nuclear maturation, cytoplasmic maturation, and Epigenetic maturation which is precisely regulated by molecular factors. Invasive and noninvasive methods are commonly used to select developmentally competent oocytes that can improve the take-home baby rates in assisted reproductive technology (ART) centers. One of the noninvasive methods conventionally utilized to

determine competent oocytes is the morphological analysis of cumulus complex, first polar body, zona pellucida, perivitelline space, meiotic spindle, and ooplasm. however, all morphological criteria that are currently used for the grading and screening of oocytes are not able to eliminate the subjectivity. Despite recent studies of the molecular factors related to oocyte quality, it is technically difficult to develop an index based on these factors, and new indices that reflect intracellular conditions are necessary. The numerous transcriptomics, proteomic and metabolomic studies have been conducted in the follicular fluid and follicular cells (granulosa and cumulus cells) in order to find non-invasive biomarkers of oocyte quality. Recent studies have uncovered the presence of cell-secreted vesicles in follicular fluid. Moreover, these cell-secreted vesicles contain small non-coding regulatory RNAs called microRNAs, which can be shuttled between maturing gametes and surrounding somatic cells. In humans, it is known that extracellular microRNAs of follicular fluid are associated with fertilization ability and early embryo quality. Recently, oocyte condition can be evaluated noninvasively using a temperature imaging system. The dynamic changes in the cytoskeleton and mitochondrial activity are considered to contribute to intracellular thermal variations. Intracellular temperature in mature oocytes was higher in fresh oocytes immediately after PB1 extrusion, and the temperature decreased with time after polar body release. The differences in oocyte intracellular temperature can correlate with developmental competence. Fresh oocytes had high-temperature regions localized around the cell membrane and around the spindle. Further studies should evaluate the link between temperature and cellular phenomena to establish its use as an indicator of quality.

Keywords: Oocyte quality, oocyte maturation, follicular fluid, microRNA, temperature

IS44 A review on the role and importance of oribatid mites, taxonomy and status of species reported from Iran

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Acari (Ticks & Mites) are an important group of arthropods, and along with scorpions, tarantulas, spiders, etc. situated in the class of Arachnida. These tiny creatures are cosmopolitan, and so far more than 50,000 species have been reported worldwide, and it is estimated that the number of mite species reaches half a million. Among the mites, Cryptostigmata, which also known Oribatida (Order Sarcoptiformes), as one of the largest groups, occupies the predominant fauna of most soils. So far, more than 11,000 species and subspecies of these mites have been described. These mites benefit from a wide range of food and feed on fungi, mosses, lichens, plants and sometimes carrion, and are actively involved in the decomposition of organic matter and the formation of soil nutrients and soil texture. In addition to the effective role of these mites in the decomposition of organic matter, their importance as bioindicators in soil and air management, control of some pests, diseases and weeds, as well as being in the cycle of transmission of animal parasites as intermediate hosts, is considered. Is. However, unfortunately, in our country, no comprehensive scientific research has been done on the taxonomy of these mites, and only a few species have been reported in the form of master's and doctoral dissertations from different parts of the country. At present, about 400 species of oribatid mites are reported from Iran, of which approximately 30% belong to the primitive group (Macropylina) and the rest to the higher group (Brachypylina). The family Oppiidae is known as the richest family in terms of number of species. Among the species reported from Iran, about 40 new species have been described, most of which have been named "Iran". Due to the diversity of habitat and climate in Iran, it is expected that there are many unknown species in this vast and ancient land.

Keywords: Arthropod, Cryptostigmata, fauna, Distribution, taxonomy

IS45 An overview of assisted reproductive technology procedures

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Infertility is a major issue in the lives of couples who suffer from it and endure a lot of social and psychological pressures. Unfortunately, 1 to 6 couples remain in infertile societies and 10% of them need assisted reproductive technology. The birth of Louis Brown in July 1978 with the help of this technology was an important turning point for infertile couples, which is now considered as an important and internationally recognized treatment

option. Since then, significant improvements have been made in the knowledge of reproductive biology and biotechnology. The outcome of treatment is not very satisfactory and the average pregnancy rate worldwide is 30-34%. The rate of congenital anomalies and abnormalities is slightly higher than the normal population, which is related to a woman's age and has nothing to do with this treatment. Assisted reproductive techniques include ICSI, IUI, IVF, ZIFT, GIFT, IVM, PGD, PICSI, assisted hatching and embryo cryopreservation. In vitro fertilization and intracytoplasmic injection are the most common methods of treating infertile couples and allow artificial insemination outside the body. Indications for IVF include absent fallopian tubes or obstruction of bilateral. Endometriosis, male infertility, secondary infertility, unexplained infertility and genetic diseases leading to miscarriage or abnormal birth. The injection of an immobilized mature sperm into the cytoplasm of a mature metaphase II oocyte is known as intracystoplasmic sperm injection. Indications for ICSI include recurrent failure in IVF, severe oligospermia, severe asthenospermia, sperm obtained by TESE, PESA, TESA methods in obstructive and non-obstructive azoospermia, and frozen sperm. The steps of assisted reproductive techniques include ovulation stimulation, ovarian response assessment, oocyte retrieval, sperm preparation, IVF / ICSI, and embryo transfer.

Keywords: ICSI, IVF, Severe Oligospermia, Non-obstructive azoospermia, Unexplained infertility

IS46 Exosome application in cancer diagnosis and therapy

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Exosomes are natural nanovesicles with 50-100 nm sizes, which contain proteins, nucleic acids, and microRNAs. Exosomes originate from multivesicular bodies (MVB), which release their contents outside the cell. These nanovesicles can fuse with the membrane of the recipient cell to pass their information. Exosomes can be used as diagnostic biomarkers since they have a broad range of macromolecules and are proper candidates to provide information about the tumor from which they were originated. Moreover, Exosomes can be used as nanocarriers to deliver therapeutics to the target cell or tissue, such as tumors. Since these nanocarriers are naturally isolated from body cells, they exert fewer side effects than synthetic nanoparticles.

Interestingly substances carried by exosomes also have therapeutic effects on some lesions. Exosomes' immunogenicity is very low, resulting in their low cytotoxicity. Since exosomes are derived from cell membranes, they are not captured by the reticuloendothelial system. Therefore, exosomes' half-life in the blood is longer compared to other nanocarriers. Also, many studies have found that exosomes can spontaneously migrate toward unhealthy tissues. Exosomes containing chemotherapy reagents or phytochemicals such as curcumin or anti-tumor miRNAs were effective in inhibiting tumor growth. To conclude, exosomes hold high promises for cancer diagnosis and therapy.

IS47 The effect of green nanoparticles on the aggregation of protein

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The aggregation of proteins, including amyloid fibril formation, is the cause of many age-related diseases encompassing Alzheimer's (AD), Parkinson's (PD) and cataract. These human diseases involve the conversion of a specific protein or protein fragment from a soluble native state into insoluble amyloid fibrils that are deposited in a variety of organs and tissues. Nanoparticles interfere with protein amyloid formation and can significantly influence the nucleation and aggregation process of peptides. In this study protective ability of synthesize green nanoparticles of plant origin, using an extract derived from natural products that are powerful antioxidants, against amorphous aggregation and amyloid fibril formation of proteins are discussed. Green synthesis nanoparticles had a potential inhibitory effect on the aggregation of reduced protein in a concentration-dependent manner. This inhibitory effect of nanoparticle probably caused by decreasing the rate of fibrillation through surface absorbing of free monomeric peptides and prevents amyloid fibril formation. The surface properties of the green nanoparticle and the interaction between both nanoparticle and protein determine the potential inhibitory effect of green nanoparticles in preventing the aggregation of reduced protein. Thus, green synthesized nanoparticle as nano chaperone, can be used as a therapeutic approach in the treatment of amyloid disease such as Alzheimer disease.

Keywords: Nanoparticle; Alzheimer disease; Amyloid; chaperone

IS48 Herbal research: Important forgottens

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The Iranians were the first tribes who discovered the properties of medicinal herbs. The history of Persian medicine dates back to three thousand years ago and many centuries before Christ. The school of Zoroaster (Mazdayasna) existed long before the medical schools of Greece. The 2500-year antiquity of Simorgh is more than some medical symbols in the world and Greece.

According to Cyril Elgood, the Iranians taught the Greeks the fundamental of Greek medicine to the Greeks. Cyril Elgood and John Bernal cite the unfamiliarity with the Pahlavi or other ancient Iranian languages, and the destruction of ancient Iranian books as the reasons for the neglect of Persian medicine. It seems that the unfamiliarity and alienation with historical sources and scientific-cultural history still exist in the Iranian scientific community. The history of Iranian traditional medicine as well as Iranian endemic herbs have not been properly considered by Iranian researchers. While in modern ethnopharmacology, familiarity with historical sources is known as one of the important ways in discovering of natural-based drugs.

The safety of all herbal medicines due to their natural origin is a misconception. Biological and chemical contaminants, drug interactions, and misidentification of medicinal herbs are among the dangers associated with using herbs. However, these items, perhaps for economic reasons, are not the main subject of all herbal research. Nevertheless, there are items with impact on the validity and reproducibility of the results of herbal research and studies, such as the correct identification of medicinal herbs, scientific nomenclature, and detailed explanation of experimental methods (such as location and source of plant samples or the processing steps of herbs). These important details are also of forgotten in some publications on herbal medicines, although there is no extra cost to mentioning them. Paying more attention to the education and research of graduate students and paying attention to the above-mentioned items can have a significant impact on the international validity of herbal research.

Keywords: medicinal herbs, validity, reproducibility, scientific nomenclature

IS49 Drug Delivery Using Nanoparticles

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Various nano-sized protein and lipid complexes are being investigated as drug delivery systems. The encapsulation of more than one drug in a single nanocomplex carrier could enhance the therapeutic potency and afford synergistic therapeutic effects. In this study, we developed a novel protein-lipid nanocomplex as a controlled drug delivery system for two important cancer drugs, doxorubicin (DOX) and mitoxantrone (MTO). Apoferritin (AFr) functionalized with folic acid (FA) was used to encapsulate DOX to create the targeted protein nanocomplexes (TPNs). The encapsulation was achieved by the disassembling of apoferritin into subunits at pH 2 followed by its reformation at pH 7.4 in the presence of the DOX drug. The second drug, MTO, was loaded into the cationic solid lipid nanoparticles (cSLN) to form the liposomal drug nanocomplex particles (MTO-cSLNs). Two complexes were then assembled by tight coupling through ionic interactions to obtain the final drug delivery system, the dual targeted protein-lipid nanocomplexes (DTPLNs). It is notable, the toxicity of the anticancer drugs can be decreased by utilizing nanocarriers and targeted drug delivery systems. UV-Vis and fluorescence spectroscopy were used for structural characterization of TPNs and DTPLNs. Transmission electron microscopy (TEM) was used for comprehensive analysis of the final DTPLNs. We confirmed that the DTPLNs display desired time-dependent and pH-dependent drug release behaviors. We also demonstrated the improved anti-cancer efficacy of DOX and MTO in their encapsulated DTPLNs as compared to their free forms. Our results provide promising prospects for application of the DTPLNs as efficient drug delivery systems.

Keywords: Apoferritin; Doxorubicin; Mitoxantrone; Cationic solid lipid nanoparticles; Dual targeting; pH-responsive

IS50 A review on history and taxonomic status of bats in Iran

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Bats (order Chiroptera) are one of the most diverse, abundant and widely distributed orders of mammals and the only one with the capacity of powered flight. Nearly, 1400 species of 230 genera and 21 families can be found all over the world except in the northern and southern polar areas, representing approximately 20%of all mammalian species. Chiroptera can be divided into the two suborders Megachiroptera (old world fruit bats) are represented by only one family with 46 genera and 191 species and Microchiroptera (echolocating bats) comprise 20 families include 184 genera with 1210 species. Despite the importance of bats in providing ecosystem services as well as natural hosting reservoirs, so far the least study has been done on them compared to other mammals. Diverse physical geography and close vicinity of the Iranian plateau to the major biogeographic zones has caused this country to possess a variety of fauna unequaled in other parts of the Middle East. Bat biodiversity, like many other taxa is considerably high. Bats of Iran have been thoroughly studied since long time ago, both by Iranian and foreign zoologists. By the present taxonomic arrangement finally, 51 species of bats have been reported from Iran. These bats belonging to the families of Pteropodidae (1 species), Rhinopomatidae (3 species), Emballonuridae (2 species), Rhinolophidae (5 species), Hipposideridae (3 species), Vespertilionidae (34 species), Miniopteridae (1 species), and *Molossidae* (2 species). However, our knowledge about distribution and abundance of bats in Iran is far from adequate. For example from the 51 species of bats reported of Iran, six species have been reported only once, 17 species are known from less than 10 localities and only seven species are known from more than 50 localities. There may be further possibility to observe more bat species to occur in Iran because there are several species reported from neighboring countries in bordering areas to Iran. These species include *Rhinolophus lepidus* from Afghanistan to be seen in the northeast (Khorassan province), *Plecotus turkmenicus,* and *Rhinolophus bocharicus* from Turkmenistan to be present in similar habitats of NE and *Pipistrellus rueppellii* from Iraq to be found in western Iran. Also, *Myotis myotis* occurs in western Turkey, It's occurrence in NW Iran is possible. Only recently, intensive studies on bats have provided opportunities to make available new data on the taxonomy and ecology of bats. Future studies on bat research require much attention on involving ethical values in scientific studies, their importance in providing ecosystem services, expanding molecular studies, a survey of their viruses and their relationship to emerging diseases, re-organizing current conservation assessments, evaluating the effect of land use alternation, global warming and caves destruction on the Iranian bats, and also to enhance public attention to conservation oriented research projects.

Keywords: Mammalia, Chiroptera, Taxonomy, Conservation, Viruses and emerging diseases

IS51 Animal models in physiological studies: Challenges and prospects

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The animal model is widely used in physiology and pharmacology research. Although the use of animals in research can be an advantage for other animals, it is more useful for the advancement and improvement of human life. Even in many investigations, animal studies is considered as an introduction to clinical trials. But first of all, the use of animals as research tools requires to make a mutual relationship between humans and animals, so, ignoring safety and health and neglecting the ethical considerations of working with animals can have problematic consequences. From the past until now, these models have been divided into different groups, including experimental models, breeding and transgenic, etc., but undoubtedly any research at the beginning should have a proper reason for the use of the animal model, and the ethical and legal concerns of working with animals should be considered (such as a place for keeping and free access to water and food and many physical and environmental factors ..), which may affect the physiological and behavioral responses of the animal. The first models may have simulated part of the disease, but over time most of the key features of the diseases were replicated in the models to make them appear to be very creative and useful. However, due to limitations such as mismatching of animal and human, these models have been revised many times and with recent advances, computer simulations, and 3D printing of biocompatible materials with the help of bio 3D printer as a new

technology have replaced animal models and through eliminating the previous restrictions can be used to design and build cellular constructions and living components.

Keyword: Animal model, Ethical considerations, 3D Printer

IS52 Royan Kidney Group (RKG): Cells Therapy and Tissue Engineering in Renal and Urinary Tract Diseases: Stem cells as a new trend

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Kidney and urinary tract research group is one of the established groups in Royan Institute, and at present, most of its activities have focused on the administration cell therapy in patients with renal transplantation, acute and chronic renal failure and urinary incontinency. Kidney and urinary tract research group started its activities in the basic and clinical sciences by the research charity institute support from 2012. Our final goal in kidney group is to use the cell therapy as an alternative therapeutic for treatment of different renal disease. Based on this, the group's strategy has mainly focused on the following topics: 1- Development and generate of renal stem cells and differentiation of pluripotent stem cells into renal cells, 2- Create animal models of acute and chronic renal failure and transplantation of stem cells for therapeutic effects, 3- Transplantation Immunology and provided solutions for clinical studies using animal models of transplantation, 4- Understanding the mechanisms involved in the pathogenesis of polycystic kidneys to aid to the healing process of the patient and 5- Cell therapy in urinary tract diseases. Several projects have designed related to with different renal cells and their transplantation in animal models of acute and chronic renal failure. According to above goals, after equipping the non-human primate animal's lab, the model of renal failure was established in these animals as a way to study the effects of mesenchymal stem cells (MSCs) transplantation in decrease of inflammation and increase of regeneration. The results show that injection of bone marrow MSCs (BM-MSCs) as intra-renal vascular effectively reduce cisplatin-induced acute renal failure. Although our histological findings did not show significant differences between cell injected group with the control group, but it seems to reduce inflammation and prevent apoptosis through cell immune regulatory mechanisms, reducing symptoms and improving quality of life of treated animals. Also, there are also clinical trials using MSCs in acute and chronic renal failure. Differentiation of pluripotent stem cells into renal cells, is be designed for differentiation of embryonic stem cells into tubular cells. The proposal has been trying to plan the initial differentiation of pluripotent cells into renal progenitor cells. We are also trying to provide the normal kidney tissue engineering scaffolds. In this study we want to transfer of progenitor cells on acellular renal tissue scaffold of monkey kidney and evaluate the renal function with new cells. Immunomodulatory properties of mesenchymal stem cells are evaluating for kidney transplantation. The effects of immune regulation will be evaluated by transplant of different sources of mesenchymal stem cells such as bone marrow or adipose tissue in animal models. Our goal is decrease the use of immunosuppressive drugs in patients receiving kidney transplants by administration of mesenchymal stem cells. Mutation analysis of coding region in PKD1 and PKD2 genes in autosomal dominant polycystic kidney disease is other study to detect the mutations in Iranian patients with renal polycystic disease. There are also clinical trials and several projects using MSCs in animal model of polycystic kidney disease. In urinary tract diseases field, almost 30 patients have been treated in the clinical trial for evaluation of the safety and efficacy of intramuscular injection of muscle stem cells in improving incontinence and the primary results show that this method can improve the patients 'symptoms without any special complication.

IS53 Novel Cellular Strategies for Generation of Human Cardiomyocytes in Vitro

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The human heart has very limited regenerative capacity, and the low rate of carcinogenesis is not sufficient to compensate for the enormous loss of cells after injury such as myocardial infarction. Despite advances in cardiac treatment, myocardial repair remains severely limited by the lack of an appropriate source of viable cardiomyocytes (CMs) to replace damaged tissue. Human pluripotent stem cells (hPSCs), embryonic stem cells (ESCs) and induced pluripotent stem cells (iPSCs) can efficiently be differentiated into functional CMs

necessary for cell replacement therapy and other potential applications. The number of protocols that derive CMs from hPSCs has increased exponentially over the past decade following observation of the first human beating CMs. A number of highly efficient, chemical based protocols have been developed to generate human CMs (hCMs) in small-scale and large-scale suspension systems. To reduce the heterogeneity of hPSC-derived CMs, the differentiation protocols were modulated to exclusively generate atrial-, ventricular- and nodal-like CM subtypes. Recently, remarkable advances have been achieved in hCM generation including chemical-based cardiac differentiation, cardiac subtype specification, large-scale suspension culture differentiation, and development of chemically defined culture conditions. All highlight the possibility that hPSC-derived CMs may be very close to implementation in cell-based replacement therapies and other applications. Herein we review recent progress in the in vitro generation of CMs and cardiac subtypes from hPSCs and discuss their potential applications and remaining limitations.

Keywords: Heart Regeneration, Human Pluripotent Stem Cells, Direct Reprogramming, Cell Therapy

IS54 Wnt signaling in development and stem cell control

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The Wnt signaling pathway is one of the central signaling pathways regulating early vertebrate development. The role of this signaling pathway on the specification of embryonic axes, especially in *Xenopus* embryo, is well documented. In recent years, it has become clear that the Wnt pathway also regulate many aspects of stem cell behavior and adult tissue homeostasis. Since stem cells are an ideal candidate for cell therapy, it is important to identify the signaling network that controls the activity of these cells. Our recent works have shown that activation of Wnt/β-catenin signaling pathway in adipose tissue-derived mesenchymal stem cells (AD-MSCs) resulted in a decrease in bone matrix synthesis and expression of osteogenic specific genes in these cells. Moreover, while the expression of *BMP* and its target gene (*ID3*) was decreased, the expression of BMP antagonist, *Noggin*, was significantly increased in Wnt activated AD-MSCs. Altogether, our recent results suggest that activation of Wnt signaling in osteogenic induced AD-MSCs inhibits osteogenic differentiation through inducing the expression of BMP antagonist. These results provide further insight into the role of Wnt signaling in stem cell differentiation.

Key words: Mesenchymal stem cells, Wnt signaling pathway, osteogenic differentiation

IS55 Wolbachia in scale insects: A unique pattern of infection prevalence, high genetic diversity, and host shifts

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Wolbachia is one of the most successful endosymbiotic bacteria of arthropods. It is a master manipulator, modifying its hosts' biology in many ways to increase its vertical (maternal) transmission. Wolbachia can also undergo host shifts that can be mediated by ecological vectors such as shared host plants or parasitoids. Here, I screened 687 specimens from 151 scale insect species that were mostly collected in Asia and Australia for Wolbachia infection. I fitted the distribution of within-species prevalence of Wolbachia to our data and compared it to distributions fitted to an up-to-date dataset compiled from surveys across all arthropods. In contrast to other hemipteran groups, the prevalence of Wolbachia in scale insects follows a distribution similar to exponential decline (most species are predicted to have low prevalence infections). By conducting Illumina pooled amplicon sequencing of 59 infected scale insect samples and 16 direct associates of scale insects (including wasps and ants), I determined 63 Wolbachia strains in these species belonging to supergroup A, B and F. I observed a lack of congruency between Wolbachia and scale insect phylogeny and identified several putative host-shifts events. Finally, I fitted a Generalised Additive Mixed Model (GAMM) to assess factors influencing Wolbachia sharing among scale insect species. I found strong effects of host phylogeny without any significant contribution of host geography. There were high rates of Wolbachia sharing among closely related species (i.e., host-shifting mostly happens between species of the same genus) with a sudden drop-off in sharing with increasing phylogenetic distance. This finding can explain a large number of reported Wolbachia host-shifting among congeneric species.

IS56 Molecular data proves successful in resolving taxonomy, phylogeny and biogeography of Pompilidae (hymenoptera)

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During recent years, using molecular data for taxonomic questions has proved successful. Pompilids are difficult hymenopteran group that are understudied in Australia. Here we used a combined dataset of Mitochondrial, nuclear and UCE markers to delineate two closely related genera of Heterodontony and Cryptocheilus. We also used DNA data for species delimitation and biogeography reconstruction. The results suggest that Heterodontonyx distribution is mainly limited to Australia whereas Cryptocheilus is distributed in Palearctic, nearctic, Africa and Oriental region. Three new potential species discovered using PTP and bPTP plus BioGeoBEARS analysis suggest that Australian species may have oriental origin.

Keywords: Pompilid phylogeny

IS57 Mass production of live food and their by-products in semi-arid areas

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The semi-arid area possesses several key factors such as sun light, suitable temperature, nutrient rich soil, saline or brackish water, land availability which make it candidate for certain organisms biomass production. In this talk, production of unicellular algae, Rotifer, some crustacean, insect and fish will be discussed. The priority is given to job enhancements for local community using traditional experiences and advanced methods in closed culture systems. The advantages of using locally available species greatly help the sustainable use of resources and their conservation in the nature. In addition, due to unique adaptation of species, there is an opportunity to establish a Bio-Bank for genetic and natural resources. Apart from biomass production, the by-products of these farms are used in pharmaceutical and medicinal industries and green fuel production.

As an example, some comparative added values to land use, level of biomass production and economical investments from other countries achievements are given.

IS58 A review on the effects of the herbal active molecules, pectins and flavonoids on the mammary gland epithelial cells and cancer cell; targeting these cell in cancer cells

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Human History always was related to the use of herbal medicine which was the main treatment of diseases. Chemical drugs applying became popular along with developing science and industry. As such drugs contained side effects, using herbal medicine resume. There are two kinds of herbal effective substances: the first one is the primary metabolic substances such as polysaccharides (pectins). The other is the secondary metabolic substances as flavonoids. We assessed the effects of these herbal effective molecules on cancerous and healthy cells. The polysaccharides (pectins) were studied on GH3/B6 cells which are capable of secret Prolactin and Growth Hormone. The data were shown the effect of pectins on these cells. In the second group, we studied the flavonoid named Salvigenin. In cancer cells, Salvigenin could link to P53 following cycling-CDK linkage to inhibit the cell cycle in G,M and S phase. In such conditions, P53 plays an apoptotic role while it plays an anti-apoptotic role in normal cells. Our results declared that salvigenin accompany magnetic nano-particles promoted the apoptotic effects of this molecule alone. It is worth mentioning that such effects were not seen in normal cells. The PLGA synthetic polymer with sedimentation method used to prepare Fe3O3@mPEG-b-PLGA.

IS 59 The effect of Mouse Embryonic Stem Cells (mESCs) transplantation on ischemic tolerance in animal stroke model

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The number of people affected annually by stroke, actually over 2 million worldwide. This is because of the increase in the mean population age, the persistence of unhealthy habits, and the emerging risk factors that will affect young patients particularly. The previous studies have shown that cell transplantation can improve neurological function after cerebral ischemia and therefore extend the therapeutic time window for intervention. The development of stem cell-based therapies for cerebral ischemia aims to replace lost neurons and/or to prevent cell death. Embryonic Stem Cells (ESCs) are a good source for cell therapy and regenerative medicine. Mouse Embryonic Stem Cells (mESCs) possess stem cell properties, can be cultured in abundance in vitro and contains an inexhaustible, noncontroversial source of stem cells for therapy. 35 adult male rats weighing between 300-250 grams were used. The rats were divided into 3 groups. Control, sham and Mouse Embryonic Stem Cells (mESCs) transplantion-recipived groups. Rats of Mouse Embryonic Stem Cells (mESCs) transplantion-recipived were divided into 2 categories for evaluation of infarct volume and neurological deficit scores. In the control group, only the effect of cerebral ischemia surgery and in the sham group, the effect of injection of Mouse Embryonic Stem Cells medium (non-ischemic and transplantation) were evaluated. In the control and Mouse Embryonic Stem Cells (mESCs) transplantion-recipived groups, the rats were subjected to 60 min of right middle cerebral artery occlusion (MCAO). In the present study, Mouse Embryonic Stem Cells (mESCs) were transplanted into right rat's striatum by using stereotaxic surgery. After 7 days pretreatment, the rats were subjected to 60 min of right middle cerebral artery occlusion (MCAO). After 24 h ischemia induction, neurological deficit scores (NDS) and infarct volume (IV) in total, cortex, piriform cortex-amygdala, and striatum areas of hemisphere were assessed. In this study, a significant reduction in neurological defects was observed in the Mouse Embryonic Stem Cells (mESCs) transplantion-recipived compared to the control group. The volume of infarction was significantly lower in the Mouse Embryonic Stem Cells (mESCs) transplantion-recipived group compared to the control group in the striatum, cortex and piriform cortex-amygdala. For the first time, the present results indicate that transplantation of Mouse Embryonic Stem Cells (mESCs) before ischemia induction resulted in a significant reduction in NDS and IV, in comparison with the control group. Our study showed that Mouse Embryonic Stem Cells (mESCs) can protect neural cells against undesirable impacts of cerebral ischemia. It seems that Mouse Embryonic Stem Cells (mESCs) due to exerts decremental effect on ischemic damages.

Keywords: Cerebral Ischemia; Embryonic Stem Cells (ESCs); middle cerebral artery occlusion (MCAO); Infarct volume (IV); Neurological Deficits.

IS60 Cerebral folate and cerebrospinal fluid: essential components of normal brain development

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The cerebrospinal fluid (CSF) system has been largely ignored as a physiological fluid of any importance. However, CSF is made specifically for the cerebral cortex from the initiation of cortical development and its production continues throughout life. CSF has been shown to be a growth medium for brain stem cells and has also been shown to be essential to normal migration of cells as the cortex develops. Many conditions of poor brain development and neuropsychiatric conditions have been associated with abnormalities in the fluid system and hydrocephalus, the extreme of these, has been shown to dramatically affect cerebral folate supply. In this talk I will present evidence for the critical role of CSF and cerebral folate in the development of the cerebral cortex and how this can go wrong in the aetiology of some neurological conditions. Addressing this specific cerebral

folate issue, which is independent of folate status in the rest of the body, can prevent or treat such conditions.

IS61 Novel strategy for reduction of morphine dose in pain relief: the underlying mechanisms

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Pain, an unpleasant sensory and emotional experience, is a wide prevalence syndrome impairing different aspect of patient's life quality and associated with the economic and sociality burden. Morphine is one of the most well-known and potent analgesic agents for treatment of acute or chronic pain; however, it can also induce various side effects. Thus, finding new treatment and mechanisms for pain management as well as drugs which potentiate the analgesic effects of low doses of morphine and reduce its side effect will be good strategies. Nociceptors transmit information about noxious stimuli from mechanical, thermal, and chemical sources to the central nervous system and higher brain centers via electrical signals. Nociceptors express various channels and receptors including voltage-gated sodium channels (VGSCs), voltage-gated sodium channels (VGCCs), transient receptor potential channels (TRP channels) and NMDA receptors which inhibition or alteration of these pain targets can attenuate the pain response. The other potential new targets for pain relief are miRNA replacement therapy and nanomedicine approach. Also, combining a suboptimal dose of morphine with another drug providing additive analgesic effects with less side effect will be useful method for pain management. The molecular players in the above mentioned approaches are diverse and complex. Thus, it can be concluded that the future of pharmacological pain therapies will be multidirectional.

Key words: Pain relief; Morphine; Side effect; Nociceptors

IS62 Investigation of the effect of point mutations on human transthyretin protein structure and aggregation

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In cell proteins will be synthesized away the nascent chain to folded state. For almost all proteins, based on appropriate conditions, there would be an aggregated state, generally called amyloid can lead to neurodegenerative diseases such as Alzheimer's and Parkinson's diseases. Generally, aggregations causing these pathological conditions are initiated from intrinsic disorders (e.g., mutations). Transthyretin, a tetrameric transporter protein that in its monomeric form can self-associate to shape amyloid-beta aggregation is one of these proteins. All the point-mutations that can expose buried hydrophobic region, unstable tetrameric formation, and ultimately cause aggregation can lead to pathological conditions such as Transthyretin amyloidosis disorders or transthyretin amyloid cardiomyopathy (TAC). This study focuses on producing and isolating recombinant human transthyretin in *E.Coli* by making specific amino acid alternation via site-directed mutagenesis. To evaluate protein structure and aggregation, some techniques such as turbidity, mass spectrometry, dynamic light scattering (DLS), fluorescence, circular dichroism (CD), and X-ray crystallography have been widely used. Results show that a W41F protein mutation in transthyretin leads to intense instability and amyloid fibril accelerated formation. In contrast, W79F protein mutation shows no sensible structure or stability alternation. Changes in protein sequence and structure can affect properties such as hydrophobicity, secondary structure propensity, and charge. These changes in the way of increasing the hydrophobicity or polypeptide propensity to convert from alpha-helix to beta-sheet and decreasing the total surface net charge of protein can increase the aggregation propensity.

Keywords: Amyloid-β, Protein folding, Neurodegenerative diseases, Transthyretin, Intrinsic disorders

ORAL PRESENTATIONS

AO1 Food deprivation decreases thyroxine conversion into triiodothyronine in goldfish

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Thyroid hormones (THs) regulate metabolism, which are essential for metabolic-dependent biological systems including development, growth and reproduction. In mammals, hypothalamic thyrotropin-releasing hormone (TRH) stimulates pituitary to synthesis thyroid-stimulating hormone that trigger thyroxine (T4) synthesis in the thyroid gland, which is then converted into triiodothyronine (T3). In fish, TRH does not function, and hypothalamic corticotropin-releasing hormone regulates pituitary and thyroid gland. Moreover, conversion of T4 into T3 occurs mainly in peripheral tissue mostly liver rather than in the thyroid itself. Food deprivation induces metabolic changes in the body to cause negative energy balance. The aim of the present study was to investigate the effects of food deprivation on circulating THs levels. Mature male goldfish (*Carassius auratus*) were divided into 2 fed and 2 food-deprived aquaria, and kept under 22 ºC and 12 h light/12 h dark photoperiod. The control goldfish were fed 3% b.w. with commercial food in the morning and afternoon. The goldfish were not fed in the food-deprived group. The period of experiment was 21 days, and samples were collected at –3 h, +3 h, 1 d, 7 d, and 21 d post-food deprivation. Circulating levels of T4, T3, free T4 and free T3 were measured by ELISA as well as fish body mass and hepatosomatic index (HSI). No differences in circulating T4, Free T4 and Free T3 levels were observed between fed and food-deprived goldfish during the period of experiment ($p>0.05$). Compared to control, circulating T3 levels was decreased in food-deprived goldfish at 7 and 21 d post-food deprivation associated with decreases in body weight and HSI ($p<0.05$). This study suggests that food deprivation was without effects of T4 synthesis in the thyroid gland, however conversion of T4 into T3 was affected that might be due to liver functions.

Keywords: ELISA, Hepatosomatic index, Thyroid gland, Thyroid hormones

AO2 Effect of *Bacillus coagulance* probiotic on Tyrosine Hydroxylase gene expression in Parkinson's male rats

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Parkinson's disease (PD) is a progressive and destructive neurological disorder associated with loss of dopaminergic neurons and tyrosine hydroxylase (TH)-deficiency syndrome. Recently, gut microbiota and a cross talk of gut-brain axis have become as a potential mechanism underlying therapeutic intervention in PD. In this study ۳۲rats were divided into 4 groups of control, Parkinson, Parkinson fed with milk and Parkinson fed with milk containing *Bacillus coagulance* probiotic. 6-hydroxydopamine (6-OHDA) was infused into right medial forebrain bundle (MFB) to make a chemically-induced model of PD. Four weeks after gavage, parkinson's symptoms were evaluated using apomorphine-induced rotation test and the expression level of TH was measured by Real-Time PCR, respectively. The findings revealed that the milk and milk+probiotic treatments had favorable effects on the regeneration of damaged neurons of the brain. Also, the presence of this beneficial probiotic significantly increased the expression of TH. These results provide support for the importance *Bacillus* probiotics as a therapeutic intervention in PD.

Keywords: Microbiome, Post treatment, Neurological disorder, Real-Time PCR

AO3 Sample size optimization of *Anodonta cygnea* (Linnaeus, 1758) in ecotoxicological studies through the morphological features

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The use of bivalves as the sessile benthos is very ordinary in aquatic toxicological monitoring studies. On the other hand, the bioethical considerations compel us to take minimum samples from the environment as much as possible without reducing the trial quality. Therefore, we experimentally assessed the correlation between morphometric characteristics of *Anodonta cygnea* and its acetylcholinesterase (AChE) activity inhibited by

diazinon. For this purpose, the AChE activity of *A. cygnea* was examined after exposure to various concentrations of diazinon for 21 days by Elman's method using an ELISA microplate reader. Some principal morphometric indices such as total length (TL), width, height, length of the hing, weight of soft parts, weight of valves, inlet, and outlet size were measured through standard instructions. Results showed that the average level of the enzyme activity in the adductive muscle was 27.285 nmol/min/mg protein. There was a significant correlation between TL and AChE inhibition. Thus, the maximum inhibitory was observed in the size class 850-950 mm. Moreover, an increase in inlet size leads to more intake and following that, more inhibition. In conclusion, using these findings in the sampling procedure can enhance the selected and most relevant samples in the field studies.

K**eywords:** AChE activity, *Anodonta cygnea*, Correlation, Morphometric characteristics

AO4 The role of Zagros Mountains in intraspecific diversity and endemicity of *Asaccus* Dixon and Anderson, 1973 in Iran

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The Zagros Mountains stretch from northwest to south of Iran and act as a barrier against the faunal elements of the Mesopotamian lowlands to the central plateau of Iran and a corridor for south faunal elements to north. Due to the special geological structure of the Zagros Mountains, reptiles have settled in special habitats in valleys, caves and karsts. The genus *Asaccus* Dixon and Anderson, 1973 (Phyllodactylidae), is one of the special faunal elements of the Zagros Mountains, which based on morphological characters consist of valid ten species After collecting samples from different regions of Zagros, the process of tissue and DNA extraction, a nuclear gene (MC1R) and two mitochondrial genes (12S, Cytb) were used. The results of this study show nine new lineages with high genetic distance in different regions of the Zagros, each of which is considered as a potential species. This study, the factors affecting the distribution and speciation of genus *Asaccus* have been investigated. The possible factors in causing diversity within the species of *Asaccus* are their limited lifestyle and isolation in caves and karsts.

Keywords: Caves, karsts, lizards

AO5 Mediodorsal thalamic cannabinoid CB1 receptors mediate the effect of exercise and enriched environment on dextromethorphan-induced anxiety in rats

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Dextromethorphan (DXM), as a medication used to treat coughing, is an NMDA receptor antagonist that could be abused to induce rewarding effects in the brain. Evidence suggests that exercise may reduce the symptoms of anxiety. Thus, the aim of the present study was to investigate the possible effect of exercise and also enriched environment (EEN) on the DXM-induced anxiety, using the elevated plus-maze (EPM) test in male Wistar rats. The animals were divided to two groups: the exercise/EEN groups and normal groups. The exercise/EEN-juvenile rats (50-70 gr) were placed on treadmill and exposed to EEN about 30 minute on a day for 5 weeks (the protocol for using the treadmill was as follows: the first three weeks 15 min, the fourth week 20 min and the fifth week 30 min), and then, they were bilaterally cannulated in the mediodorsal nucleus of thalamus (MD), using a stereotaxic surgical procedure. After recovering period, the anxiety-like behaviors were measured under the dugs' administrations in the elevated plus-maze (EPM) test. Intraperitoneal administration of the different doses of DXM (3-7 mg/kg, i.p.) induced the anxiogenic-like behaviors in the EPM through decreasing the percentage of open arm time (%OAT) and open arm entries (%OAE). Interestingly, the anxiogenic effect of DXM was not observed in the exercise/EEN-rats, suggesting an improving effect of exercise and EEN rehabilitation on the anxiety. Furthermore, we found that microinjection of ACPA, as an agonist of CB1 receptors into the MD, 5 min before the administration of DXM (7 mg/kg) potentiated the improving effect of

exercise and EEN on the animals. Taken together, it can be suggested that the exercise and EEN can inhibit the anxiogenic effect of DXM which can be considered in clinical studies. In addition, the MD cannabinoid CB1 receptors may be involved in the anxiolytic effect of rehabilitation on DXM administration.

Keywords: NMDA receptor antagonist, Treadmill, Elevated plus maze, Rats

AO6 Identification of novel cardiac transcription factors involved in direct reprogramming of mouse fibroblasts to cardiac progenitor cells

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Heart disease is one reason of morbidity worldwide which accounts for approximately 33% of all deaths. Cardiac cells after myocardial infarction (MI) lose their function and become Oscar tissues. There is a new strategy that called direct reprogramming or Transdifferentiation, that explains how a somatic cell can be converted to another type of cell, without transition from pluripotent state. Therefore, this study helps to explore the key genes and transcription factors using by bioinformatics approach. The gene expression dataset GSE61486 and GSE77375 were extracted from the Gene Expression Omnibus database, and the Galaxy software was utilized to identify the Differentially Expressed Genes (DEGs) for all both study. Functional and enrichment analyses of the DEGs were performed by the EnrichR. Up-regulated genes and down-regulated genes consider cardiac progenitor- and fibroblast-specific genes, respectively. By using this database, we reach a list of kinases, microRNAs and the upstream transcription factors. in each step, we used VENNY to utilized common up genes. Then, the protein-protein interaction (PPI) network of the up-regulated genes was constructed and visualized using STRING database and Cytoscape software, respectively. CytoHubba used to utilized rank the important nodes (genes) of the PPI modules. Moreover, the upstream regulatory network and the miRNA-target interactions of the up-regulated DEGs were analyzed by the X2K web and the *miRTarBase* respectively. Top 10 transcription factors, kinases, and miRNAs were also determined. To the best of our knowledge, the association of SUZ12, GATA4, TBX5, TBK1, has-miR-555 with direct reprogramming was reported for the first time. We hope that our data can shed light on the dark side of Direct reprogramming and create a new perspective.

Keywords: Bioinformatics, Direct Reprogramming, Cardiac progenitor cells, Transcription factors, Protein kinase, Metabolite

AO7 Effect of Mating Status on the Female Mate Choice in the Aphidophagous Ladybird Beetle, *Hippodamia variegata* (Goeze) (Coleoptera: Coccinellidae)

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Since the process of gamete production and fertilization are costly in terms of being predated, infected or injured; therefore, a methods to optimize the distribution and utilization of these gametes is to choose mates based on their mating status. Many studies consider that virgin males can provide more nutrients to females via ejaculates than previously mated males and this can lead to greater fecundity; however, previously mated males may be more competitive than virgin males and they attempt to copulate more frequently, while in several investigations male mating history could not alter female reproductive success. In this experiment, we examined female mate choice of *Hippodamia variegata* when exposed to two males with different mating status, a virgin male and a previously mated male and we observed to record the male with which the female mated. By using Mann-Whitney U test through SPSS software it was clear that female choices did not differ between virgin and previously mated males (13 virgin and 12 mated males of 25 females; two-tailed binomial test: $P = 1.000$). The copulation latency was shorter for mated males ($U = 10.000$, $P = 0.0005$) and, moreover, the copulation duration was longer for them ($U = 0.0005$, $P = 0.0005$). Our study reveals that sexual status of males does not affect female mate choice, but more eagerness can explain shorter period prior to copulating for males with mating

history; however repeated matings probably cause reduction in ejaculate production and consequently prolonged mating duration could assure paternity share.
Keywords: Mating experience, Sexual selection, Reproductive success, Paternal effect

AO8 The effects of low fructose diet combined with α-lipoic acid supplementation on rat model of non-alcoholic fatty liver disease

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Non-alcoholic fatty liver disease (NAFLD) is one of the most common liver diseases which could lead to fibrosis and cirrhosis .Insulin resistance often associat with NAFLD and progression of it. Previous studies have reported that fructose and lipoic acid could prevent insulin resistance. In this study, a low-fructose diet combined with α-lipoic acid was used to evaluate its effect on hepatic steatosis, insulin resistance and some parameters of NAFLD due to high fat diet in the Sprague-Dawley rats. Male rats were divided into five group (n=8). Normal control group (NC), high fat diet group (HF), fructose group (Fru), lipoic acid group (Lip) and fructose plus lipoic acid group (Fru+Lip). The high fat control group was orally treated with the high fat emulsion diet (HFD) and fructose group orally treated with the HFD plus fructose (1g/kg), Lipoic acid group orally treated with the HFD plus lipoic acid (60g/kg) and fructose plus lipoic acid group orally treated with the HFD plus fructose (1g/kg) combined with lipoic acid (60g/kg) once per day via gavage for six weeks. After six weeks, the rats were sacrificed. Serum was collected for measurement of biochemical and ELISA analyses and also liver for hepatic biochemical parameters. Adipose tissue was collected for measurement of PGC-1α expression by Real time PCR. After six weeks, the plasma level of lipid profile, insulin resistance, TNF-α, hepatic content of malondialdehyde (MDA), and triglyceride (TG) increased and PGC-1α expression decreased in HFD group. In fructose group, serum glucose, insulin resistance, serum and liver lipid profile, TNF-α, and hepatic malondialdehyde significantly decreased and PGC-1α expression increased compared to the high fat control group (P<0/05). In addition, in Fructose plus Lipic acid group, serum glucose, insulin resistance (HOMA-IR) significantly decreased compared to the fructose group (P<0/01). This study showed that a low-fructose diet could prevent insulin resistance and hepatic steatosis that they are features of nonalcoholic fatty liver disease (NAFLD). These data also indicate that lipoic acid improved this effect and low fructose diet combined with α-lipoic acid supplementation might provide a beneficial treatment for NAFLD.

Keywords: Glucose, Insulin resistance, High fat diet, Fatty liver disease

AO9 The relationship between heart rate variability and metabolic parameters alterations in conscious rats with hemorrhagic shock

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Hemorrhagic shock (HS) is a common cause of death in trauma patients. Recently, special attention has been paid to the heart rate variability (HRV), as a useful way for identification of a wide spectrum of diseases. The aim of this study was to determine whether HRV is linked to metabolic parameters changes in compensatory class of HS. Conscious male Sprague Dawley rats were randomly divided into the sham and HS groups. After anesthesia, the tail artery and femoral vein were cannulated and fixed. Then, conscious animals were located in a small and dark chamber. After 1 hour of recovery period, HS was induced by blood withdrawal until blood pressure decreased to 40±5 mm Hg. Next, blood withdrawal was stopped. The arterial blood pressure and heart rate were recorded by Powelab system throughout the experiments. Furthermore, HRV was analyzed during three phases of compensation. At the end, the blood borne variables was measured. HRV parameters increased in the first phase of compensation in HS group and amplified in the second phase. However, HRV values were returned back to the values of sham group during the third phase of compensation in the HS group, while, blood glucose and plasma lactate levels in the HS group remained higher than the ones in the sham group. Also, there

was a marked decrease in vein oxygen content without any significant alterations in pH. This study indicated that heart rate variability in hemorrhagic shock may occur independent of the metabolic alterations.
Keywords: Glucose, Lactate, Phases of compensation

AO10 Comparison of the results of three sample preparation methods of scanning electron microscope (SEM) to study the morphological characteristics of astigmatic mites

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The use of the scanning electron microscope (SEM) images to study the morphology and taxonomy of mites along with the traditional method of optical microscope slides increases the validity of the information. Various studies have been performed on SEM sample preparation methods in different groups of mites. In this study, three experimental methods were compared and their results were analyzed for astigmatic mites. Samples were stored in 70% ethanol for 10 days for fixation and after washing in distilled water, these three methods were performed as follows, first method: samples were stored in 70% ethanol and glycerol solution for one hour, transferred on the stub, and left at room temperature overnight, Second method: samples were stored in 50% ethanol and glycerol solution for 30 minutes, stored in 70% ethanol and glycerol solution for 30 minutes, transferred on the stub, and left at room temperature overnight, third method: samples were stored in 70% ethanol and glycerol solution at room temperature overnight, transferred on filter paper, and transferred on the stub. Imaging was performed after the coating of the samples with gold. The first method images were better than the other two methods in terms of the shrinkage of different surfaces of the sample and the detection of taxonomic features. In this study, unlike many other methods of sample preparation, toxic compounds were not used. Due to the morphological diversity and sensitivity of mite specimens to the preparation methods, it is necessary to improve these methods for other groups of mites and even at the species level.
Keywords: Taxonomy, mite, ethanol

AO11 The inhibitory effect of Sinusoidal Electromagnetic Field and Betaine on the expression of RUNX2 and OCN genes human adipose tissue derived-mesenchymal stem cells in vitro

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Pulsed Electromagnetic Field (PEMF) and Betaine are two safe factors in bone lesions repair. The stimulatory effects of betaine on osteogenic differentiation of human osteoblast - like cells was reported. Despite the wide range of success PEMF therapy in bone disorders, but the inhibitory effects of PEMF on osteoblast proliferation, differentiation and mineralization in vitro were reported. So The aim of this study was to investigate the effects of these inducers on the osteogenic differentiation of human adipose-derived stem cells (hASCs) . The ells were extracted from abdominal adipose tissue after obtaining written informed consent and cultured until the third passage. Isolated cells were confirmed by flow cytometry and differentiation into osteocytes and adipocytes. The experimental groups were: negative control (cultured cells in α-MEM and 10% FBS), positive control (cultured cells in osteogenic differentiation medium, ODM), OD + BET (cultured cells in ODM containing 10 mM betaine), OD + EMF (cultured cells in ODM and exposed to 50 Hz frequency and 1mT intensity sinusoidal electromagnetic field, 8h/day). After 7 and 14 days, osteogenic differentiation by cell morphology and the expression of genes (*RUNX2* and *OCN*) using Real time PCR were evaluated. There was a significant increase of *RUNX2* and *OCN* mRNA levels in the positive control compared to the negative control. At the end of day 14, a significant decrease of *RUNX2* gene expression in the OD + BET compared to positive control was observed. There was, a significant decrease of genes expression in the OD + EMF compared to positive control and OD + BET, at the end of 7 and 14 days. Treatment of cultured hADSCs in ODM by betaine and EMF leads to decreased expression of osteogenic related genes and osteogenesis.
Keywords: Human adipose stem cells, Electromagnetic field, Betaine, osteogenic differentiation, Real-time PCR

AO13 Constructing gene regulatory network of cardiomyocytes derived from various Transdifferentiation approaches

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Heart disease is one of the most important and most common causes of death among adults and even children in worldwide. In recent years, a novel approach called transdifferentiation, has been devised. In this approach, differentiated cells, such as fibroblasts, which, under normal conditions, are unable to differentiate into other cells, are directly transformed into other differentiated cells, such as heart cells. Investigating on the effect of gene expression in the transdifferentiation process, can be helpful in better understanding in this approach. In the present study, the gene expression profiles of GSE49192 and GSE55820 were derived from Gene Expression Omnibus (GEO) database, further analyzed by R script. Then, through Limma package, statistical parameters adj.P.vlaue<0.05 and |LogFC|≤-1.5 and |LogFC|≥1.5 were applied to determine Differentially Expressed Genes (DEGs). The GO and KEGG analyses were conducted through Enrichr. The protein-protein interaction (PPI) network of the DEGs was established through STRING website, visualized by Cytoscape and further analyzed by MCODE. The cytoHubba plug-in was used to identify hub genes. Our analysis showed that 400 and 898 genes were upregulated in GSE49192 and GSE55820, respectively. Moreover, 246 and 894 genes were downregulated in GSE49192 and GSE55820, respectively. The analysis showed that HAND2 ،GATA4 ، MEF2C, TBX5, ISL1 ،JUN and CREB are the most important TFs in the PPI network of direct reprogrammed cardiomyocytes. It was found that TBX5, MEF2C and ISL1 were that hub genes in directly reprogrammed cardiomyocytes through both studies. These factors have been used recently in Transdifferentiation studies and led to improve the efficiency. We also found that the actin binding is the most enriched pathways in direct reprogramed cardiomyocytes. The results of this study might help to achieve a better and more accurate understanding of the cardiac reprogramming process by these two methods, as well as application of identified factors might increase the efficiency of cardiomyocytes generation via differentiation and Transdifferentiation.

Keywords: Cardiac direct reprogramming, Fibroblasts, Transcription Factors, Small Molecule, Bioinformatic

AO14 Effect of alamandine on cardiac contractility, blood pressure and ECG of rats treated with cardiotoxic agent doxorubicin

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The renin-angiotensin system (RAS) plays an important role in the pathogenesis of cardiovascular diseases. Alamandine is recently identified as a component of RAS. In the cardiovascular system, alamandine actions included vasodilation, antihypertensive, and antifibrosis effects. The aim of the present study was to evaluate the potential protective effect of alamandine on doxorubicin (Dox)-induced cardiac toxicity. Rats received DOX (3.75 mg / kg/week) i.p to reach total cumulative dose (15 mg / kg) and alamandine (50 µg / kg / day) via mini-osmotic pumps for 42 days. Cardiac toxicity was evaluated by measuring hemodynamic parameters, electrocardiogram and histopathological findings. The results indicated that systolic blood pressure (SBP), diastolic blood pressure (DBP), left ventricular systolic pressure (LVSP), +/- dP/dt(max) in rats treated with DOX were significantly lower and left ventricular end diastolic pressure (LVEDP) was significantly higher than control and DOX+alamandine group. Doxorubicin increased PR and QT intervals significantly. Whereas, RR intervals were significantly decreased. Alamandine co-administration significantly attenuate these changes. The histopathological findings confirm the results. In conclusion, alamandine attenuated doxorubicin-induced alteration in ECG pattern and restored the mechanical and physiological functions of the heart.

Keywords: Renin Angiotensin System, Heart

AO15 Extraction of chitin and chitosan from shrimp shell *Penaeus semisulcatus* and blue swimmer crab *Portunus segnis*

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Chitin is the most abundant amino polysaccharide in nature. The sell of crustaceans such as crabs, lobsters, shrimps, and some cephalopods, etc., contains chitin. Chitosan is a polymer obtained by chitin deacetylation. Chitin and chitosan have attracted much attention, especially in the medical and pharmaceutical industries. The purpose of this study is to use marine wastes to produce biological compounds such as chitosan. Chitosan from shrimp shell p. semisulcatus External vasculature, carapace, chest and abdomen, claws and legs of the blue swimmer crab p. Segnis was extracted using hydrochloric acid (HCl), sodium hydroxide (NaOH) and hydrogen peroxide (H2O2) at different concentrations and temperatures during processes to remove minerals, proteins, pigments and various acetylation methods. This study was performed by changes in the concentration and temperature of the materials. The percentage of optimal chitosan purity was determined using FTIR analysis and its value was estimated to be 81%. The results of the present study showed that crab and shrimp shells are a potential source for the production of chitin and chitosan. Extraction of bioactive substances from marine organisms can be a way to reduce environmental pollution and use them optimally to replace these substances with environmentally friendly chemicals, in solving the environmental problems of human societies.

Keywords: Marine wastes, crustaceans, bioactive substances, chitosan

AO16 Study of the effect of punicalagin on improving behavioral function in streptozotocin-induced Alzheimer's disease in male rats

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Alzheimer's disease is a progressive and irreversible disease that eventually leads to neuronal loss and neurodegeneration. Based on the findings, oxidative stress is the most important hypothesis involved in the pathophysiology of Alzheimer's disease, in which free radicals lead to cell damage, pathology and memory loss. Punicalagin is the main antioxidant substance in pomegranate, and has many physiological activities, including strong antioxidant and anti-inflammatory properties. In this study, the protective effect of punicalagin against streptozotocin-induced memory impairment was investigated. Male Wistar rats weighing 200-250 g were used in five experimental groups. Streptozotocin was injected intracerebroventricularly into the animal (3 mg/kg, twice with an interval of 48 h). Also, Punicalagin was injected intracerebroventricularly (0.1 mg/kg) for 3 days. 14 days after receiving streptozotocin, behavioral tests for Novel object recognition and passive avoidance learning were performed to assess learning and memory ability, and then evaluated with Prism program. The results showed that the ability to Novel object recognition in the STZ group decreased significantly compared to the control group as well as the treatment group. Also, the study of the items measured in the passive avoidance learning test shows a decrease in learning of the STZ receiving group compared to the control and treatment groups. According to the results, it seems that punicalagin can prevent streptozotocin-induced learning and memory impairment and improve brain behavioral function. Therefore, considering the effectiveness of punicalagin in the results of behavioral tests to detect a Novel object recognition and passive avoidance learning, it can be used to reduce the destructive effects of Alzheimer's disease.

Keywords: Antioxidant, novel object recognition, passive avoidance learning

AO17 The Study of The Carbamazepine on Electrophysiological Parameters of Seizures during Unilateral Kindling in the CA1 Region of the Dorsal Hippocampus in Adult Male Rats

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Epilepsy is a chronic and multifactorial disease with recurrent seizures. Carbamazepine is the most common drug used to treat epilepsy. In this research project, the effects of carbamazepine on the seizure parameters in adult male rats during dorsal hippocampal are investigated epilepsy by electrical kindling method. In this study, 28 adult male rats were randomly divided into 4 groups. Animals in the Kindle group received daily kindling stimuli rapidly in the CA1 region of the dorsal hippocampus. In the drug-kindle groups (CBZ20K and CBZ40K), *20 mg/kg* and *40 mg/kg* of carbamazepine were injected before receiving kindling stimuli. In the methylcellulose + kindle (MCK) group, before receiving kindling stimuli, the value 0.2 ml of methylcellulose solution was injected. Seizure intensity indices, duration of afterdischarge, and duration of seizures were recorded during execution. The results show that there is a significant difference between the mean seizure severity in comparison between the two groups. However, there is no significant difference between the mean duration of afterdischarge in the two groups MCK and CBZ40K. In addition, there is no statistically significant difference between the mean duration of seizures in the two groups KND and MCK**.** The results show that the effective amount of carbamazepine in the CBZ40K group reduces the severity of seizures, the duration of afterdischarge and the duration of seizures compared to rats in the KND group. **Keywords*:***Epilepsy, Duration& Severity of Seizure, Afterdischarge duration

AO18 Oxytocin improves behavioral and molecular abnormalities induced by functional disruption of mitochondrial complex II enzyme: The role of OXTR in improving depression in male and female rats

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Background: Energetic metabolism is a major determinant of cellular viability and its disruption in neural cells can lead to neurodegenerative diseases. Mitochondrial complex II enzyme has a pivotal role in ATP production and toxins like 3-NP interfere with its function and causes Huntington-like symptoms. In this study, we tested efficacy of oxytocin (OXT) to modify 3-NP-depression and underlying molecular changes. Methods: This study is performed as an original reseach on mouse samples. A single dose intraventricular injection of OXT was used as the pretreatment. Then, injection of 3-NP was used for modeling similar pathology of Huntington in male and female rats. Forced swim test was employed for testing depression and western blot analysis was performed for measuring the levels of oxytocin receptor (OXTR) in striatum (ST), prefrontal cortex (PFC), hippocampus (HIP), and amygdala (AMY). Results: We found that 3-NP induced depression-like behaviors in forced swim test. It increased immobility time and reduced swimming and struggling duration. Pretreatment with OXT significantly improved these behaviors in male and female rats. It reduced immobility time and increased swimming and struggle duration. Also, 3-NP reduced the levels of OXTR in ST, PFC, HIP, and AMY consistantly. Pretreatment with OXT prevented 3-NP to reduce the levels of OXTR in all the studied brain regions. OXT improved the molecular changes similarly in males and females. Conclusions: These data suggest that OXT can prevent the development of depression in Huntington in both behavioral and molecular levels.

Keywords: Oxytocin, OXTR, Depression, Mitochondrial complex II enzyme**,** 3-NP

AO19 Investigating the protective effect of taurine on levels of oxidative stress, testosterone and sperm parameters against cyclophosphamide-induced toxicity in NMRI male mice

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Cyclophosphamide is an anti-tumor drug, widely used in the treatment of cancer, autoimmune diseases, and organ transplants, which has severe side effects on fertility. This study was performed to investigate the protective role of taurine, as an antioxidant, against the toxicity of cyclophosphamide. In this experiment, adult male NMRI mice were divided into four groups (n=6): control, taurine (100 mg / kg gavage administration per day), cyclophosphamide (100 mg / kg intraperitoneal injections per week) and finally cyclophosphamide + taurine group. After 35 days of treatment, mice were sacrificed. Serum and sperm samples of each mouse were collected and biochemical factors, sperm parameters such as count, motility, morphology, viability, membrane integrity, sperm nucleus maturation and DNA damage and also serum levels of testosterone, total antioxidant capacity (TAC) and malondialdehyde (MDA) were evaluated. A significant decrease in sperm parameters, levels of testosterone and total antioxidant capacity and also a significant increase in the serum level of malondialdehyde were observed in the cyclophosphamide group compared to the control, whereas Sperm abnormalities and malondialdehyde levels reduced significantly in the cyclophosphamide + taurine group when compared to the cyclophosphamide group. Our data also showed a significant increase in the levels of testosterone and TAC in the cyclophosphamide + taurine group compared to the cyclophosphamide group ($p<0.05$). No significant difference was observed in the amount of DNA damage and Sperm nucleus maturation in the cyclophosphamide group compared to the control group ($p>0.05$). We conclude that taurine is effective in ameliorating the adverse effects of cyclophosphamide-induced oxidative stress.

Keywords: Cyclophosphamide, Taurine, Oxidative stress, Infertility, Sperm parameters

AO20 Identifying the span of changes in the distribution of Eurasian marsh frog (*Pelophylax ridibundus)* in the context of climate change

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Global assessments of the biological and conservational status of various species have shown that amphibians are more impacted by climate change than other vertebrates. Therefore, the purpose of this study was the investigation of habitat potentials of *Pelophylax ridibundus* in Iran. In the present study, considering the importance of the effects of climate change on the distribution potentials of species, an attempt was made to use the SDM statistical package and to use four models GLM, RF, BRT and Maxent to identify the distribution potentials of swamp frogs in Iran in current climatic conditions and 2080 (RCP8.5 scenario). The occurrence points were collected by the authors. Also, the climate layers were prepared from the WorldClim global site . Using the VIF test, among 19 climatic variables, independent variables were identified and used for modeling. Finally, in this study, the ensemble approach was used to reduce the uncertainty in modeling. The results of the study showed that in general, the Caspian Sea coasts, central Zagros, southern Zagros, and areas of southeastern Iran are favorable areas for the distribution of this species. Currently, areas in Gilan, Mazandaran, Golestan, Kurdistan, Bushehr, and Sistan and Baluchestan provinces and 2080 climate conditions, smaller areas in Mazandaran, Gilan, Kurdistan, Kermanshah, and Sistan and Baluchestan provinces have the greatest potential to for this species distribution. The results also showed that currently 39.24% and in the future climatic conditions 31.14% of areas with distribution potential are within the network of protected areas in Iran and the Bio19 variable is the most influential variable in the species distribution. Although the species under study is on the Least Concern (LC) category, it is nevertheless recommended that conservation approaches be increased in these areas and to use the potential of existing protected areas to protect this species using appropriate and specific approaches.

Keywords: Amphibian**,** Species distribution modeling, Conservation, Climate change

AO21 Study of metazoan parasite infections of *Rastrelliger kanagurta* (Cuvier, 1816) fish collected from the coast of Sistan and Baluchestan (Chabahar)

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A total of 61 fish of *Rastrelliger kanagurta* were caught from the coasts of Sistan and Baluchestan Province (Chabahar) in the summer of 2019 to study parasites. immediately transported to the Aquatic Research Laboratory of Shahid Beheshti University by a styrofoam cooler containing ice. The total length and weight of the fish were measured. Various organs of the fish including gills, eyes, stomach, pyloric appendages, gonads and intestines were examined. Isolated parasites were fixed in 70% alcohol and 10% formalin. In this study, two parasites of the digen taxonomy, including *Lecithocladium angustiovum* and *prodistomum oriental* were identified with a prevalence rate of 100 and 26.4%, respectively, An indomazocraes parasite in the monogenic taxonomy, and mazocraeidae family in the digen taxonomy were identified with a prevalence of 1.9%. Also, the study of the severity of infection of Digen parasites in different organs of fish showed that the Diges parasite of the genus Lecithocladium had the highest severity of infection (17.3 16 16.1) in the stomach. Identification and evaluation of the level of infection of these parasites have little effect on fish mortality. These are more important in terms of biodiversity and ecology.

Keywords: digenea, Lecithocladium, monogenea, Mazocraeidae

AO22 The effect of taurine on histological changes of mouse ovary after autotransplantation in the gluteus superficialis muscle

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Ovary transplantation is a promising method to preserve fertility in cancerous patients undergoing chemo/ radiotherapy. However, one of the major limitations of this technique is ischemia-reperfusion (IR) injury, which causes serve damage to the follicular cells and decreases the number of follicles in the transplanted ovaries. We aimed to investigate the effect of taurine as an anti-oxidant and anti-apoptotic agent on the histological changes of autotransplanted mouse ovaries. 18 female NMRI mice (4-5 weeks old) were divided into three groups: control, autografted and autografted + taurine (200 mg/kg/day). Mice were treated from 1 day before transplantation until 7 days after. 28 days after transplantation, ovaries were studied stereologically and the percentage of apoptotic follicles was estimated using the TUNEL assay. Data were analyzed using one-way ANOVA and Tukey's test and the means were considered significantly different at $p<0.05$. A significant decrease in the total volume of the ovary ($p<0.001$), volume of the cortex ($p<0.001$) and medulla ($p<0.001$) and the number of different types of follicles ($p<0.001$) was observed in the autografted group compared to the control, whereas the total volume of the ovary ($p<0.01$), the volume of cortex ($p<0.01$) and volume of medulla ($p<0.04$) and the number of different types of follicles ($p<0.001$) increased significantly in the autografted + taurine group compared to the autografted group. The apoptosis rate increased significantly in the autografted group compared to the control ($p<0.001$), while it decreased significantly in the autografted + taurine group compared to the autografted group ($p<0.001$).

The results showed that taurine treatment could reduce the IR induced damages to the grafted ovary tissue and improve the follicular survival through reducing apoptosis.

Keywords: ovary transplantation, ischemia-reperfusion, Stereology, Apoptosis

AO23 Design and fabrication of microfluidic device to generate gradient concentration of cryoprotectants for vitrification mouse embryo

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Embryo cryopreservation is a fundamental and widely used method in the field of assisted reproductive techniques. The way of loading/unloading of cryoprotectant agents, which require to be applied for dehydrating the embryo and consequently reduction the risk of ice crystal formation, has still remained as a matter of

concern. In the conventional cryoprocedure, embryos are sequentially transferred from an isotonic solution into a highly concentrated solution of CPAs through a few discrete steps which can be a major source of osmotic shock and mechanical injuries. *Thus, providing a platform to gradual increase the concentration of CPAs can effectively reduce the osmotic shock. Therefore, to achieve this, we designed and fabricated a microfluidic device to generate CPAs concentration gradient over time. Our design allows to inject the initial hypertonic CPAs solution into the inlet by using the controllable syringe pumps, and achieve four different final CPAs concentration (6, 9, 12, 15%) into the embryo chambers throughout time.* Afterward, the accuracy of the concentration gradient of CPAs on the fabricated chip were examined in 10 minutes by using image processing. The results showed that 15%, 12%, 9% and 6% assigned chambers reached acceptable concentrations of 14.5%, 11.9%, 9% and 5.2% after 10 minutes, respectively. To compare the efficacy of our device and the conventional procedure, we studied the volume changes and shrinkage rate of embryos. Our finding confirmed that these parameters significantly improve in those embryos that expose to on-chip CPAs loading. In conclusion, our developed microfluidic chip can effectively reduce osmotic shock and the concequent damages, which may provide a new path for vitrification of embryos in microfluidic systems by determining the optimum time/concentration point in the microfluidic system.

Keywords: Osmotic Shock, Microfluidic Chip, Cryoprotectant agents, mouse embryo, Vitrification

POSTER PRESENTATIONS

AP1 Protective Effect of *Stachys lavandulifolia* Against Seizure-induced Memory Impairment and Oxidative Stress in Experimental Models of Seizures in Rats

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Stachys lavandulifolia has been used in the traditional medicine for arthritis and rheumatism disorders. Its leaf extract has also been used to treat epilepsy and other CNS disorders. To evaluate the effect of *Stachys lavandulifolia* extracts (SLE) on experimental models of seizure-induced memory impairment in rats. Seizures were induced in Wistar rats (200–220 g) by sub-threshold dose (35 mg/kg) pentylenetetrazole (PTZ) every other day for one month and treated with SLE (25, and 50, mg/kg, intraperitoneally). After full kindling, effect on memory was assessed using passive avoidance test (PA). At the end of experiment rats were sacrificed using deep anesthesia and hippocampus was isolate for oxidative stress (malondialdehyde (MDA)) evaluation. PTZ treated groups exhibited seizures with memory deficits ($p < 0.01$) as compared to control group. SLE at highest dose (50 mg/kg) showed protection in PTZ induced seizures. SLE also attenuated the seizure induced memory impairment as indicated by significant ($p < 0.01$) improvement in the retention latencies in PA as compared to PTZ treated group .In addition, treatment with the SLE protects the hippocampus by lowering the MDA level. The findings suggest that SLE exhibited significant anticonvulsant activity and preventing memory impairment by inhibition of oxidative stress damage.

Keywords: Kindling, Behavioral test, Neurodegenerative disorders, Pentylenetetrazole

AP2 Looking at the effect of high fat diet on non-alcoholic fatty liver in mice using Glass'd effect size: A strong positive relation

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Due to the importance of life style especially the diet on functional integrity of liver, we study the effect of high fat diet on the hepatocyte function and structure in mice. Consequently, we divided the mice into two groups; the first group, n=8, fed with standard rodent chow, 10Kcal, and the other group, n=16, fed with high fat diet, standard chow plus 4% cholesterol and 50% corn oil. The mice kept for eight weeks and later their liver, and serum isolated and analyzed. We used the hematoxylin and eosin to dye the liver tissues and test the ballooning, inflammation, steatosis in the tissue. Also, we checked the fluctuation of liver enzymes such aspartate aminotransferase (AST) and alanine aminotransferase (ALT). The result revealed in addition to the increase in the liver enzymes such as ALT and AST, inflammatory cells, ballooning, and macro-vesicles increased sharply in hepatocytes. Using Glass'd analysis for effect size, demonstrated there is strong positive relation between the high fat diet and the factors we estimated above. In contrast to the meaningfulness of the data, the confidence interval of the effect size demonstrate inconclusiveness of the result. Thus, we think the experiment must be repeated with bigger sample size to confirm the results.

Keywords: Liver, Aspartate aminotransferase (AST), Alanine aminotransferase, Inflammation, Steatosis, Ballooning

AP3 Effects of ethanolic extract of *Zataria multiflora* and closantel on *Fasciola hepatica* egg hatching in in vitro conditions

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Closantel is an antiparasitc drug widely used for treatment of fascioliasis as well as other parasitic infection like haemonchosis in cow, sheep and goat. The effects of *Zataria multiflora* in treatment of bacterial, parasite and fungal infection has been proved by several researchers. The aim of this study was to evaluate ethanolic extract of *Zataria multiflora* and closantel on hatching egg of Fasciola hepatica in in vitro condition. Zataria extract perform with 70° ethanol and 100, 75, 50, 25, 10, 5, 2, 1 mg/ml dilution were prepared. The same dilution of closantel also prepared. For evaluation 900 µl of *Zataria multiflora* extract or drug adjacent with 100 µl egg extract for 16 days in 24°c. Results showed that in comparison with control group, closantel and *Zataria multiflora* extract were significantly decreased the egg hatching ($P<0.05$). These result in correlation with

extract or drug concentration. Egg hatching in closantel groups were significantly decrease in compare with Zataria multiflora extract groups ($P<0.05$). In addition to, closantel effectively decrease the egg hatching percentage of *Fasciola hepatica* and it can be used as a first choice drug for treatment of infection. However, the *Zataria multiflora* extract show a significant decrease in egg hatching percentage and it seems the side effect of extract is less than closantel and it can be used as an alternative treatment protocol in *Fasciola hepatica* infection.

Keywords: Medicinal plants, trematodes, Sheep liver worm, anti-parasitic

AP4 A study of the hydroalcoholic extract of Malva neglecta on ovarian hormones in rats

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Estrogen and Progesterone are important hormones during pregnancy and play an important role in supporting pregnancy and the fetus. Testosterone is secreted in the female sex by the ovaries and adrenal glands, but too much of this hormone during pregnancy can be life-threatening for the fetus. Today, due to the side effects and high cost of chemical drugs, the study of plants used in traditional medicine, has become a priority. Malva neglecta is one of the important medicinal plants that is used for respiratory and digestive problems. The aim of this study is to evaluate the effects of this plant extract on the level of ovarian hormones in pregnant rats. In this study, 18 pregnant rats were divided into 3 groups: 1.Control group receiving water and food, 2.Group receiving Malva neglecta extract at a dose of 200 (mg / kg body weight per day), 3.Group receiving Malva neglecta extract at a dose of 500 (mg / kg body weight per day). Rats received the extract for 18 days daily by gavage. After 18 days, serum levels of estrogen, progesterone and testosterone were measured and the rate of abortion in pregnant rats was assessed. The results showed that the Malva neglecta reduces the levels of estrogen and progesterone and increases the level of testosterone. Also, the rate of abortion was 33.33% in rats treated with 200 doses, 50% in 500 doses and 66.66% was observed in rats treated with prostadine. Therefore, this plant is a threat to pregnancy and can cause aboration. Therefore, Malva neglecta can be a good alternative to chemical drugs in abortion therapy. To obtain more information in this field, it is recommended to study the effect of this plant on the structure of the ovaries and uterus.

Keywords: Aboration, Pregnancy, Plant

AP5 Phylogeography of Iranian long-legged wood frog (*Rana pesudodalmatina*)

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Amphibians are very important taxa which their populations have sharply declined in recent years .Therefore, they deserve more detailed studies and special conservational attentions. Iranian long-legged wood frog (*Rana pesudodalmatina*) is one of the endemic species of the country which belongs to the order of Anura. Its distribution is limited to the southern Caspian Sea in Hyrcanian Forests. The aim of the current study is to investigate phylogeography and genetic diversity of the species. Therefore, some samples were collected from its distribution range in the northern provinces including Golestan, Mazandaran, and Gilan. The collected individuals are studied using two mitochondrial genes 16S ribosomal RNA and cytochrome b. The results revealed that the individuals of the species form two main eastern and western clades. The Intraspecific genetic diversity was low between sequences. Haplotype diversity based on 16S gene and cytochrome b gene was 0.6 and 0.7, respectively. The parsimony statistical network for the cytochrome b showed one haplogroup for *Rana pesudodalmatina* and indicated that ancestral haplotype was located in the western region of the distribution. It seems that due to Pleistocene climate fluctuations, *Rana pesudodalmatina* was took refuge in the south of the Caspian Sea, and was then expanded its distribution range to surrounding regions during Holocene. It is suggested that this species and its habitat (Hyrcanian Forests) should be protected because it is an endemic species with low genetic diversity and unique habitat.

Keywords: Iranian Long-legged Wood Frog, Endemic, Phylogeny, Cytochrome b, 16S ribosomal RNA

AP7 Effects of the aeration systems on production efficiency of the rearing shrimp ponds (case study: Chuebdeh Site, Abadan, Iran)

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One of the decisive factors for the remediation of water quality is correlated to aeration and dissolved oxygen (DO) level. The present case study focused on the Chuebdeh site in Abadan (Iran). For this purpose, six 4 hectares- ponds with E-W direction with close position to each other were chosen. Half of them were equipped with the pedal wheel aeration system with a capacity of 59.2 kg/hour oxygen production. The stocking density was 20000 PL15 (46 mg) in square meters, and the water quality parameters were measured during the rearing period. At the harvest time, the weight gain (WG), specific growth rate (SGR), feed conversion ratio (FCR) and survival rate of shrimp were calculated. Results indicated that the aerated pond water's parameters such as DO, BOD5, COD, ammonium, nitrite, and pH were recorded equal 4.79, 5.98, 4.91, 0.085, 0.016 mg/l, and 8.4, respectively. The average WG was significantly increased in shrimp cultivated in the aerated ponds (14.5 g) compared to those without an aeration system (13.2 g) at the same time. The survival rate improved through the aerating operation by up to 88%. In conclusion, the payment of the expensive cost to install an excellent aeration system can be profitable for a long-term overview.

K**eywords:** Dissolved oxygen, Growth, Water quality, White leg shrimp (*Litopenaeus vannamei*)

AP8 Evaluation of the Reducing Effect of Trigonella foenum-graecu and Portulaca oleracea on Blood Factor in Type2 Diabetic Patients

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Many efforts have been made to treat diabetics' patients with herbal medicine in the past decade studies. According to the researches, Trigonella foenum-graecu and Portulaca oleracea seeds extracts can explain blood sugar and cholesterol-lowering effects due to having flavonoids, steroids and alkaloids and they could be used as an adjunct therapy for patients suffering from type 2 diabetics. The present research aims to assess the reducing effect of Portulaca oleracea and Trigonella foenum-graecu seeds on blood factors. In order to evaluate the effect of a period of Portulaca oleracea and Trigonella foenum-graecu seeds consumption on blood factors in type 2 diabetic patients, 24 patients with type 2 diabetes were present in 4 control groups. Diabetic patients took Trigonella foenum-graecu supplement (10 g daily), Portulaca oleracea supplement (10 g daily) and Trigonella foenum-graecu + Portulaca oleracea supplement (10 g Trigonella foenum-graecu + 10 g Portulaca oleracea daily) for 8 weeks. Blood sampling was performed in two stages before and after the test and fasting blood sugar factors, blood sugar two hours after a meal, low-density lipoprotein (LDL) and high-density lipoprotein (HDL), triglycerides, total cholesterol, urea and Creatinine was measured and to analyze the results paired t-test was used, and analysis of variance and Tukey's post hoc test were considered for group comparison. Blood glucose two hours after a meal, blood LDL, triglycerides and total cholesterol in diabetic patients and in these factors, the treatment of 10 g Trigonella foenum-graecu + 10 g Portulaca oleracea had a reducing effect; therefore, this treatment can be used as a complementary therapy in diabetic patients not suffering acute complications of diabetes.

Keywords: medicinal plants, Cholesterol, Triglyceride, Urea

AP9 Investigation of invading scorpions in Hormozgan province (Arachnida; Scorpiones)

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Scorpions are strange animals on Earth that are 430 million years old. There are more than twenty species of scorpions with deadly venom in the world of which, three species are distributed in southern Iran. Every year,

about 32,000 people die by scorpion stings in the world of which, about 20 are belong to Iran. The most dangerous areas of scorpion stings are from west to south and southeast of Iran. Until now, 68 species of scorpions have been recorded for the fauna of Iran of which, 29 species are distributed in Hormozgan province. In 2020, scorpions delivered to medical centers by patients from different localities of Hormozgan province were studied. Totally, 10 species belonging to seven genera and two families were identified, including: *Androctonus crassicauda* (Pocock, 1900), *Compsobuthus plutenkoi* Kovařík, 2003, Kovařík, 2003, *Hottentotta navidpouri* Kovarik et al., 2018, *Mesobuthus eupeus* (CL Koch, 1839), *Odontobuthus* sp., *Sassanidothus gracilis* (Birula, 1900) and *S. zarudnyi* (Birula, 1900) belong the family Buthidae; and *Hemiscorpius acanthocercus* Monod & Lourenço, 2005, *H. enischnochela* Monod & Lourenco, 2005 and *H. shahii* Kovařík et al., 2017 belong the family Hemiscorpiidae. *C. plutenkoi* and *H. shahii* are rare species and collected for the second time. *A. crassicauda* and members of the genus *Hemiscorpius*, as dangerous scorpions, are widely distributed in the province. The report of *Hemiscorpius gaillardi* (Vachon, 1974) from Hormozgan province seem be the result of misidentification and more detailed studies are needed in this field. In order to prevent scorpion stings and manage patients' treatment, it is very important to know the high-risk areas, the species of scorpions active in them, as well as the familiarity of doctors and other treatment staff with dangerous species.
Keywords: Fauna, Buthidae, Hemiscorpiidae, systematic, Iran

AP10 A survey on Scorpions (Arachnida; Scorpiones) of Sistan & Baluchistan province

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Scorpions (Arachnida; Scorpiones) are important group of Arachnids were appeared about 430 million years ago, and distributed in the world except Antarctica. Every year, about 1.230.000 people are bited by scorpions in the world and 32.250 of them are died. Scorpions feed on many insects and play important role in biological control of pests. Until now, 68 species of scorpions are reported for the fauna of Iran, of which 19 species are recorded from Sistan & Baluchistan province. This study was done during 2016-2019 in different locality of Sistan & Baluchistan province. All samples were collected from different localities by daytime excavation and using UV ultralight in night. Totally 10 species belonging eight genera and two families were collected and identified, consisting: **Buthidae**: *Androctonus baluchicus* (Pocock, 1900) from Zabol; *A. crassicauda* (Olivier, 1807) from Iranshahr, Khash, Nikshahr, Seravan, Zabol and Zahedan; *Hottentotta sistanensis* Kovarik et al., 2018 from Mehrestan and Seravan; *Kraepelinia palpator* (Birula, 1903) from Zabol; *Mesobuthus eupeus* (C. L. Koch, 1839) from Chabahar, Iranshahr, Khash, Mehrestan, Nikshahr, Souran, Zabol and Zahedan; *Odontobuthus tirgari* Navidpour et al., 2013 from Iranshahr, Khash, Seravan, Zabol and Zahedan; *Orthochirus fuscipes* (Pocock, 1900) from Chabahar, Iranshahr and Zabol; *Sassanidothus gracilis* (Birula, 1900) from Iranshahr and Zabol; *S. zarudnyi* (Birula, 1900) from Zabol; **Hemiscorpiidae**: *Hemiscorpius persicus* (Birula, 1903) from Nikshahr. *M. eupeus* has distributed in all areas of province. *A. crassicauda* as one of dangerous species showed a wide distribution in this province. Also, two new species of *Odontobuthus* Vachon, 1950 were identified. These two species will be described in next time. Identification of species and its distribution area, especially for medically dangerous species, can be useful for in health management and biological control of agricultural pests.
Keywords: Fauna, Buthidae, new species, systematic, Iran

AP11 The study of rs450819 polymorphism on metabolic syndrome in people with mutation in DYRK1B gene

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Metabolic syndrome is the clustering of multiple factors that directly increases the risk of cardiovascular disease and type 2 diabetes. Two missense mutations of the DYRK1 B gene, including H90P and R102C, were recently found to co-segregate with a rare autosomal-dominant form of the metabolic syndrome, called

abdominal obesity-metabolic syndrome(AOMS3). Affected individuals developed an early-onset cardiovascular disease, hypertension, central obesity, and diabetes. DYRK1B R102C mutation significantly increases the key gluconeogenic enzyme and glucose-6-phosphatase. In this research, we evaluated the association between SNP rs4508194 and metabolic syndrome in individuals with DYRK1B gene mutation.SNP rs450819 genotypes are determined by polymerase chain reaction in121 heterozygote and homozygote subjects in DYRK1B gene. PCR products were sequenced and then a survey was done on sequences. Data were analyzed with chi-square statistical testing and Prism6 and SPSS software.results do not showed a correlation between this SNP alleles and increase metabolic syndrome risk in individuals suffering from metabolic syndrome and this illness risk factors.

Keywords: Metabolic syndrome, Cardiovascular disease, DYRK1B gene, SNP rs450819

AP12 On the diet of *Hyla savignyi* (Amphibia: Anura: Hylidae) in western Iran

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The anurans order is the most diverse group of amphibian with more than 6200 known species belonging to 49 families, is widely distributed on all world except Antarctica. There are two species of tree frogs belonging family Hylidae in Iran. Anurans are opportunistic predators that feed upon numerous food resources occurring in their environment. This research that carried out in Spring and Summer 2020 in Ilam province, using the stomach flushing technique, a total of 69 specimens of *Hyla savignyi*, were flushed. A total number of 371 food items were identified. Examination of the stomach contents demonstrated that the diet of this species was more diverse and mainly consist of terrestrial insects, including hymenopterans and coleopterans. The high variety of prey items such invertebrates is reflect the diversity of the study area. The presence of different size preys indicates an opportunistic feeding.

Keywords: Amphibian, *Hyla savignyi*, Stomach flushing, Insects

AP13 Investigation of the morphological variation in populations of *Stenus erythrocnemus* (Col.: Staphylinidae) in Iran

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Species with wide distribution ranges usually exhibit broad morphological diversity in response to gradient of biotic and abiotic factors. The aim of this study was to compare morphological variation among populations of *Stenus erythrocnemus* in Iran. Measuring of fourteen morphological characters such as ocular distance, elytra length, femur length etc. of 71 specimens from Ilam (Eyvan), Guilan (Asalem), Fars (Dasht Arjan) and Lorestan (Nour Abad) provinces were carried out. In order to measurement of characters, slides were prepared and photos were taken and distances were measured on images in ImageJ software. The analysis of morphological data was done using SPSS software and analyzed by ANOVA, MANOVA, PCA, DFA and cluster analysis. The results of one-way ANOVA analysis showed a significant difference between 9 relative characters ($p<0.05$). Principal Component Analysis revealed three main components, which accounted for 70.97% of the total variance. The separation of Ilam and Lorestan populations from Gilan and Fars was confirmed by PCA and CVA analysis. The ecological factors can affect the morphological characteristics, therefore, the morphological differences among populations could be due to differences in habitat characteristics that species live in it. Thus, with morphological flexibility, the organisms can increase their chances of survive in a habitat.

Keywords: Morphological flexibility, Cluster analysis, PCA, Habitat, *Stenus*

AP14 Investigation of the level of hepatic enzymes and liver tissue mature female *Trichogaster trichopterus* in extract of *Vitex agnus castus* and Fluoxetine

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Today, traditional medicine and the use of herbal extracts have found a special place among the patients. Studies show that herbs have a significant role in protecting the liver against toxins.This study was performed to investigate the protective effects of Iranian medicinal plants on fish liver. The *Vitex agnus castus* is a plant from the family of (Verbenaceae) that has long been used in traditional medicine. This herb is used to regulate the female hormones and to eliminate menstrual disorders. Fluoxetine is an antidepressant drug from the family of selective serotonin reuptake inhibitors. The aim of this study was comparison of the effect of alcoholic extract of *Vitex agnus castus* plant and fluoxetine on liver tissue and liver enzymes in mature female three spot Gourami.This study was carried out in the Faculty of Pharmacy, Islamic Azad University of Tehran. For this purpose, 120 mature female fish speciments of *Trichogaster trichopterus* with average weight of (3±1)grams in 10 treatments were divided into control groups, each groups consisted of 12 pieces of fish, control 1 (intact) and control 2 (ethanol injection)and treatment groups receiving 10, 20, 30, 50 mg/kg alcoholic extract of the fruit of *Vitex agnus castus* and 1, 3, 5, 7.5 mg/kg of fluoxetine. All the experiments were administered 10 times one day in between in the form of an intramuscular (IM) injection within 20 days and were repeated 3 times. At the end, after anesthetizing the fishes, liver and liver enzymes were studied in treatment groups and compared with control groups. The statistical results of the level of liver enzymes between the control groups and the treatments showed a significant differences ($P < 0.05$). The findings of this research showed an increase in the hepatic enzymes of fluoxetine and *Vitex agnus castus* extracts. The results of this study showed that the extract of Vitex agnus castus and fluoxetine increase in dosage affected liver tissue and liver enzymes. Also, the effects of Vitex agnus on liver tissue were less than fluoxetine and the Vitex agnus did less damage to the liver tissue.

Keywords: *Vitex agnus castus*, *Trichogaster trichopterus*, Fluoxetine, liver, hepatic enzymes

AP16 Study of the Effect of Genistein on the Renal Function in the Ischemic Acute kidney Injury in Male Rat

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Background and Aim: It is well known that there are gender differences between susceptibility to acute kidney injury (AKI) and 17 β-estradiol (E2-β) protects against the post-ischemic AKI. Genistein is a phytoestrogen which can be an agonist of estrogen β receptor. The goal of this study was to determine whether genistein has a protective role against renal ischemia/reperfusion (IR)-induced functional disorders of the kidney in male rats. Methods: Rats under anesthesia by an intraperitoneal (i.p.) injection with ketamine and xylazine were placed on a warming surgical table. Following incision in the midline of abdomen, artery and vein of both kidneys were carefully separated from each other The animals were dedicated to five groups (n=7): sham, G + sham (genistein, 15 mg/kg in 1 ml 1% DMSO, i.p.), DMSO + sham (1 ml 1% DMSO, i.p.), I/R (45 min bilateral renal ischemia followed by 24 h reperfusion), G + I/R (genistein, 15 mg/kg in 1 ml 1% DMSO, i.p. 30 min before the induction of ischemia as well as 1 h after the induction of ischemia). Then, the rats were put in metabolic cages for 24 hours, and subsequently, urine, blood and tissue samples of the kidney were collected. Results: Compared to sham, sham+G and sham+DMSO groups, IRI ended in kidney dysfunction, as revealed by decreased creatinine clearance (C_{Cr}), increased fractional excretion of sodium (FE_{Na}) and potassium (FE_K), as well as decreased effective free water reabsorption ($^{eff}T^c_{H2O}$). This was happened with an increase of malondialdehyde levels in renal tissue. Genistein administration decreased all the changes. Conclusion: Genistein apparently protects against renal I/R-induced injuries of the kidney via increasing renal blood flow and decreasing lipid peroxidation in kidney tissue.

Keywords: Creatinine, Clearance, Fractional excretion, Ischemia/reperfusion, Lipid peroxidation

AP17 Non-steroidal Anti-inflammatory Drug, Tolmetin Attenuates Pentylenetetrazole-induced Seizure and Improve Passive Avoidance Memory Deficits in Male Wistar Rats

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Large body of evidence suggests that anti-inflammatory agents and antioxidants have neuroprotective properties and may be beneficial in the treatment of neurodegenerative disorders. To evaluate the effect of tolmetin (a non-steroidal anti-inflammatory drug) on experimental models of seizures, and seizure-induced memory impairment in rats. In this experimental study, male Wistar rats (200-220 g) randomly divided to negative control (saline injection), positive control (pentylenetetrazole (PTZ) injection) and the tolmetin (50, and 100, mg/kg ,intraperitoneally). Seizures were induced in by PTZ (60 mg/kg) and the anticonvulsant effect of the tolmetin was evaluated in seizure models. Effect on memory was assessed using passive avoidance test (PA). In experimental study, PTZ treated groups exhibited seizures with cognitive deficits ($p < 0.01$) as compared to control group. Tolmetin at highest dose (100 mg/kg) showed protection in PTZ induced seizures. In addition, it also attenuated the seizure induced memory impairment as indicated by significant ($p < 0.05$) improvement in the retention latencies in PA as compared to PTZ treated group .The findings suggest that tolmetin exhibited significant anticonvulsant activity and indicate its usefulness as an adjuvant to antiepileptic drugs with an advantage of preventing memory impairment.

Keywords: Anticonvulsant, Behavioral test, Drug pharmacology, Neurodegenerative disorders

AP18 Cigarette butt-induced oxidative stress in the liver of goldfish

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Annually, over 5.5 trillion cigarettes are produced worldwide, and it is estimated that 4.5 trillion cigarette butts (Filters) are still being littered in the world. The dispersal of cigarette butts has caused this hazardous waste to be considered as one of the most important environmental risks all over the world. Cigarette butts are carried by stormwater into the surface waters and ultimately the deep ones. Following increases in the free radical generation and impared antioxidant defence system activity, oxidative stress is occurred leading to structural and functional dysfunctions in organisms. In the present study, our goal was to assess the possible changes in cigarette butt leachate-induced oxidative stress biomarkers in the liver of goldfish (*C. auratus* L.) under the standard lab conditions. At least 8 goldfish and leachate from 2 Kent cigarette butts were added to each 50L glass tanks and kept under standard conditions (independent triplicates). Following 7&10 days, liver samples gently removed and oxidative stress biomarkers viz. the activities of antioxidant enzymes glutathione peroxidase (GPx) and superoxide dismutase (SOD) and also carbolynated proteins (CP) content were measured as compared to controls in the liver homogenates, spectrophotometrically. Our results showed that cigarette butt leachate treatments caused a significant elevation in the levels of oxidative stress biomarkers in all fish liver samples ($p<0.05$). These changes may lead to the structural and functional dysfunctions in the certain tissues. In our study, only 3 mortality cases were seen. Collectively, once cigarette butts enter the aquatic environments may result in fish mortalities due to certain physiological disorders in their liver tissues.

Keywords: Cigarette litter, Fish, Antioxidant enzymes, Oxidation, Carbonylated proteins

AP19 Evaluation of the effects of ages and sexes on hormonal factors of *Alosa braschnikowi* in the Caspian Sea

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Alosa braschnikowi has an opportunistic nutritional behavior in the southern Caspian Sea. Due to its good weight and length, this fish is an economical and valuable species and has commercial value in the western part of the Caspian Sea. Also, it is caught by other fish such as sturgeon. The aim of this study was to measure the hormonal factors of *Alosa braschnikowi* in both males and females and at different ages to the amount of these

hormones is detected. This study was performed on 37 fish on Rudsar beach (Guilan). In order to carry out this research, the fish were caught at different ages and in both males and females in February and March, April, May and November 2018. Samples were randomly selected and immediately after sampling, blood was taken from the fish and the fish were divided into two sexes, male and female, and in 3 age groups (3, 4 and 5). Testosterone, 17-beta-estradiol and 17-alpha-hydroxyprogesterone were measured using ELISA and by the Monobind Inc (American-made) ELISA kit. Laboratory results showed that 17-beta-estradiol and 17-alpha-hydroxyprogesterone did not have statistical significant difference between the sexes ($P > 0.05$). However, testosterone levels were statistically significant between the sexes ($P < 0.05$) and the amount of testosterone in male fish was higher than female. Also, testosterone, 17-beta-estradiol and 17-alpha-hydroxyprogesterone at different ages did not have statistical significant difference ($P < 0.05$). In general, it can be said that the hormonal characteristics of this fish are not affected by age and only to some extent, sex affects these factores. It seems that the possible reason for hormonal differences in this research is impact of factors such as reproductive stages on these hormones that these stages have much more ineffectiveness compared to age and sex factors.
Keywords: *Alosa braschnikowi*, Testosterone, 17-beta-estradiol, 17-alpha-hydroxyprogesterone

AP20 Investigation of helminthes parasite fauna of *Neogobius melanostomus* in the Southern part of the Caspian Sea

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Gobiidae is a family of bony fishes in terms of high abundance and species richness have second place after Cyprinidae in the southern part of the Caspian Sea. So the members of this family are one of the unique features of this ecosystem and have a special value in terms of protection. Because of abundance and high biomass, these species play major role in food chains of economically valuable animals including Sturgeon fishes (Acipenseridae) and also they are intermediate hosts and carriers of many parasites in the Caspian Sea ecosystem. The aim of this study was to investigate helminthes parasites fauna of *Neogobius melanostomus* in the Southern part of the Caspian Sea. A total of 179 specimens of *N. melanostomus* were collected using trawl net from two stations; Nowshahr and Babolsar. During this study, abdomen, internal organ surface, gut contents and liver paranchym were investigated. In total, three species of nematodes in cyst form were separated and identified; *Raphidascaris acus* and *Streptocara* sp. from intestine and *Eustrongylides excisus* in cyst form attached to abdomen. *Stereptocara* sp. was reported for the first time from this species. Since according to diet studies of this species in the Caspian Sea, crustaceans have been the dominant element of diet, the presence of nematodes in the parasitic fauna is not unexpected.

Key words: Gobiidae, parasite, nematode

AP21 Investigation of population structure of Neogbius caspius using geometric morphometric of otolith in southern Caspian Sea

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The otoliths or hearing stone are calcified structures that are part of the auditory system of teleost fishes. The high morphological variability of otoliths has been used widely in identification of fish species and population. Analysis of population structure is the first step in proper management of species and biodiversity conservation. Gobiidae have the second place after Cyprinidae in species richness and abundance in the southern part of the Caspian Sea. The members of this family play major role in food chains of economically valuable animals including Sturgeon fishes and Caspian seal. A few studies have been conducted in analyzing of population structures of Gobiidae so far. The aim of present study is investigation of geographical variability in otoliths shape of caspian goby, *Neogobius caspius*, in southern Caspian Sea in order to understanding population structure of this species. In total, 110 otoliths of *N. caspius* were collected by special hand trawl net from four localities: Anzali, Nowshahr, Babolsar and Amirabad. After extraction of otoliths and taking digital image using stereomicroscope equipped with camera, shapes were compared between localities based on Elliptical Fourier

shape descriptors of otolith outline. The results of PCA analysis identified separate groups within our studied samples. The differences found in the otolith shapes among specimens of Anzali, Nowshahr, and Babolsar-Amirabad strengthens the existence of separated phenotypic populations of *N. caspius* in the southern Caspian Sea. So, otolith shape morphometry, probably represent a valuable tool for population identification of *N. caspius.*

Keywords: Gobiidae, population structure, Elliptical Fourier analysis

AP22 Effect of inhibition of D2 dopamine receptors on offspring's fertility of intact male rats

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Dopamine is one of the most abundant central and peripheral neurotransmitters that its D2 receptor has been found in testicular and ovarian tissues. Probably, using the drugs that affect the reproductive system Influence the physiological processes of the offspring of the parents under treatment. The aim of this study was to investigate the effect of dopamine D2 receptors (D2R) inhibition on the fertility of offspring of intact male rats. Twenty adult male *Wistar* rats weighing 190±10 were divided into two groups including saline and sulpiride (receptor antagonist of D2 dopamine) (4 mg/kg bw, ip) received. After 14 days treatment, each male rat mated with three adult female rats; female offspring of these rats were raised to normal under puberty; then body and ovaries weight, and the fertility of offspring were assessed using IVF. The mean body and ovaries weight, as well as the percentage of egg cells, biceps, blastocyst embryos, and fetuses hatched after IVF were significantly reduced in offspring of male rat under treatment with sulpiride compared with saline control group ($p<0.05$). Also, following the inhibition of dopamine D2 receptors in the parent, the percentage of discontinued embryos resulting from IVF of female offspring showed a significant decrease ($p<0.05$). Inhibition of dopamine D2 receptors in male parents reduced the fertility of female offspring.

Keywords: IVF, Sulpiride, Fertility, Dopamine

AP23 Studing the short tem memory of male offspring of intact rats treated with sulpiride

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Studies have shown that memory is impaired after using the D2 (D2R) dopamine receptor antagonists.as well as, there are dopamine receptors in the reproductive system. Probably, using the inhibitors of D2 receptors by affecting the reproductive system influences the physiological processes of the offspring of the parents under treatment. The aim of this study was to investigate the effect of dopamine D2 receptors (D2R) inhibition on the short term memory of offspring from male rats treated with sulpiride.Twenty adult male *Wistar* rats weighing 190± 10 g were divided into two groups including saline and sulpiride (antagonist of D2 dopamine receptors) (4 mg/kg bw, ip) received. After 14 days treatment, each male rat mated with three adult female rats; male offspring of these rats were raised to normal under puberty, and after puberty, they were evaluated for Short term memory by cross-maze.The results of the cross maze showed that actual alternation percentage as a memory evaluation index, was significantly reduced in offspring of male rat under treatment with sulpiride compared with saline control group ($p<0.05$).Inhibition of dopamine D2 receptors in male parent reduces the Short term memory of male offspring.

Keywords: Memory, Sulpiride, dopamine, Offspring

AP24 The relationship between lung injury and heart rate variability induced by hemorrhagic shock: a new experimental approach

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Heart rate variability (HRV) has been recently used to recognize cardiovascular disorders. The aim of this study was to determine the relationship between lung injury in different severity of hemorrhagic shock and HRV. Male Sprague-Dawley rats were randomly divided into sham group and groups with three different time courses of hemorrhagic shock (HS): Short Time Course (STC, 34.5±1.4min), Moderate Time Course (MTC, 81.6±3.9min) and Long Time Course (LTC, 137.42±10.5min). All experiments were done in conscious animals. HS was induced by blood withdrawing until blood pressure decreased to 40±5 mmHg, remaining at this level until the end of the compensatory end point. Then, animal were resuscitated by infusion of blood and lactated ringer solution. Hemodynamic was recorded and HRV was analyzed by Power Lab system and Kubios software, respectively. Besides, blood gas parameters, plasma malondialdehyde (MDA) and lung TNF-α and iNOS gene expression were evaluated. All frequency components of HRV increased from the starting point of the blood withdrawal and reached the maximum values at the compensatory end point in all HS groups. Very Low Frequency (VLF) decreased sharply and reached to below basal values after resuscitation in the all HS groups. Interestingly, VLF in the LTC group was lower than that in the other groups. Furthermore, analyzing of blood gas parameters indicated that the metabolic acidosis in the groups of STC and MTC has been compensated, while in the LTC group has not. The changes in gene expression and MDA showed a significant damage in the LTC group. In the present study we indicated an inverse relationship between VLF and the severity of lung injury in severe hemorrhagic shock which may linked to impairment in vascular myogenic function and sympathetic overactivity. Therefore, we suggest that HRV analysis could be valuable for predicting lung injuries in different level of hemorrhagic shock.

Keywords: Conscious rat, cardiovascular disorders, resuscitation

AP25 Investigate of intraspecific variability of *Pholcus phalangioides* (Araneae: Pholcidae) using molecular data from Iran

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Although studying spiders in Iran has developed dramatically (most of them include faunistic studies) the lack of proper data from important families with a wide distribution range such as Pholcidae family (Daddy long leg), in particular pholcus genus, is evident. Until now, 13 species of this genus are registered that most of them related to study from Senglet in 1974 and 2008. So, in this study, the intraspecific variability of pholcus phalangioides as a cosmopolitan species by the focus on the molecular data and were compared with its conspecifics through the distribution range using borrowed sequences from the Genbank. Specimens were collected from northern Iran, then a partial fragment of a mitochondria gene, Co1, was amplified using our newly designed specific primer. TCS program was used to draw a parsimony network to find the real intraspecific variability. The procursus of the male palp was drawn via prolateralo-dorsal view for morphological studies. Both molecular and morphological results were in line with each other as Iranian representatives share the same haplogroup with Europeans with a significant distance with the second haplogroup consist of samples from other countries such as USA (4.6%). In closing, acquiring more results using more specimens and genes, especially from the Middle East, is demanded a better phylogenetic conclusion.

Keywords: CO1, Cosmopolitan species, Daddy long leg spiders

AP26 Investigation of the L- Carnitine effect on angiogenesis and granoluza cell proliferation in transplanted mouse ovarian tissue

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The aim of this study was to investigate the role of L- Carnitine (LC) as an antioxidant on angiogenesis and follicular cell proliferative status in transplanted mouse ovarian tissue. Ovarian tissue transplantation is an emerging technology for fertility preservation. A major obstacle in survival of the ovarian implants is vascular failure which leads to tissue necrosis. NMRI mice were divided into four groups. Control (non-grafted), Transplant (autograft without treatment), Saline group (autograft+ saline), LC group (autograft+ LC). 6- weeks-old mice were ovariectomized and left ovaries were transplanted into the back muscle tissue. LC (200 mg/Kg) was injected intraperitoneally one day before surgical operation and repeated until one week after grafting. 3 weeks later, ovarian grafts were recovered and were immunohistochemically assessed. Anti- mouse CD31 immunohistochemical staining (staining epithelial cells of new blood vessels) was performed in 6- µm thick sections to evaluate neo-vascularization of the grafted tissues. The proliferative follicular cells was assessed by nuclear antigen Ki-67 immunostaining. We quantified and compared neo-vascularization and also proliferative index in all groups. Our results indicated that the expressions of tested proteins in control group were higher than transplanted groups, but their expressions had no statistically differences between transplanted groups. Our results showed that LC alone didn't show significant effect on angiogenesis and proliferative index in transplanted tissue. These results may be for lasting 3 weeks after grafting and this study should perform in first week after transplantation. It seems that usage of LC in combination with a scaffold or growth factors could improve autotransplantation results.

Keywords: Ovarian transplantation, CD31, Ki-67

AP27 Prevalence and intensity of blood parasites infections in Legless Lizards, *Pseudopus apodus* from Iran

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Parasites are known as a very diverse groups of living organism, playing a vital role in ecosystems. Haemogregarines are a large group of obligate intracellular single-celled parasites that are found in invertebrates and vertebrates animals. They can infect a wide range of animals from fishes to mammals. In the present study, Haemogregarines blood parasite was investigated in Legless Lizards, *Pseudopus apodus* from north of Iran. Blood smears of caudal venous were collected and prepared by fixation with methanol and stained with Giemsa in 15 minutes. After the morphological examination of the prepared smears by light microscope, the presence of haemogregarines blood parasites was confirmed. 14.2% of lizards were infected by these haemoparasites. The mean intensity of haemoparasites was 0.084% in each infected individual. Molecular study alongside with more specimens are needed for identifying all haemogregarines parasites in these lizards.

Keywords: Haemogregarine, vertebrate, morphological, molecular

AP28 Occurrence of haemogregarine parasites in Eurasian green-winged teal bird (*Anas crecca*) in Iran

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Haemogregarines of the genus Hepatozoon Miller, 1908 (Order Adeleida, Family Hepatozoidae) are common parasites of mammals, amphibians and reptiles. Nevertheless, they are one of the least studied parasites in birds. In the present study 25 Eurasian green-winged teal (*Anas crecca*) were caught in Anzali wetland which is located in the north of Iran in order to study the blood parasites. The blood samples were being taken from the wing vein of the living birds before releasing. Slides were dried in the air and stained by Giemsa solution. The samples investigated using light microscope. The Infection of *Hepatozoon* sp. was found in 2 of 25 birds. The prevalence and intensity of infection were very low. This is the first report of *Hepatozoon* infection in Eurasian green-winged

teal in the world. Molecular and phylogenetic analysis are needed for the identification of this parasite in species level.

Keywords: *Hepatozoon*, prevalence, intensity, phylogenetic

AP29 Changes in plasma thyroid hormone levels in *Epinephelus stoliczkae* under the influence of different amounts of chromium

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Blood parameters are sensitive to environmental stressors and are considered as a non-destructive method in assessing fish health and ecosystem status. The aim of this study was to investigate the effect of different concentrations of chromium metal on the levels of thyroid hormones in the *Epinephelus stoliczkae* of Oman Sea in laboratory conditions. The Epaulet grouper were exposed to three concentrations of 3.6, 7.31 and 14.6 mg per liter of chromium for 21 days, and blood samples were taken from the fish at 0.5, 1, 7, 14 and 21 days from test start. The levels of triiodothyronine (T3) and thyroxine (T4) in plasma were measured by radioimmunoassay. The results of thyroid hormone levels in different concentrations of chromium metal compared to the control group showed a significant decrease ($P < 0.5$). This indicates a disturbance in the balance of thyroid hormones as a result of the negative effects of chromium metal on the Epaulet grouper.

Keywords: Marker, Heavy Metals, Chabahar Bay, Oman Sea

AP30 Evaluation of changes by chromium pollutant in the red blood cells epaulet grouper (Epinephelus stoliczkae) in vitro

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Chemicals and pollutants affect the properties of blood cells and provide useful information about the environment of organisms. The aim of the present study was to investigate the changes in the red blood cells (cellular and nuclear major axis, cellular and nuclear minor axis, cell and nuclear volume, cytoplasmic volume) of Oman Sea epaulet grouper (*Epinephelus stoliczkae*) under laboratory conditions exposion of chromium contaminant for 21 days. For this purpose, three sub-lethal concentrations of chromium metal 3.6, 7.31 and 14.6 mg / l were selected for the treatment of epaulet grouper and blood samples were taken from the fish at the end of 21 days. The major and minor axis of blood cells and nucleus were measured with micrometer of light microscope. Erythrocyte, nuclear and cytoplasm volume were calculated using by existing equations. The results of this study showed that there was a statistically significant difference between the parameters measured in the red blood cells of the control group and the groups treated with chromium pollutants ($P < 0.5$). Factors investigated of red blood cell in epaulet grouper can be used to monitoring of chromium contamination.

Keywords: Red blood cell, Fish, Pollution

AP31 Protective Effect of *Berberis integerrima* Hydro-Alcoholic Root Extract against Cisplatin-Induced Nephrotoxicity in Male Rat

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Background and Aim: Cisplatin, which has a potent chemotherapeutic effect, affords toxicity in other tissues. Reactive oxygen species (ROS) are involved in cisplatin toxicity associated with increased lipid peroxidation. *Berberis integerrima* (*B. integerrima*), as an Iranian traditional medicinal plant, has several therapeutic properties such as antioxidant, antidiabetic, hepato-protection and for kidney stones This study determined potential renal protective role of hydroalcohol extract of *B. integerrima* (barberry) against cisplatin-induced acute kidney injury. Methods: Animals (240-270 g body weight) were dedicated into four groups (n=7 per group): control, control+B.E (barberry extract, 160 mg/kg/day during 10 days, i.p.), Cis (cisplatin, 8 mg/kg on 7th day, i.p.), Cis+B.E (barberry extract, 160 mg/kg/day during 10 days; cisplatin, 8 mg/kg on 7th day). After placing the rats in metabolic cages for 24 hours, blood, urine and kidney tissue samples were collected. SPSS

22 statistics software package was applied for analyzing all data (expressed as mean ± SEM) by one-way ANOVA with Tukey's post hoc test. Results: Compared to control and control+B.E groups, cisplatin administration led to kidney dysfunction (P< 0.001). This was accompanied by a reduction in the activities of antioxidant enzymes (P< 0.001) and an increase in the levels of malondialdehyde (P< 0.001) in renal tissues. Barberry extract administration decreased all the changes. Conclusion: An intensification in antioxidant enzymatic status and decrease in lipid peroxidation indicate that barberry extract may be a potential candidate in combating cisplatin-induced oxidative stress kidney tissues.

Keywords: Cisplatin, Acute kidney injury, Hydroalcohol extract of *Berberis integerrima*, Lipid peroxidation

AP32 Study of current and future habitat distribution of *Dendrobaena byblica* through a model-based data (MAXENT)

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MaxEnt software is currently one of the most popular tools which used to predict of species distribution and environmental niche modeling. In the absence of a complete inventory of species spatial distributions, predictive models of species distributions are alternatives that increasingly being used to produce detailed distribution and habitat suitability maps. Species distribution models examine associations between general environmental factors and known habitat ranges of particular species. Ecological Niche Modeling (ENM) through MaxEnt could facilitate ecological inferences in soil dwelling taxa. Species distribution models are not only useful to identify the environmental factors that explain the occurrence, but also explain the abundance of species due to their different habitat preferences. To predict the current distribution of *Dendrobaena byblica*, as a native species, the model was constructed based on five bioclimatic variables (Annual Mean Temperature, Monthly Mean Temperature, Mean Temperature of the Coldest Quarter, Precipitation of the Wettest Month, and Precipitation of the Driest Month) were obtained from Worldclim. The current species distribution showed a non-random prediction of species distribution. Its value was 0.89± 0.01 for training data. Jack-knife analysis revealed that the Annual Mean Temperature and Mean Temperature of the Coldest Quarter are the most useful variables to predict species occurrence. The distribution of the species in the future is affected by Annual Mean Temperature (39.1%) and Precipitation of the Wettest Month (20%). The currently suitable areas for the species are predicted to be the North line, Zagros Mountains and the eastern highland regions in the Khorasan Province. In the future, these areas will be limited to the northern part of the country.

Keywords: Earthworm, Prediction of species distribution, Jack-knife analysis

AP34 Evaluation of damaged motor nerve function in the laboratory strains treated with omega-3 coated iron oxide nanoparticles

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Although the peripheral nervous system has an innate ability to repair and regenerate, this capability is limited and peripheral nerve regeneration is slow on its own. Due to the slow rate of axon regeneration, recovery of motor function is incomplete and irreversible damage to the structure and function of target organs may occur. In this study, the effects of restoring the function of sciatic nerve motor neurons following injury treated with omega-3 coated iron oxide nanoparticles dissolved in distilled water were investigated. Forty male Wistar rats were randomly divided into four groups of 10 mice in each group. Negative control group (nerve compression), sham group (surgery without nerve compression), experimental group 1 (nerve compress with iron oxide nanoparticles coated with Omega-3 dissolved in distilled water at a dose of 10 mg / kg), Experimental Group 2 (nerve compress with administration of iron oxide nanoparticles coated with omega-3 dissolved in distilled water at a dose of 30 mg / kg) The sciatic nerve of the right leg was then compressed one centimeter above the site of the trigeminal nerve. The footprint test was evaluated during the test period. The results showed that in

the groups treated with omega-3 coated iron oxide nanoparticles dissolved in distilled water, compared with the negative control group, the speed of the healing process and improvement of motor function increased significantly ($p < 0.05$). The results showed that administration of omega- ۳coated iron oxide nanoparticles dissolved in distilled water has neuroprotective effects and improves motor function in the treated groups, also increases the speed of repair.

Keywords: Regeneration, Peripheral nerve injuries, Nerve, Nanoparticle

AP35 The investigation of toxicity of phenpropathrin against *Tetranichus urticae* in the melon farms

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Melon is the important crop in the Torbat ejam, Taybad, Fariman and Khaf from Razavi Khorasan. More than 100,000 hectares melons have planted in these areas. Many insects were reported as serious pests on the melon, contain *Myopardalis pardalina*, *Dacus ciliates*, *Epilichna chrysomelina*, *Acytopeus curvistorius* and *Tetarnychus urticae*. In this research, toxicity of phenpropathrin against *T.urticae* was evaluated in the spring and winter 2018 at the farms of around Torbate jam. Final concentration was 0 (control), 500, 1000 and 1500 ppm. Spraying was done in the early morning and three replicate were done for every treatments. Results showed that population acari in the toxic treatments were significantly reduced in comparison to control. The amount of reduction was 52, 88 and 92 percent in the 500, 1000 and 1500 ppm, respectively. Also, there was significant difference between 500 with 1000 and 1500 ppm. Conclusion of current study is that the concentration of 1000 ppm of phenpropathrin is appropriate dose to recommendation for controlling of *T.urticae* in the melon farms.

Keywords: Acaricide, Concentration, Insect, Population, Treatment

AP36 Toxicity of *Ferula assafoetida* extract on the adults of confused flour beetle, *Trboliun confusum*

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The component of important ancient Herbal, *Ferula assafoetid*a contains sulphur compounds and trepans derivation. This plant was used as natural insecticide against Lepidoptera and homoptera in the Iran. In the current study, the effects of *F. assafoetida* on the adults of *Tribolium confusum* were evaluated. The few sap of plant was transferred to university of Birjand from Kerman province. Extract of saps were prepared using ethanol 90 percent and diluted with acetone. Adults (72 hours olds) of *T. confusum* were selected from insectary room in the entomology laboratory. Final concentrations were 0, 20000, 40000, 60000, 80000 and 100000 ppm. Experiments were performed in the three replications and used from acetone as control treatment. Results showed that 20000 and 40000 ppm were not significantly difference in comparison to the control. The difference among two concentrations 60000 and 80000 ppm with 43 and 55 percent of mortality with control was siginificant. The highest mortality was appeared in the 100000 ppm. Results suggest that only 100000 ppm is appropriate dose to recommendation against *T. confusum*. The economic importance of *F. assafoetida* is open discussion to evaluate using of its extract against store pests.

Keywords: Acetone, Insecticidal effect, Mortality, Treatment

AP37 Identification of potential biomarkers for multiple myeloma using bioinformatics analysis of microarray data

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Multiple myeloma (MM) is a cancer that forms in a type of white blood cell called a plasma cell. Rather than produce helpful antibodies, the cancer cells produce abnormal proteins that can cause complications. The interaction between myeloma cells and the bone microenvironment ultimately leads to the activation of

osteoclasts and suppression of osteoblasts, resulting in bone loss. The purpose of this study was how interactions between myeloma cells and osteoclasts that might affect the clinical course of myeloma. We selected microarray datasets GSE31154 from the GEO database. Differential expressed genes (DEGs) were investigated with GEO2R (with p values <0.05 and $|\log FC| \geq \pm 1.5$). Functional enrichment analysis of the Gene Ontology (GO) and pathways associated with DEGs were analyzed by GO and Kyoto Encyclopedia of Genes and Genomes (KEGG), respectively. To find the Transcription Factors (TFs) controlling the expression of upregulate genes, ChEA was used. Finally, we constructed the protein-protein interaction network (PPI) between TFs and upregulated genes using STRING and Cytoscape.It was found that 257 and 737 genes were upregulated and downregulated, respectively. GO analysis revealed that DEGs were extensively involved in various biological process (BP), such as cellular glucuronidation, glucuronate metabolic process and retinoic acid metabolic process. Nuclear nucleosome, centriole were significantly enriched for cellular components (CC) and for molecular function, glucuronosyltransferase activity, retinoic acid binding and monocarboxylic acid binding were the highly enriched GO terms. KEEG pathway analysis show Alcoholism, Ascorbate and Retinol metabolism were indicated in multiple myeloma. ChEA showed that POU5F1, EZH2, SMAD4 and BACH1 were the top TFs controlling the upregulated genes in Plasma cell myeloma .Moreover, HIST1H4A, HIST1H4C, HIST1H4B and HIST1H4H were selected as hub genes in the module constructed using upregulated genes. Our analysis showed that histone genes sets may be used as prognostic factors for survival prediction for MM patients.

Key words: microarray, unregulated, hub genes

AP38 Investigation of the role of Dichloroacetate (glycolysis inhibitor) on breast cancer cell proliferation

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Breast cancer is the most common cancer among women. In recent years, due to the targeting of tumor cell metabolism and a successful coadministration of DCA with conventional chemotherapy, radiotherapy, other drugs, or natural compounds has been tested in several cancer models. DCA could significantly affect cancer stem cell fraction and contribute to cancer eradication. The DCA selectively promotes mitochondria-regulated apoptosis and inhibits tumor growth in preclinical models by shifting the glucose metabolism in cancer cells from anaerobic to aerobic glycolysis. In the current study we investigated the effects of glycolysis inhibition (using DCA) on viability of breast cancer cell line 4T1 in vitro. 3000/well cells were seeded into 96-well tissue culture plates. After 48 hours' incubation, we replaced media with fresh cell culture media containing increasing doses of DCA (0.5, 1, 2, 3, 4, 5, 6,7,8,9 and 10 mM). After 24 h of incubation, we performed MTT assay by replacing the media with 10 µl of MTT solution and incubated in the dark for 3 h. MTT solution was then removed and DMSO was added to the wells. After 30 min extraction at room temperature, the absorbance of the *formazan* solution was read spectrophotometrically at 570 nm. Dichloroacetate (3 mM) in cancer cell proliferation leading to reduced growth of cell line 4T1. Doses 3 mM the viability rate is less than 70%. At doses of 0.5 and 10 mM, the viability rates are 91% and 59%, respectively. Moreover, the high doses of DCA (0.5, 3, 10 mM) induce a significant morphological change during the study. We have shown the breast cancer 4T1 cell line were highly sensitive to DCA, and dose of 10 mM causing a significant inhibition of cancer cell viability and growth.

Key words: 4T1 cell line, DCA, MTT assay, viability

AP39 The effect of Nickel (II) Schiff Base complex on the some blood parameters in diabetic rat (Wistar)

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Schiff bases are a group of organic compounds with the C = N-R group that act as coordinate ligands and form stable complexes with metals. Due to the increasing use of Schiff base compounds in biology and treatment of incurable diseases, the effect of nickel (II) Schiff base complex in the treatment of diabetes was investigated in the present study. For this purpose, 49 Wistar rats (220-200g) were divided into 7 equal groups as control, receiver Schiff Base, receiver DMSO, diabetic without treatment, diabetic and receiver 5mg/kg wb Glibenclamide, and two diabetic groups that were treated with 50 and 100 mg/kg bw of Nickel (II) Schiff Base solution by gavage. The rats were diabetic with single dose of streptozotocin (80mg/kg bw). After treatment period (40 days), blood samples were taken from rats, and serum biochemical parameters were measured with a special kit. The obtained data were statistically analyzed ($P<0.05$). The results showed a significant increase in level of glucose, liver enzymes and malondialdehyde in the untreated diabetic group compared to the control group, and their reduction in the groups that receiving Glibenclamide and Schiff base compared to the diabetic group. Also, there was no significant difference in concentration of the mentioned parameters between the groups treated with nickel and the group consuming Glibenclamide. According to the results, the synthetic compound of nickel (II) Schiff base complex is somewhat effective in improving the complications of diabetes in the liver via glucose reduction at a level comparable to Glibenclamide as a antidiabetic drug. Therefore, further research is recommended, maybe offer a way in diabetes treatment.

Keywords: Alkaline phosphatase enzyme, Alanin Aminotransferase, Salen ligand, Metal complex

AP40 The effect of aqueous-alcoholic leaf extract of *Ducrosia anethifolia* on the placental and umbilical cord tissue in pregnant diabetic rats

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Awareness of the properties and side effects of herbal medicines is important especially during the critical period of pregnancy. In this study, the effect of aqueous-alcoholic leaf extract of *Ducrosia anethifolia* on the placental and umbilical cord tissue structure in pregnant diabetic rats was investigated. For this purpose, 48 rats (220-200g) were fertilized and divided to non-diabetic groups include control, recipient of Meshgak, and 4 diabetic groups include untreated diabetic, using Glibenclamide (5mg/kg/bw) and the groups which treated with 1cc of the Meshgak extract (500 &1000mg/kg/bw) by gavage for 20 days. The rats became diabetic by single-dose injection of streptozotocin (80 mg/kg/bw). At the end of the treatment, blood samples were taken, and glucose and insulin were measured in rat's serum. Then the removed embryos and placenta and umbilical cord were measured with a caliper. The sections of placental and umbilical cord tissue (5µm) were prepared, and their slides were stained. The desired parameters were measured with image analysis software and their tissue changes were examined. The data were analyzed by statistical software SPSS(17) and compared with Tukey test. The results showed a significant decrease in maternal insulin concentration, maternal and fetal weight, and increase in blood glucose and placental weight in the untreated diabetic group, but improvement was observed in treated groups with Meshgak extract and the group consuming Glibenclamide. Histological study showed that increasing the thickness of layers and the number, diameter and volume of placental cells (Glycogen and Giant cells) in the diabetic group decreased with using Meshgak extract in the treatment groups. Cell destruction and irregularities in the vascular endothelium due to diabetes were observed. According to obtained results, Meshgak extract with the same results as Glibenclamide has reduced maternal blood glucose, so it has slightly improved diabetes-related complications in these tissues.

Keywords: Insulin, Glibenclamide, blood glucose, Glycogen cell

AP41 Neuroprotective efficacy of *Nostoc Commune* extract on 6-OHDA-induced cognitive deficits in model of Parkinson's disease

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Oxidative stress plays an important role in the degeneration of dopaminergic neurons in Parkinson's disease. Nostoc Commune extract (NCE) has been identified as a bioactive compound in brain disorders, with antioxidant activities. The present study aims to evaluate the effects of NCE on 6-OHDA-induced cognitive disorders in a rat model of Parkinson's disease. Rats were divided into four groups: control, disease, NCE 50, and NCE 100. The Parkinson's model was induced by 6-OHDA injection unilaterally (AP: +1 mm; L: +2.5 mm; D: +4.5 mm). In this research study, intrastriatal 6-OHDA-lesioned rats received NCE (50 and 100 mg/kg) orally for three weeks. Apomorphine-induced rotation on day 21 and a novel object recognition test (NORT) on day 22 were carried out. The results showed that injection of 6-OHDA decreased discrimination Index in the NORT ($p < 0.001$). NCE50 and NCE100 treatment reduced apomorphine-induced rotational asymmetry and enhanced the time spent with the new object in the novel object recognition test ($p < 0.001$) compared with the disease group. Besides, NCE 100 showed better therapeutic effects than NCE 50. In conclusion, the beneficial effect of NCE on the improvement of learning and memory may be attributed to antioxidant activities. Thus, using these substances may be useful by modulating the level of antioxidant activity and protecting the nervous system against 6-OHDA toxicity in pharmacological alleviation of cognitive deficits.

Keywords: novel object test, hippocampus, rat, learning and memory deficits

AP43 The effects of exercise and quercetin on insulin-like growth factor-1 as a possible mediator in depression caused by dimethylhydrazine-induced colon cancer in rats

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In addition to physical problems, depression is one of the most important challenges for patients with various types of cancer, especially colorectal cancer. Modulation of brain neurotrophic factors is the key link between cancer and depression. In this study, we evaluated the effects of Quercetin and exercise on depressive behaviors in rats with colon cancer induced by 1,2-dimethylhydrazine-induced (DMH) and investigated possible mechanisms. The animals were divided into five groups: 1. Control group, 2- Cancer group (by injection of 20 mg/kg DMH, subcutaneous injection, once a week for 10 weeks), 3- Cancer group and Quercetin (50 mg/kg 1, gavage once a week for 12 weeks 4. Cancer group and moderate-intensity training for 12 weeks, 5- Cancer group with Quercetin and exercise treatment for 12 weeks. Rats receiving DMH showed more depressive behaviors in the forced swim test and the open field test. Histopathological experiments showed nerve damage and reduction of Nissl bodies in the Prefrontal cortex. In addition, injection of DMH increased the serum levels of insulin-like growth factor (IGF-1) as well as, in tumor tissue and decreased expression of brain-derived neurotrophic factor (BDNF), β-tyrosine kinase receptor (TrKβ), and β-catenin in the Prefrontal cortex. In contrast, Quercetin treatment and exercise had antidepressant effects and increased BDNF expression by modulating IGF-1 in the peripheral circulation and its augmentation in the brain. All behavioral and histopathological related cases were also reduced. The results show that a combination of Quercetin and exercise, by modulating the amount of IGF-1 in the peripheral circulation and its increase in the brain regulates the BDNF signaling pathway in the Prefrontal cortex of the brain and exerts anti-tumor and anti-depressant effects.

Keywords: Brain-derived neurotrophic factor, Prefrontal cortex, rat, colon cancer

AP44 Identification of common factors involved in organ fibrosis using analysis of microarray dada

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Fibrosis is known as a severe pathophysiological complication that can severely spoil the normal structure and function of implicated tissues. Identifying the critical genes in the occurrence of this complication in various organs can be useful in controlling and treating their fibrosis. This study aimed to identify important genes affecting fibrosis. For this purpose, three separate Microarray Datasets with access numbers GSE 975456 (for lung tissue), GSE130123 (for liver), and GSE97546 (for kidney) were downloaded from the GEO at the NCBI database, and their data was analyzed using GEO2R. For all studies, data were analyzed utilizing the parameter P-value ≤ 0.05 and Log Fc $\left|\geq 1\right.$. The up-regulated genes of all three tissues were compared with each other, and ultimately, five common genes were identified in the fibrosis of the studied tissues (lung, liver and kidney). These five common genes were analyzed in Enrich r database .The results of the analysis of these genes showed that TAL1, ELK4 and NANOG were the most important upstream factors for these common genes (P-value ≤ 0.05). On the other hand, analysis of the common genes with KEGG database illustrated that they have a significant relationship with cortisol synthesis and secretion and AMPK signaling pathway (P-value ≤ 0.05). Gene ontology and biological process analysis of these genes with the Enrich r database demonstrated that these five genes are involved in different processes such as positive regulation of action potential. The findings of this study showed that common and important pathways and factors are involved in the fibrosis of studied organs. Further studies are needed to verify the results of these analyzes with further studies and samples.

Keywords: Bioinformatics, Fibrosis, Signaling pathways, Biological processes, Transcriptional factors

AP45 Analysis of the Gene Expression Profile of Bone Marrow Mesenchymal Cells from Follicular Lymphoma Patients

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Mesenchymal stem cells (MSCs) are multipotent cells with the ability to self-renew and differentiate into a variety of cell types, tissue-repair and immuno regulatory. Follicular lymphoma (FL) is a systemic neoplasm of the lymphoid tissue arises from a germinal center B cell proliferation which is affected by a tumor microenvironment, mesenchymal stromal cells. regulating molecular mechanism related follicular lymphoma, seem to be useful for developing a new strategy to control its progression. Here, the microarray dataset GSE85229 from the Gene Expression Omnibus (GEO) that have the expression data for normal human bone marrow mesenchymal cells and bone marrow mesenchymal cells from follicular lymphoma patient. Differential expressed genes (DEGs) were investigated with GEO2R (p values <0.05 and $\left|\log FC\right| \geq 1.5$). the Enrichr database was used to find significantly gene ontology terms (GO), namely biological process, cellular component and molecular function. To find the signaling pathways associated with upregulated DEGs, the KEGG database was used. To find top ten transcription factors (TFs) that presumably control DEGs, ChEA database was used. MiRTarBase database used to finding microRNA related to upregulated genes. GO analysis revealed that DEGs contain 240 upregulated and 208 downregulated genes. They were extensively involved in various biological process such as DNA replication, mitotic sister chromatid segregation, DNA metabolic process. KEEG pathway analysis showed that Cell cycle, p53 signaling pathway, Human T-cell leukemia virus 1 infection are the most significant pathways associated with upregulated genes. FOXM1, E2F4, AR and E2F7 were the top TFs controlling the upregulated genes. microRNAs analysis revealed that the top microRNAs associated with up DEGs were hsa-miR-193b-3p, hsa-miR-215-5p, hsa-miR-192-5p. Controlling molecular mechanisms of Mesenchymal stem cells might be useful to control Follicular lymphoma.

Keywords: Bioinformatics, Microarray, Transcription factors, MicroRNA

AP46 Investigation of the Effect of ascorbic acid on proliferative potential of breast cancer cells

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Breast cancer is one of the most causes of cancer-related mortality in the world. Several factors cause this disease, including genomic instabilities. It is hoped that with control of genomic mechanisms, steps can be taken to improve this disease. Ascorbic acid (AA) is an essential micronutrient that the human body needs. It is also plays biphasic roles in cancers. In this study, we investigated the effects of different doses of ascorbic acid on murine breast cancer cells line (4T1). Accordingly, 4T1 cells (3000/well) were seeded in 96-well tissue culture plates. After 48 h incubation, we replaced media with fresh media containing increasing doses of AA (0.1, 0.2, 0.5, 1,1.5, 2, 2.5, 3, 3.5 ,4 4.5 and 5 mM). After 24 h of incubation, we performed MTT assay by replacing the media with 10 µl of MTT solution and the plates were incubated in the dark for 3 h. MTT solution was then removed and DMSO was added to the wells. After 30 min extraction at room temperature, the absorbance of the formazan solution was read spectrophotometrically at 570 nm. The results of the MTT assay showed that in doses of (0.1), (0.2) and (0.5) mM, the viability rates are more than 90% and in dose of 1mM 70% cells are alive. The survival of breast cancer cell line (4T1) at concentrations higher than 1 mM was significantly reduced. The results of this study show the sensitivity of breast cancer cells (4T1) to high concentrations of ascorbic acid.

Keywords: Cell survival, cell proliferation, MTT assay, cancer, cell line 4T1

AP47 Diversity and abundance of meiofauna in intertidal zone of Qeshm Island

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Meiofauna are small, benthic invertebrates, playing a primary role in sediment nutrient cycling and stability in benthic ecosystems. During January 2019, biodiversity and abundance of meiofauna in sediments and algae of intertidal zone of Qeshm Island were investigated. Four stations were selected on Qeshm Island coastline, including Ramchah, Do-Koohak, Noqashe and Dargahan. Sediment samples were collected using sieves with 500µm and 37µm mesh size. Totally, eight groups of meiofauna, including Copdpoda, Nematoda, Amphipoda, Ostracoda, Isopoda, Mites ,Polychaetae and Platyhelminth were sorted and identified. Moreover, copepoda (73%) was abundant in comparison to other meiobenthos in the studied area. Conclusions on assemblage structure and diversity of meiofauna between different stations showed that meiofauna were abundant in Noqashe station with abundancy about 40%.

Keywords: Copepoda, Persian Gulf, Marine sediment, Nematoda, Meiofauna

AP48 The Protective Effect of Quercetin on Sperm Parameters and Serum Biochemical Factors in Adult Mice Treated with Cyclophosphamide

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Cyclophosphamide is an anticancer medication that despite its wide range of uses, causes reproductive toxicity. One of its most important effects is oxidative stress, which causes biochemical and physiological disorders of sperm. We can use antioxidants to reduce the oxidative effect. This study aimed to investigate the protective effect of quercetin as a powerful antioxidant on sperm parameters and serum biochemical factors in mature adult mice following the treatment with cyclophosphamide. In this study, 24 mature adult male NMRI mice, were randomly divided into 4 groups (n=6), including control group, group received cyclophosphamide (dose 100 mg/kg/week), group received quercetin (dose 50 mg/kg/day) and group received cyclophosphamide + quercetin. 35 day after the treatment and intraperitoneal injection, the serum samples were collected to measure the testosterone level, total anti-oxidant capacity and malondialdehyde level. The left testis was used to measure daily sperm production (DSP) and left caudal epididymis was cut in the Ham's F10 medium, then the released

spermatozoa were used to analyze the sperm parameters. Data were analyzed by one-way ANOVA and Tukey's test at a significance level of $p<0.05$. In this experimental study, a significant decrease was observed in the mean sperm count, viability, normal morphology, motility, and daily sperm production, serum testosterone level and total antioxidant capacity and a significant increase was seen in the malondialdehyde (MDA) level in the cyclophosphamide group compared to the control group. The results of this study showed that quercetin, as a strong antioxidant, could ameliorate the adverse effects of cyclophosphamide on sperm parameters and serum biochemical factors in mice.

Keywords: Antioxidant, Malondialdehyde, Testosterone

AP49 Study of Axial Skeleton in the Nesterov's Desert Monitor, *Varanus nesterovi*

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Variety in the anatomy of reptiles indicates the emergence of multiple solutions to biomechanical problems and reflects different evolutionary pressures to create different body shapes. So far, no study has been done on the skeleton of Varanus in Iran; *Varanus nesterovi* is one of the three species of *Varanus* in Iran, which was introduced in 2015 from the western regions of the Zagros Mountains on the border of Iran and Iraq. In this study, *V. nesterovi* specimens from the Zoological Museum of Razi University of Kermanshah were used. To examine the skeleton, two methods had been used: A) removing skeletal components and photographing them B) using CT-scan method. The axial skeleton includes the skull, spine, and ribs. Skull *V. nesterovi* consists of 40 bones fragments and 46 pleurodont teeth, including 29 vertebrae of this species including the proximal vertebrae and 72 caudal vertebrae. *Varanus* has nine cervical vertebrae, with relatively small protrusions on the lateral surface of vertebrae four and five. The sixth and seventh vertebrae each have short ribs. The ribs attached to the eighth and ninth vertebrae extend to near the sternum. The trunk ribs of *V. nesterovi* consist of three true ribs connected to the first to third thoracic vertebrae, 11 floating ribs connected to the vertebrae 13 to 23, and five short abdominal ribs connected to the vertebrae 24 to 28. The last nut before the sacral vertebrae has no ribs.

Keywords: Monitor lizards, bone, vertebra, skull

AP50 Assessment of Maze Function and Bilateral Neural Transmission Learning in Right-handed and Left-handed Persons

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Today measuring perceptual-motor learning skills is a practical approach for better understanding of brain functions. Therefore, the purpose of this study is measure the performance of subjective Maze function of bilateral neurotransmitter transduction in right and left handed individuals.This research was a scientific-comparative study. Using random sampling, 40 male and female students of Shiraz Medical School have been investigated.Research tools include Patterson's Maze, Motion Detection, and Chapman's Questionnaire.MANCOVA multivariate analysis of covariance showed that the mean error and time of drawing in the mirror in the right hand group were much lower than the left hand. On the other hand, the right hand group had a lower mean Maze error than the left hand group.It can be deduced that right-handed students have the advantage of mastering in the two-way brain-transfer learning assignments (which is a two-handed task and interact with the cognitive function of the brain's hemisphere), and perform in drawing the shape in the mirror with less time and error .

Keywords: Draw in the mirror, Superior hand, Nervous pathway, Memory

AP51 Effects of Vitamin D on Motor Coordination Impairment Induced by electric lesion of the Nucleus Basalis Magnocellularis

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Vitamin D is important for the stability of many physiological functions, and a deficiency of this vitamin is associated with an increased risk of several diseases, including multiple sclerosis, Alzheimer and Parkinson's disease. Numerous studies have proved the association between vitamin D intake and the improvement of age-related cognitive impairment. In this study, the effect of vitamin D on motor coordination disorders of adult male rats in the model of Alzheimer's disease with electrical lesion of nucleus basalis magnocellularis (NBM) is investigated. In this experimental study, male Wistar rats were randomly divided into five groups including (n=7) control, NBM lesion, sham (electrode entry into NBM without induction of electric current), NBM lesion+Vehicle vitamin D (sesame oil), and NBM lesion+Vitamin D. The treated groups received vitamin D and Vehicle for 10 days starting 3 days before lesion by intraperitoneal injection. Then, the motor activity was evaluated with a Rotarod apparatus. The results of this study show a significant reduction in the time spent on the Rotarod apparatus in the NBM lesion group compared to the control group ($p<0.001$). The results did not show a significant difference between the sham and control groups. There was no significant difference between the Vehicle vitamin D and NBM lesion groups. The NBM lesion+vitamin D group showed a significant increase in the duration of stay on the Rotarod apparatus compared to the NBM lesion group ($p<0.05$).
The results of this study showed that vitamin D improved motor coordination in NBM-lesioned rats.

Keywords: Nucleus basalis of magnocellularis, Vitamin D, Motor coordination impairment, Rotarod

AP52 The effect of valproate sodium on synaptophysin expression in motor neuron-like cell differentiation of human endometrial stem cells

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One of the proposed therapeutic approaches for spinal cord injury (SCI) is substituting lost and damaged cells by differentiated stem cells (1, 2). Human endometrial stem cells (*hEnSCs)* is a mesenchymal stem cell that has been presented as a new source for neural tissue engineering applications with the capability to differentiate into many neural cell types (3, 4). Valproate sodium (VAS) is a small molecule that can pass through the blood brain barrier (BBB) and has neuroprotective and anti-inflammatory properties. Also, VAS inhibits the differentiation of astrocytes and oligodendrocytes, which are essential for SCI repair (4). Our goal was to study the effect of VAS on the expression of synaptophysin (SYP) in neural-like cells differentiated from endometrial stem cells. hEnSCs were extracted using collagenase type I, and at passage three, the cells were confirmed by flow cytometry. For motor neuron differentiation, the hEnSCs were treated in three steps: 1) preinduction step (1 day), 2) induction step (7 days), 3) maturation step (7 days). The VAS (100 µg/mL) was added in step 3 of differentiation. After 15 days, the expression of synaptophysin was evaluated by immunofluorescence. The immunofluorescence results displayed the high protein expression of synaptophysin as an important neural-specific marker compared to undifferentiated hEnSCs (control group). VAS small molecule promoted the differentiation of motor neurons from hEnSCs by up-regulating the synaptophysin marker and VAS may be use in the near future to help treat SCI.

Keywords: hEnSCs, SYP, Spinal cord injury (SCI)

AP53 New distributional records of non-troglobiotic Lepidoptera, *Scoliopteryx libatrix* (Linnaeus, 1758) in hypogean habitat of western Hyrcanian Forests

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Cave-dweller animals are categorized in three groups depending on the degree of their cave association. troglobionts are true cave-dweller, whereas, troglophiles and trogloxenes use caves temporarily. Not all cave-user organisms have troglomorphic characteristics. Occasional cavernicolous species are more than obligate subterranean taxa. Cave arthropods are diverse and all three categories mentioned above, are found in its members. Erebidae is one of the six families in the superfamily Noctuoidea which is one of the most speciose groups in Lepidoptera. *Scoliopteryx libatrix* (Linnaeus, 1758) is a troglophile species of this family which has distributed throughout the North America; and is also found in Eurasia and northern Africa. In Iran this species has been reported from Arasbaran Forest, northwest of the country. New distribution records of Herald moth, *S. libatrix*, is presented in this study. The Hyrcanian or Caspian Forest is a narrow and continuous vegetation belt extending along the northern slopes of Alborz mountain ranges. It poses humid climate, dense and diverse vegetation and great variety of habitats including subterranean environments. Therefore, occurrence of a considerable arthropod species is expectable in this area. Here, we report *S. libatrix* from three caves in western Hyrcanian Forests. Liyarud, Divrash, and Eqbal caves with 502, 1809, and 527 meters height, respectively, are three new localities for this species. In each cave, a few individuals were observed on the walls and roof of the caves, in the dark zone. One specimen was collected for further identification according the available keys. During cold seasons, Herald moth hibernates in dark and cool places; so, the observation of this moth in the caves of this region is expectable.

Keywords: cave, hibernation, herald moth

AP54 The effect of Dog-rose (*Rosa canina* L) extract on in vitro maturation of immature oocytes in mice

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Dog-rose plant with the scientific name of *Rosa canina* has a fruit that has been considered by the pharmaceutical industry due to its antioxidant properties. The aim of this study was to investigate the effect of Dog-rose fruit extract on in vitro maturation of immature oocytes of NMRI mice. In this study, animals were randomly divided into five groups: control, sham, experimental 1, 2 and 3. Mice in the control group received only water and food for mice, and mice in the sham group received 500 µl of distilled water for 21 days. It was injected intraperitoneally and 100, 200 and 300 mg / kg body weight of the extract was injected intraperitoneally to mice in the experimental group for 21 days. They were incubated for 24 hours. Oocytes that reached metaphase stage 2 were then fertilized with sperm and after 24 and 48 results were evaluated. After injection of Dog-rose fruit extract, the rate of maturity in the eggs of experimental groups increased compared to the control group and the formation of 4-cell embryos in groups 1 and 2 increased compared to the control group ($p<0.05$). The results show that Dog-rose fruit extract due to its antioxidant compounds can be effective on the maturation of immature mouse eggs and the development of the resulting embryos.

Keywords: Mice, in vitro fertilization of oocytes

AP55 Effect of hydroalcoholic extract of clove (*Syzygium aromaticum L.*) on morphine-induced conditioned place preference in male rats

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Nowadays, the use of herbs is very common and few studies have been done about their side effects. Cloves have an antinociceptive effect similar to morphine. Therefore, the aim of the present study was to investigate

the effect of hydroalcoholic extract of clove on morphine-induced conditioned place preference in male rats. Twenty-four male Wistar rats weighing 250 to 300 g were selected and divided into 8 groups (n = 8) in each group (n = 8). Healthy extract recipient at doses of 25,100mg / kg. To induce morphine dependency, mice were injected intraperitoneally for three days (morphine) 10mg / kg and saline 0.3 cc intraperitoneally for six hours, respectively, in the light (morphine) and dark (saline) apparatus, respectively. cpp (conditioned place preference) were incubated for 45 min. On the test day, the extract was tested for morphine-induced conditioned place preference half an hour before intraperitoneal injection of solvent extract or DMSO (0.03cc) and clove extract at doses (25,100mg / kg). The pro method and the cpp machine were evaluated and the time spent in the room's bright room was considered as the location preference. During all tests, the motor activity of the animals was also measured. Data were analyzed using one-way ANOVA and Tukey test ($p < 0.05$). Results showed that 25mg / kg dose of clove extract decreased ($p < 0.001$), and 100mg / kg dose of clove extract increased ($p < 0.001$) the morphine-induced conditioned place preference compared to the control or receiving group. Clove extract at 25mg / kg decreased motor activity ($p < 0.05$) compared to control group. These results suggest that the hydroalcoholic extract of clove has an effect on morphine-induced psychological dependence and locomotor activity.

Keywords: Morphine, Conditioned Place Preference, Psychological Dependence, Locomotor Activity

AP56 Evaluation of the effect of coenzyme Q10 on TFAM gene expression and the number of mt DNA copies of mice preantral follicles during in vitro culture

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One of the best strategies to maintain fertility in infertile patients is in vitro maturation of follicles and eggs. In this study, 14-day-old female NMRI mice used. Female mice are first sacrificed and the ovaries removed, the follicles removed mechanically and cultured in incubator for 12 days. The follicles are divided into two groups of control and culture treatment in the presence of 50 µM coenzyme Q10.The study was performed in two parts. 1) Developmental evaluation of preantral follicles; 2) Molecular evaluation (Real time PCR) of preantral follicles and granulosa cells. The diameter of preantral follicles in treatment group versus control was 328.41 ± 7.67 and 299.27 ± 11.55 respectively, which increased significantly in treatment group. TFAM expression in granulosa cells of treatment group versus control was 1.46 ± 0.10 and 1.02 ± 0.07 respectively, which increased significantly in treatment group. The expression of TFAM in oocytes of treatment group versus control was 1.81 ± 0.13 and 1.18 ± 0.18 respectively, which increased significantly in treatment group. The number of mt DNA copies of granulosa cells in treatment group versus control was 484589 ± 10979.98 and 314786 ± 7207.96 respectively, which increased significantly in treatment group. Coenzyme Q10 by improving the expression of TFAM and increasing number of mt DNA copies and improving the mitochondrial function of preantral follicles leads to improved follicular development and growth.

Keywords: Follicle culture , Development , Mitochondria

AP58 Acute effect of hydroalcoholic extract of Pecan on morphine withdrawal symptoms in adult male mice

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Addiction, especially morphine dependence, is one of the most common and incurable diseases. Since *Peganum Harmala* has analgesic effects, the aim of this study was to investigate the acute effect of hydroalcoholic extract of Pecan on morphine withdrawal symptoms in adult male mice. In this study, 42 adult NMRI mice weighing 30 ±2 gr were divided into two main groups: control (saline) and morphine. Chronic dependence was performed for 3 days and 3 times a day with 6 hour intervals. On the first to third day, doses of 50, 50 and 75 and on the fourth day, 75 mg / kg of morphine were received subcutaneously. The control group received only saline with the same volume during this period. In all groups, naloxone 5 mg / kg was injected intraperitoneally to induce

withdrawal syndrome. To two morphine subgroups 30 minutes before naloxone injection, 5 and 15 mg / kg Pecan hydroalcoholic extract were injected intraperitoneally. The control group received solvent extract (saline). In all groups, after naloxone injection, the symptoms of morphine discontinuation, including jumping and standing on two legs for half an hour were evaluated.Data were analyzed by one-way analysis of variance (ANOVA) and Tukey test. The significance level was considered P <0.005. The results showed that morphine withdrawal symptoms were more evident in morphine-dependent mice than in the control group. Pecan hydroalcoholic extract at a dose of 15 mg / kg significantly reduced morphine withdrawal symptoms such as jumping and standing on two legs compared to the control group.
Conclusion that Pecan has an effect on the mechanisms involved in physical dependence on morphine.
Keywords: Physical Dependence, Naloxone, Morphine Withdrawal Syndrome, Mice

AP59 The potentiative effect of ketamine on morphine-induced analgesia may be mediated via hippocampal cholinergic nicotinic receptors in a rat neuropathic pain model

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Neuropathic pain can be induced due to peripheral nerve injury, diabetes, and also infectious diseases. Considering that morphine as a strong painkiller makes tolerance and addiction, the decrease of its dose or its co-administration with the other drugs may be a good strategy in pain management. The aim of the present study was to investigate whether Ketamine as a non-competitive NMDA receptor antagonist could increase the effect of the lower doses of morphine to induce the maximum analgesia in a rat neuropathic pain model. Moreover, the role of dorsal hippocampal nicotinic receptors was evaluated to show pain memory may have an important role in the encoding of pain information. The chronic constriction injury (CCI) surgery was simultaneously performed with hippocampal cannulation to induce neuropathic pain in Adult male Wistar rats (200-230 g). After 14 days of recovery, the flexion withdrawal threshold for the mechanical stimuli was recorded before the surgery, before (baseline) and after the administrations of morphine, ketamine and/or mecamylamine using von Frey hairs. Two- and one-way ANOVA were used to analyze data for statistical significance ($p < 0.05$) through SPSS program. Systemic administration of morphine (3-5 mg/kg, i.p.) or ketamine (0.1-0.5 mg/kg, i.p.) increased the percentage of maximum possible effect (%MPE) to induce the neuropathic analgesia. Interestingly, ketamine potentiated the response of an ineffective dose of morphine to induce a strong analgesia. Intra-hippocampal microinjection of mecamylamine (0.5-2 µg/rat), a cholinergic nicotinic receptor (nAchR) antagonist, also increased the effect of co-administration of morphine and ketamine in a rat neuropathic pain model. Thus, the potentiative effect of ketamine on the non-tolerant dose of morphine may be a good strategy in neuropathic pain therapy. Since the inactivation of hippocampal nicotinic receptors increased the ketamine/morphine-induced analgesia, it can be suggested that pain memory formation plays a critical role in neuropathic pain.
Keywords: Acute pain, Opiate analgesia, Mecamylamine, rat(s)

AP60 Frankincense reduces the hepatic encephalopathy-induced inflammation in the rat hippocampus

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Hepatic encephalopathy is one of the brain diseases induced by hepatic failure. Patients show a broad spectrum of neuronal disturbances. In this disease, due to the failure of the liver in detoxification, the level of toxic compounds including ammonia increases in the blood. On the other hand, ammonia-increase in the brain induces neuroinflammation. Frankincense has neuroprotective and anti-inflammatory properties. Due to the effect of hepatic encephalopathy on the increase in the inflammatory factors, this study aimed to evaluate the potential anti-inflammatory effect of frankincense in the rat hippocampus. Twenty adult male Wistar rats were

used. Three groups of animals underwent the surgery for ligation of the common bile duct. In two groups, frankincense was gavaged in doses 100, and 200 mg/kg, one week before surgery to the day of sacrifice. The sham group was treated as the other groups and received saline, but the bile-duct was not ligated. 28 days after surgery, animals were euthanized under deep anesthesia, and their hippocampi were removed. The expression levels of tumor necrosis factor-alpha (TNF-α) were measured by the real-time PCR method. Hepatic encephalopathy upregulated TNF-α, and frankincense reduced its expression levels, significantly. The results indicated that frankincense improved hepatic encephalopathy-induced neuro-inflammation by reduction of the inflammatory factor TNF-α. Therefore, prolonged consumption of frankincense as a potent anti-inflammatory compound is recommended in the patients.

Keywords: Tumor necrosis factor-α, Brain, Neuroinflammation

AP61 Protective effect of royal jelly on reproductive system and fertility in male rats treated with methotrexate

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Folic acid antagonist methotrexate plays an important role in the treatment of various malignancies and inflammatory diseases. Research has shown its destructive effect on spermatogenesis and fertility status by using laboratory animals. The aim of this study was to evaluate the protective effect of royal jelly on the reproductive system in male rats treated with methotrexate. In this study, 26 male rats (200-150 gr) were divided into 4 groups including control, receiving Normal Saline, methotrexate sole-treated, 3 times a week at a dose level of 0.3 mg/kg and methotrexate + royal jelly: (100 mg/kg) groups. The animals received the agents for 42 days, orally. Following euthanization, the testicular and epididymal tissues were dissected out weighted, and the sperm count was obtained. Observations showed that methotrexate, further to its effect on testicular/body weight, significantly ($p<0.05$) decreased the sperm count. However, the royal jelly-received animals exhibited the mentioned parameters significantly higher versus methotrexate-sole-treated groups. Thus, it could be concluded that royal jelly could be considered as an effective agent against methotrexate-induced detrimental

Keywords :Methotrexate, royal jelly, Infertility ,testis, Male rats

AP62 The effect of donepezil on *CyP19a1* gene expression in female Wistar rats with polycystic ovary syndrome

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Evidence suggests that the role of neurotransmitters in polycystic ovary syndrome (PCOS) is not yet fully understood. However, it has been shown that in PCOS conditions the level of the neurotransmitter acetylcholine (ACh) decreases. Previous studies have shown that the growth and differentiation of ovarian follicles may be regulated by ACh. The aim of this study was to evaluate the expression of *CyP19a1* gene after injection of donepezil (A type of acetylcholinesterase inhibitor) in female wistar rats with PCOS. For this study, 25 female wistar rats (3 groups of 5 with PCOS and 2 groups of 5 negative and positive controls) were used. Induction of PCOS in rats (160-200 gr) was induced by intramuscular injection of estradiol valerate (4 mg per 1000 gr body weight, Abu Reihan Co., Iran). In order to evaluate the effect of donepezil on the steroidogenesis pathway of ovarian follicles, Intraperitoneal injection of this drug was performed in 3 groups with PCOS at doses of 2, 4 and 6 $\mu mol/Kg$. The effect of donepezil was evaluated by ovarian extraction and *CyP19a1* gene expression. The results of *CyP19a1* gene expression show that injection of donepezil increases *CyP19a1* ($p < 0/05$) gene expression in PCOS groups compared to the control group. According to the results of this study, it seems that the improvement of PCOS conditions in the treatment with donepezil is due to the increased expression of *CyP19a1* gene.

Keywords: Acetylcholine, Aromatase, Steroidogenesis

AP63 Earthworm Species from Taleghan Region, Central Elburz Mountans, IRAN

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Earthworms are key species in terrestrial ecosystems and play essential role in ecology, environment as well as agriculture. Earthworms are ecologically divided into three groups: Epigeic, Endogeic and Anecic, and their distributions depend on physical and chemical factors in the soil. On the other hand, variety of earthworms effect on physical and chemical structure of the soil. The present study has been done faunistic study of earthworms in Taleghan region (Elburz province), east of Elburz Mountains with special climate and geography with several rivers and various habitats such as: jungle, grassland, fruit garden and agriculture lands that cause rich biota. This study was first conducted in the summer 2020 in this area. Mature specimens were collected by hand sorting and digging up quadrate ۵۰×۵۰cm in 9 sites. Then in laboratory, Earthworms were rinsed in water, anaesthetized in diluted ethanol 15% and fixed in 96% ethanol. The specimens were studied and identified morphologically and anatomically by valid identification resources and keys. The list of identified species are the following:*Aporrectodea caliginosa* (Savigny, 1826), *Ap. rosea* (Savigny, 1826), *Ap. jassyensis* (Michaelsen, 1891), *Dendrobaena byblica* (Rosa 1893), *D. octaedra* (Savigny 1826), *Dendrodrilus rubidus* (Savigny), *Eisenia andrei* Bouche, 1972, *Eiseniella tetraedra* (Savigny, 1826), *Octolasion lacteum* (Örley, 1881).All of these species belong to the Lumbersidae family and belong to the ecological group of the epigeic and endogeic group.

Keywords: Lumbricidae, Ecological group, Alborz Province, New Report

AP64 The Infection Parameters of Two Onchoproteocephalidean Species in Two Shark Species from the Persian Gulf

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Parasite assemblages are highly complex and dynamic systems, some of which are very host specific. Of those, the cestode order Onchoproteocephalidea has a subset of elasmobranch-hosted hook-bearing genera, one of which is the genus *Phoreiobothrium* Linton, 1889 and its members infect the two families in the shark order Carcharhiniformes. Recently, some studies have focused on the faunistic situation of this genus in the Persian Gulf and the present study, in the same direction, evaluates the infection of two shark species with the species of *Phoreiobothrium* .As a part of a stock assessment project conducted by the Iranian Fisheries Science Research Institute during November–December 2007, 35 specimens of *Carcharhinus dussumieri* and 22 specimens of *Rhizoprionodon oligolinx* were collected on board the research vessel Ferdous I from the coast of Hormozgan province. Each of the spiral intestines was removed, fixed in 10% buffered formalin and then all worms were transferred to 70% ethanol for storage .The specimens were stained according to the acetic carmine method . From each host species, one undescribed species of *Phoreiobothrium* was isolated namely *Phoreiobothrium* sp.1 from *C. dussumieri* and *Phoreiobothrium* sp.2 from *R. oligolinx* .The prevalence, intensity, mean abundance, and mean intensity of *Phoreiobothrium* sp.1 were respectively 8.6%, 1-4, 0.2±0.8 and 2.3±1.5 in *C. dussumieri* and likewise these indices were respectively 4.5%, 68, 3.1±14.5 and 68 for *Phoreiobothrium* sp.2 in *R. oligolinx*. The differences in infection parameters between the two shark species likely reflect the variations in foraging strategies and availability of intermediate hosts.

Keywords: parasite, host, *Phoreiobothrium, Carcharhinus dussumieri, Rhizoprionodon oligolinx*

AP65 The occurrence of tapeworms of freshwater fish from the Gawshan reservoir in Kurdistan province

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The bony fishes are an important food resource for the humans that is why the recognition of their diseases and pathogens is important. The helminth parasites are one of the most common parasites in fish, creating problems for some of them. The bony fish hosted by seven out of 19 orders of tapeworms with more than 460 species.

The aim of this study was to investigate the morphological and molecular characteristics of tapeworms from freshwater fishes from the Gawshan reservoir, South of Kurdistan province. A total of 30 fish specimens belonging to three species including *Capoeta damascina*, *Capoeta trutta* and *Squalius cephalus* were collected from Gawshan reservoir from August 2018 to September 2019. The specimens were identified using morphological and molecular data and scanning electron microscopy. The obtained specimens were from two orders, Caryophyllidea and Bothriocephalidea. The carophyllidean specimens were isolated from the intestine of *C. damascina*, *C. trutta*, and *S. cephalus*, and the bothriocephalidean from the intestines of *S. cephalus*. They were morphologically correspond with *Khawia armeniaca* in characters such as ovary shape, scolex morphology and vitelline follicles distribution and *Schyzocotyle* sp. The phylogenetic analysis with cox1 and 18S rDNA approved the morphological data. *Capoeta damascina* had the highest prevalence of infection (77%) and *C. trutta* with lowest (11%). The current study was the first parasitological investigation on the fish of Gawshan reservoir.

Keywords: Morphology, Molecular data, *Khawia armenica*, *Schyzocotyle* sp

AP66 Effect of *gallic acid on* cognitive impairments in the cerebral ischemia/reperfusion animal model

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Occlusion of the middle cerebral artery is the most common reason of ischemic stroke that can lead to a reduced cognitive performance. Gallic acid (GA) has been studied against diseases associated with damage caused by oxidative stress due to its high antioxidant capacity. The present study aims to evaluate the impact of GA on cognitive disorders in the animal model of cerebral ischemia-reperfusion (I/R). In this study, the rats divided into four groups: control, ischemia, ischemia pre-treatment with (25, 50 mg/kg) GA. Bilateral common carotid artery occlusion (BCCAO) was inducted to the ischemia group through a surgery. Animals in pre-treatment group received Gallic Acid for 30 days. The novel object test was carried out three days after the induction of ischemia. The results showed that I/R induction had caused a reduction in the discrimination index of the novel object test ($P < 0.001$). Treatment with 50GA caused a significant increase in the discrimination index comparison with I/R group ($P < 0.05$). The antioxidant property of Gallic acid maybe plays a role in improving the discrimination index and learning disorders. Accordingly, using this substance might prove to be efficient in the treatment of cognitive disorders from a stroke.

Keywords: Antioxidant, Oxidative stress, novel object test, learning

AP67 Assessment of nanosilver toxicity in the blood of goldfish (*Carassius auratus* L.)

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Nanotechnology and nanoparticles are increasingly recognized for their potential applications in aerospace engineering, nano-electronics, environmental remediation, medical healthcare and consumer products. Nanosilver (AgNPs) is one of the most commonly used nanomaterials because of its strong antibacterial properties. Due to its small particle size and specific surface area, AgNPs may end up in aquatic ecosystems posing a huge threat to aquatic organisms. In the current study, our goal was to assess the AgNPs toxicity in goldfish (*Carassius auratus* L.*)* blood. AgNPs (10, 30 & 50 *ppm*) were added to 50L plastic tanks (n=10) and kept under lab standard conditions. Following 7 and 14 days, blood samples were collected from caudal veins. Then, in blood sera, hepatic necrosis biomarkers (ALT&AST), glutathione S-transferase (GST) activity as an antioxidant enzyme and also lysozyme activity were measured and compared to control ones. Resulting data showed that AgNPs treatments caused an marked elevation ($p<0.05$) in GST activity confirming induction of oxidative stress via free radical production. Meanwhile, an increase ($p<0.05$) in the ALT&AST levels indicating a severe hepatic necrosis in fishes. An elevation in lysozyme activity ($p<0.05$) shows an antigenic role for

AgNPs which could induce the non-specific immunity in the goldfish blood samples. Collectively, AgNP may exert toxicity in aquatics via inducing a severe oxidative stress and hepatic necrosis as an antigenic particle.
Keywords: Nanoparticles, Aquatics, Antigenicity, Hepatic necrosis, Oxidative stress

AP68 CIA arthritis amelioration of Eugenol encapsulated with Chitosan nanoparticles in neonatal rats

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Due to the side effects of chemical drugs in the treatment of rheumatoid arthritis, the approach of using traditional medicine and nanotechnology is increasing. This study aimed to evaluate the therapeutic effects of eugenol encapsulated with chitosan nanoparticles in comparison with methotrexate and its function on the expression of genes involved in the disease.The 40 neonatal Wistar rats revealed rheumatoid arthritis in both sexes by CIA (Collagen Induced Arthritis) and CFA (Complete Freund Adjuvant) induction and divided into sham, control, the first treatment group receiving Methotrexate, and the second treatment group receiving Eugenol encapsulated with Chitosan Nanoparticles. Expression of the MMP-9 protein and the expression of the TNF-α and IL-10 genes evaluated by Western blotting and real-time PCR, respectively. The results showed a significant decrease in the expression level of the TNF-α gene and a significant increase in the expression level of the IL-10 gene. The expression level of MMP-9 protein was also decreased in the treatment groups but was not statistically significant. In CIA rats, inflammation, synovial hyperplasia, and pannus growth were severe. Due to immunomodulatory, anti-inflammatory, and antioxidant potentials, Eugenol Encapsulated by Chitosan Nanoparticles and Methotrexate has a protective impact against RA. It is possible to suggest that Nano Eugenol can be promising lines for RA treatment as autoimmune disorders.
Key words: Neonatal rats, TNF-α, IL-10, Methotrexate, MMP-9

AP69 The Protective Role of N-acetylcysteine in preventing the Effects of Zinc oxide nanoparticles toxicity on Mice Testis Tissue

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ZnO nanoparticles are able to produce changes in intracellular calcium, the expression of transcription factors and cytokines by producing reactive oxygen species (ROS) and lead to changes in the transcription process of genes, damaging cell DNA and apoptosis. The aim of this study was to investigate the antioxidant effect of N-acetylcysteine on testicular tissue changes, spermatogenesis and daily sperm production in mice poisoned with zinc oxide nanoparticles. In this study, 24 adult male NMRI mice (37±2gr) were randomly divided into four groups (n=6): control group (saline, 1 ml/kg), group treated with Zno NPs (50mg/kg/day), group treated with N-acetylcysteine (150mg/kg/day) and group treated with N-acetylcysteine (150mg/kg/day) + Zno NPs (50mg/kg/day). After 28 days of intraperitoneal treatments, the left testis was removed and after fixation, sectioning, tissue processing and staining with Hematoxylin and eosin method, was evaluated stereologically. Data were analyzed using one way ANOVA and the means were considered significantly different at ($P<0.05$) In zinc oxide nanoparticles group a significant decrease in the volume, length, diameter and height of the germinal epithelium and a significant increase in the interstitial tissue of the seminiferous tubules compared to the control group was observed ($p<0.001$) also in this group the mean number of spermatogonia, spermatocytes, round and long spermatid and Sertoli cells compared to the control group showed a significant decrease ($p<0.001$). In Co-treatment group N-acetylcysteine improved the above parameters compared to the group of zinc oxide nanoparticles ($p<0.01$). These parameters were not significantly different in the N-acetylcysteine group compared to the control group ($p>0.05$). N-acetylcysteine as a powerful antioxidant by increasing the amount of glutathione is able to neutralize free radicals and by preventing the formation of proinflammatory compounds and DNA failure leads to inhibition of apoptosis. In this way, it prevents the destructive effects of zinc oxide nanoparticles on rat testicular tissue.

Keywords: Mice, N-acetylcysteine, Stereology, Testes, zinc oxide NPs

AP70 Effects of serotonin reuptake inhibitor on aromatase gene expression in polycystic ovaries of Wistar rats

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Polycystic ovary syndrome (PCOS) is a female endocrine disorder that affects 5% to 10% of women. One of the causes of PCOS is an increase in the mean plasma concentration of androgen, which is associated with impaired folliculogenesis and is controlled by FSH, LH, insulin, and androgen. The aim of this study was to evaluate the effects of serotonin reuptake inhibitor (Escitalopram) on aromatase gene expression in PCOS rats. In this study, 36 female Wistar rats were divided into four groups: healthy rats, PCOS rats, treatment group during the time required for polycystic induction, and treatment group after polycystic induction. To induce PCOS, 4 mg of Estradiol Valerate was dissolved and infused in 0.2 ml of olive oil. The treatment groups, which were randomly divided into 3 cages of 5 numbers, were injected with 100 µ l in the first cage, 200 µ l in the second cage and 400 l in the third cage, respectively, weekly for the treatment group during induction and for 4 days for the post-induction group. Ovarian tissue sampling was performed 4 days after the last injection and aromatase gene expression was assessed using Real Time-PCR technique. PCOS rats showed decreased aromatase gene expression, increased androgen-to-estrogen ratio, and increased body weight. It seems that the expression of aromatase gene in PCOS mice increased after injection of Escitalopram and we saw weight loss in treated rats. By binding LH to Leydig cells, Escitalopram increases or synthesizes testosterone and provides androgen as a substrate for aromatase. We see that it reduces the ratio of androgen to estrogen.

Keywords: Escitalopram, Aromatase, PCOS, Estradiol valerate, Steroidogenesis

AP71 Identification, purification and morphological study of dinoflagellate species with red tide potential in Chabahar Bay (Sea of Oman) in the summer of 2020

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Dinoflagellates are the largest group of marine microalgae after diatoms, and many of them cause harmful blooms. Identifying susceptible areas to form Harmful blooming can be effective in taking timely action to prevent or reduce its risks, extensive environmental and economic damage to the ecosystem. In this study, the presence and morphological identification of dinoflagellates causing red tide in the Chabahar Bay in the summer of 2020 has been investigated. A sampling of seawater was performed by sterile one-liter bottles from 5 stations on the coast of Chabahar port in North part of Sea of Oman. In the laboratory, species were identified, purified. Imaging was performed using a Nikon 50I microscope and KE Keview 3.7 imaging software, and species were identified to species level with the available references. A total of 15 species of dinoflagellates and 22 species of diatoms were recorded. The purified species were transferred to a petri dish containing F2 medium for further study and stored in the Phycolab's room with 12D:12L at 25℃±1℃ condition. Results showed that 9 species of dinoflagellates including: *Amphidinium carterae*, *Amphidinium operculatum*, *Amphidinium* sp., *Tripos macroceros*, *Tripos furca*, *Peridinium quinquecorne*, *Prorocentrum micans*, *Scrippsiella trochoidea* and *Noctiluca scintillans* have the potential to cause harmful algal blooms in the sampling area. Accurate study and identification of red tide dinoflagellate can lead to a better understanding of these species and estimating their presence time in the water column and lead to more useful monitoring and control decisions to prevent or minimize environmental damage and ecosystem and human health.

Keywords: Microalgae, Phytoplankton Morphology, Harmful Algal Blooms, Makran Sea

AP72 Investigation of the Effect of Polyurethane Electrospinning Scaffold on Bone Differentiation of Adipose Mesenchymal Cells

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Bone is a mineralized and vascularized tissue that provides structural support to the body and has self-remodeling and healing capacities under normal physiological condition. However, the massive bone injury or defects caused by cancer, traumatic contusion or other diseases, which is out of body's self-healing capacity, require large bone grafts. To remedy the problems surrounding common bone spasms, bone tissue engineering has been proposed as a promising method for repairing bone defects. For bone tissue engineering, it requires that the scaffolds have excellent biocompatibility, proper mechanical and osteoinductive properties. electrospun nanofibers with extracellular matrices mimicking structure have proven to be good scaffolds for bone tissue repairing. In this study, polyurethane electrospin scaffold stimulates human adipocyte mesenchymal cells to bone cells. The composite polyurethane scaffold was prepared via electrospinning process. Scanning electron microscope (SEM) showed a beadles and uniform fibers. Also, plasma treatment was performed to increase hydrophilicity value and the efficient surface treatment was confirmed by the ultimate lower value of contact angle as 49 deg compared to 93 deg related to non-treated scaffold sample. The toxicity of the fabricated scaffolds groups was studied using MTT assessment and the results quarantined the scaffolds could provide a biocompatible surface for cultured cells. To examine the differentiation of adipose mesenchymal cells into bone alkaline phosphatase tests and electron microscopy (SEM) were used on days 7, 14 and 21 which confirmed the existence of mineral particles. This study showed that electrospun polyurethane scaffolds can cause bone differentiation of adipose mesenchymal cells.

Keywords: Bone tissue engineering, alkaline phosphatase, Nanofibers

AP73 Insecticide-enzyme interaction: spirotetramate with alpha amylase in the *Agonoscena pistaciae*

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Spirotetramat is a new insecticide that recommended to control of pistachio psylla, onion thrips and soft scales in Iran. This chemical is lipid biosynthesis inhibitor that acts with blocking of aceyl Coenzyme A carboxylase. In this study, an effect of spirotetramte on the alpha amylase activity was studied. The final concentrations of insecticides were 0 (control), 100, 200, 400, 800 and 1600 ppm. Adult insect were collected about of Birjand and two adults transfer to one ml phosphate buffer (*pH*:6.5). Samples were homogenized and after centrifuging (15000 rpm, -4 centigerade, 15 min), supernatant kept in in the -18 centigrade. Fifty microliters of toxic treatment incubated with 100 enzyme solution foe 30 min in the room temperatures. Enzyme activity was measurement using auto analyzer and alpha amylase and total protein kits. Results showed that there is no significant difference between control and 100, 200 ppm. Also, the significant reduction was occurred in the 400 and 800 ppm, with 55 and 84 percent in comparison to the control. The enzyme activity was removed completely in the highest toxic concentration treatment. Result suggests that alpha amylase as key enzyme in the carbohydrate metabolism can be reported as new target of mode of action for spirotetramt.

Keywords: Autoanalyzer, Digestive system, Homoptera, Kit, Inhibitor

AP74 The effect of taurine on angiogenesis and follicular development in autotransplanted mice ovarian tissue

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Chemotherapy and radiotherapy have adverse effects on the endocrine and reproductive functions of the ovary leading to premature ovarian failure and infertility. Transplantation of ovarian tissue is an effective way to maintain fertility and the function of ovaries in young cancerous women who undergo cancer treatments. Yet,

one of the major obstacles in ovary transplantation is ischemia-reperfusion (IR) injury. A study has indicated that taurine induces angiogenesis by activating the pathways of endothelial cell proliferation and migration. The aim of this study was to investigate the effect of taurine on the angiogenesis and follicular development in mice ovaries post autotransplantation. female mice (4-5 weeks old) were divided into three groups: control, autografted and autografted + taurine (200 mg/kg/day) and treatment was carried out one day before till 7 days after transplantation. 28 days after transplantation, the expression level of GDF9 protein as a folliculogenesis indicator was evaluated. The expression level of CD31 protein as a neoangiogenesis indicator was also evaluated on day 7 post transplantation. Data were analyzed using one-way ANOVA and Tukey's test and the means were considered significantly different at $p<0.05$. The expression level of GDF9 ($p<0.001$) and CD31 proteins ($p<0.01$) decreased significantly in the autografted group compared to the control, whereas the mentioned parameters increased significantly in the autografted + taurine group compared to the autografted group ($p<0.05$). Our results revealed that taurine treatment induces angiogenesis, which leads to a reduction in IR injury and improvement of folliculogenesis in the transplanted ovaries.
Keywords: autotransplantation, CD31, GDF9, folliculogenesis

AP75 Study of Habitats and Distribution of the Nilson's Fringe-toed Lizard *Acanthodactylus nilsoni* Rastegar-Pouyani, 1998 endemic Iran

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The genus *Acanthodactylus* is one of the genera of the family Lacertidae. This genus has about ten known species in Iran. *Acanthodactylus nilsoni* is an endemic species with a limited range of distribution in the deserts of the western Zagros. Although it has been more than two decades since its introduction, there is little knowledge about the distribution and ecological status of this species. In this study, in addition to habitat surveys, a new distribution range of Nelson's fringe-toed lizard is introduced. In spring and summer from 2018 to 2019, a new habitat for this species was identified in Kermanshah province by conducting field studies and surveys. Type habitat of the species is lowland and desert areas of Qasr-e Shirin with an altitude about 500 meters above sea level, which is a hot and dry area, with rocky and sedimentary hills with shrubby and herbaceous vegetation, shrubs, which usually hide under bushes during the day and feeds on insects and spiders. According to the results of this study, the distribution range of the mentioned species is about 150 km from the deserts of type locality to the steppes of the western slope of Zagros in Gahvarha, Dalahou city. The new habitat of a mountainous region, with a height of 1428 meters above sea level, has a temperate and cold climate, which covered with herbaceous plants, astragalus shrubs, wild almonds, oak and hawthorn trees on the foothills. In this study, two male and two female specimens were collected and identified with valid keys.
Keywords: Range distribution, *Acanthodactylus nilsoni*, Kermanshah province

AP76 The effect of climate change on the distribution and habitat suitability of the critically endangered newt, *Neurergus derjugini* Nesterov, 1916 (Urodela: Salamandridae): from the contemporary period to 2030

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Study of the climate variability in the past and present, and correlating those with changes in the distribution range of critically endangered species has attracted considerable research interest. The genus *Neurergus* consists of four recognized species, of which Azarbaijan newt *N. crocatus*, Kurdistan newt *N. derjugini*, Lorestan newt *N. kaiseri* are documented from Iran. In the present study, based on bioclimatic and topographical variables modeled and evaluated the suitable habitats and the potential distribution areas in the contemporary as well as the decade future (2030) distribution of the critically endangered newt, *N. derjugini* Nesterov, 1916 with MaxEnt approach .The results of the models showed precipitation of the coldest quarter of the year, precipitation and temperature seasonality, temperature annual range of the year, and slope made important contributions to the contemporary, as well as precipitation of coldest quarter, precipitation and temperature seasonality of the

year variables constructed important contributions to the decade future (2030) of *N. derjugini*. It can be conclude that these variables form a natural barrier for species dispersal in each specific period.
Key words. Kurdistan newt, Climate, habitat, distribution

AP77 Effect of *Buxus hyrcana* on Rotarod Balance Performance and Oxidative Stress in Experimental Model of Epileptic Male Wistar Rats

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Buxus hyrcana has been used in Iranian traditional medicine for anticancer agent. Recently reports were indicating that its extract has also been used to treat epilepsy and other neurodegenerative disorders. The aim of this study was to evaluate the effect of *Buxus hyrcana* extracts (BHE) on experimental models of seizure-induced motor balance impairment in rats. In this experimental study, male Wistar rats in range of 200±20 g were randomly divided to four group of negative control (saline), positive control (PTZ), and BHE treated (300, and 600, mg/kg, intraperitoneally). All groups except negative control were induced by seizures with sub-threshold dose of pentylenetetrazole (PTZ) (35 mg/kg) every other day for one month and treated with BHE (300, and 600, mg/kg, intraperitoneally). After full kindling, a standard rotarod test was used to evaluate motor coordination. At the end of experiment rats were sacrificed using deep anesthesia and the hippocampi were isolate for oxidative stress (malondialdehyde (MDA)) evaluation. The data were analyzed by Graphpad Prism software and displayed as mean and standard error from mean. It is also a condition of natural distribution was examined by Shapiro-Wilk test and after ensuring the normal distribution the data were analyzed by one-way ANOVA and subsequent Tukey's post hoc test was performed. Level of less than 0.05 was considered significant. Motor-skill tasks in rotarod test in PTZ group receiving BHE at a dose of 300 and 600 mg/kg was greater than PTZ group. In addition, treatment with the BHE protects the hippocampus by lowering the MDA level. Our results showed that BHE could prevent epilepsy and elevate motor coordination in the PTZ-kindled rats by inhibition of oxidative stress damage.
Keywords: Kindling, Traditional medicine, Neurodegenerative disorders, Pentylenetetrazole

AP78 Maternal Thyroxine deficiency effects on interlukin-6 in CSF of developing Wistar rats

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Cerebrospinal fluid(CSF) contain different kinds of cytokines such as interlukin-6 (IL-6) that IL-6 involves in inflammation and neurogenesis. Thyroid hormone plays a role in development of brain and levels of this hormone have been suggested to influence cytokine production. For this study used an animal model to study the role of thyroid hormone (T4) on IL-6 level in CSF of postnatal developing rat brain. To induce thyroxin deficiency, pregnant Wistar rats received methimazole(MMI) at the third day of gestation to the first day of postnatal. CSF collected from Cisterna magna of normal and MMI treated newborn rats. Hypothyroidism of pregnant mothers approved by T4 ELISA kits. IL-6 levels in CSF were determined by ELISA kits. Also the number of newborn mice at birth and weight of new born mice were evaluated in the newborn rats to indicate effect of hypothyroidism. The results of this study showed that the level of IL-6 was increased in the MMI traeted CSF of newborn rats in compare to normal newborn rats. Weight and number of newborn mice were reduced. Considering that interleukin-6 is involved in inflammation and differentiation, it can be concluded that thyroid hormone deficiency affects IL-6 and causes inflammation and reduction in neurogenesis that results in impair growth and development.
Keywords: Cerebrospinal fluid, Hypothyroidism, Methimazole, Cisterna magna

AP80 The effects of intracerebroventricular injection of Aplin-13 on food intake of broiler chicks

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Apelin is an endogenous peptide ligand for APJ orphan receptors. APJ is a G protein coupled receptor that is very similar to angiotensin II receptors. The apelinergic system is present in most tissues of the body, including the hypothalamus in the brain. In this study, the effect of intracerebroventricular injection of different doses of Aplin-13 on food intake was investigated in Ross 308 broilers at the age of 5 and 7 days. On the day of injection, 3 hours fasting were applied to the chicks to coordinate their food intake. In this study, intraventricular injection was performed into the right lateral ventricle of chickens based on the method of Davis et al. After the injection, food was given to the chicks and food intake was measured at half, one, two, three, four, eight and twenty one hours after the injection. In order to analyze the data and draw a diagram, Prism software version was used. Data analysis was performed by independent t-test. Significance level was considered $P < 0.05$. In 5-day-old chicks, both doses of 1 and 1.5 μg significantly reduced food intake at 21 hours after injection, and also the dose of 1.5 μg significantly reduced food intake at 4 hours after injection. In seven-day-old chicks, the doses of 1 and 4 μg of Aplin-13 had no effect on food intake compared to the control group. The dose of 2 μg also significantly reduced food intake from 8 to 21 hours after injection. The results of this study showed that Applein-13 reduced food intake in 5 and 7 day old chicks compared to the control group, but this effect was not significant in all doses.

Keywords: Apelin receptor, Hypothalamus, Ross 308

AP81 Investigation of pasture forage contamination with horse strongyles in different areas of Urmia, West Azerbaijan province

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Equine, including work horses, play an important role in transporting farmers' daily goods and plowing, which from this point of view, their health status is important for their owners. Although work horses are resistant to some parasitic infections, contamination with helminth parasites such as strongyles reduces their mobility and productivity in daily tasks. Strongyles are sub-family nematodes of strongylinae and cyathostominae, causing lesions in the colon wall, diarrhea, colic and emaciation in infected horses. This cross-sectional study was conducted to determine the contamination rate of different pasture forage to small and large horse strongyles in the villages around Urmia city to from 2017 to 2018. After collecting and transferring the samples to the veterinary parasitology department of Urmia University, the larvae were isolated by Berman method and diagnosed based on morphological characteristics. The results of this study showed that contaminations of parasite included Cyathostom larvae, *Strongylus equinus*, *Trichostrongylus axei*, strongyle eggs and *Parascaris equorum* eggs. Cyathostom larvae were the most common strongyle larvae in these pastures.

Keywords: Equine, Strongyle, *Trichostrongylus axei*, *Parascaris equorum*

AP82 Alpha-pinene improves spatial memory in Alzheimer's disease model rats

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Alzheimer's disease (AD) is a neurodegenerative disease that leads to memory impairment. Studies have shown that the deposition of beta-amyloid (Aβ) peptide in the brain plays an important role in the onset and progression of AD. Alpha-pinene is a type of terpene found in various plants such as pine and rosemary. Alpha-pinene can prevent oxidative stress and inflammation caused by ischemia. We studied the effect of alpha-pinene on the spatial memory of AD model rats. Adult male rats were divided into 4 groups (10 rats in each group): control, alpha-pinene, AD, and AD-alpha pinene. After intra-hippocampal injection of $A\beta_{1-42}$, rats received alpha-pinene (50 mg/kg) for 14 consecutive days, and then, spatial learning and memory of the animals were investigated

using Morris water maze. The results were analyzed using one-way analysis of variance and P <0.05 was considered as a significant level. The results showed that Aβ increased the time and distance spent to reach the hidden platform compared to animals in the control group (P < 0.05). These animals also swam less time in the target quadrant in the probe test (P < 0.01). Alpha-pinene prevented these behavioral changes in AD model rats. It is concluded that alpha-pinene can improve spatial learning and memory in animals receiving Aβ and therefore may be effective in the prevention and treatment of Alzheimer's disease.

Keywords: Alpha-pinene, Beta amyloid, Hippocampus, Morris water maze

AP83 Molecular phylogeny of the Anatolian rock lizards (genus: *Apathya*) based on nuclear DNA sequences in Iran

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Apathya is a genus of the family Lacertidae containing two species Apathya cappadocica and Apathya yassujica. Apathya yassujica is endemic to Iran which distributed in the southern Zagros mountains, while A. cappadocica inhabits rocky area in the southeastern Turkey, northern Iraq and western Iran. Two subecpeies of A. cappadocica (Apathya cappadocica uromiana and Apathya cappadocica muhtari) live in Iran throughout Zagros mountains from. In this study, the phylogenetic status and genetic diversity of these species were studied in the Zagros mountains range. Also, some samples from Turkey were added to the study. Phylogenetic relationships and genetic diversity were assessed using two nuclear genes; MelanoCortin-1 and Natural Killer Cell Triggering Receptor. The results of the study showed that the Iranian specimens of the genus were separated from the Turkey populations and settled in three distinct clades (Urmia, Baneh and Ilam clades). Also, the results showed that Ilam population form a sister clade to A. yassujica. It is assumed that orogeny process in the Anatolian (Turkey) and Zagros (Iran) mountain ranges were resulted in high diversity within the genus. Overall, due to having separate clades in each geographic region it is suggested that the taxonomic situation of the genus should be revised.

Keywords: Apathya, Phylogeny, Zagros mountains, Anatolia, Orogeney

AP85 The study of helminth parasites of Ranidae (Amphibia: Anura) from the vicinity of Sanandaj

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The amphibians are an important class in the vertebrates with great role in the ecosystem. Their health will be affected by many factors such as the habitat distraction, climate changes and pathogens. There are reports of pathogenicity by helminth parasites in the frogs. More than 20 species of Monogenea, Digenea, Cestoda and Nematoda have been reported from amphibians of Iran. The most reports are on the two common species in the region, the marsh frog, *pelophylax ridibundus* (Pallas, 1771) and green toad, *Bufo viridis* (Laurenti, 1768). The aim of the study is to investigate the fauna of helminth parasites in the family Ranidae around Sanandaj. So far, a total of 30 specimens of marsh frogs were collected from different stations of the region in the summer and fall 2020. All organ systems of the hosts were examined for the parasites. To study morphological features, the digenean were examined as permanent mounts and nematodes as temporary mounts. The prevalence of infection for a species of oxurid nematode, Pharyngodonidae in the rectum was 100%. In addition, two species of digenean trematode were found, one in the lungs and other in the intestine. The identification of parasite taxa to species level is carrying out.

Keywords: Nematoda, Digenea, morphology, marsh frog, rectum

AP86 Study of preventive effect of alpha-lipoic acid on cisplatin induced hemotoxicity in NMRI mice

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Cisplatin is one of the most effective anti-cancer drugs used to treat cancers of ovary, testicles, bladder, head and neck and many other cancers. However, the clinical use of this drug is limited by side effects such as renal, hepatic, neurological, and blood poisoning and its effects on hematopoietic tissues. Experimental studies have shown that oxidative stress caused by the metabolism of this drug is one of the main causes of side effects. Alpha lipoic acid is known as a powerful antioxidant with anti-inflammatory properties. Aim of this study was to evaluate the effect of ALA on improving the blood parameters of cisplatin mice. In this study, 35 adult male mice weighing 30-40 g were divided into 5 groups of 7. Control group, cisplatin 5 mg/kg group, CP+ALA 50 mg/kg group, CP+ALA 100 mg/kg group and ALA group 100 mg/kg alone received by repeated intraperitoneal injection for 7 days. At the end of experiment blood sample was taken from heart and parameters of WBC, RBC, HGB, HCT, MCV, MCH, and PLT were analyzed. Our results showed that RBC count, PLT count, level of HGB and HCT significantly were decreased in the CP group compared to control. However, these parameters were increased significantly in the ALA+ CP group compared to the CP group. Although we found a significant increase in WBC and neutrophil count, however, the number of lymphocytes decreased in the CP group compared to the other groups. It is concluded that different doses of ALA has protective effects against CP-induced alteration in parameters of blood cells. Thus, it could be used as a dietary supplementation to reduce CP-induced hemotoxicity.

Keywords: blood parameters, oxidative stress, antioxidants, red blood cells, white blood cells

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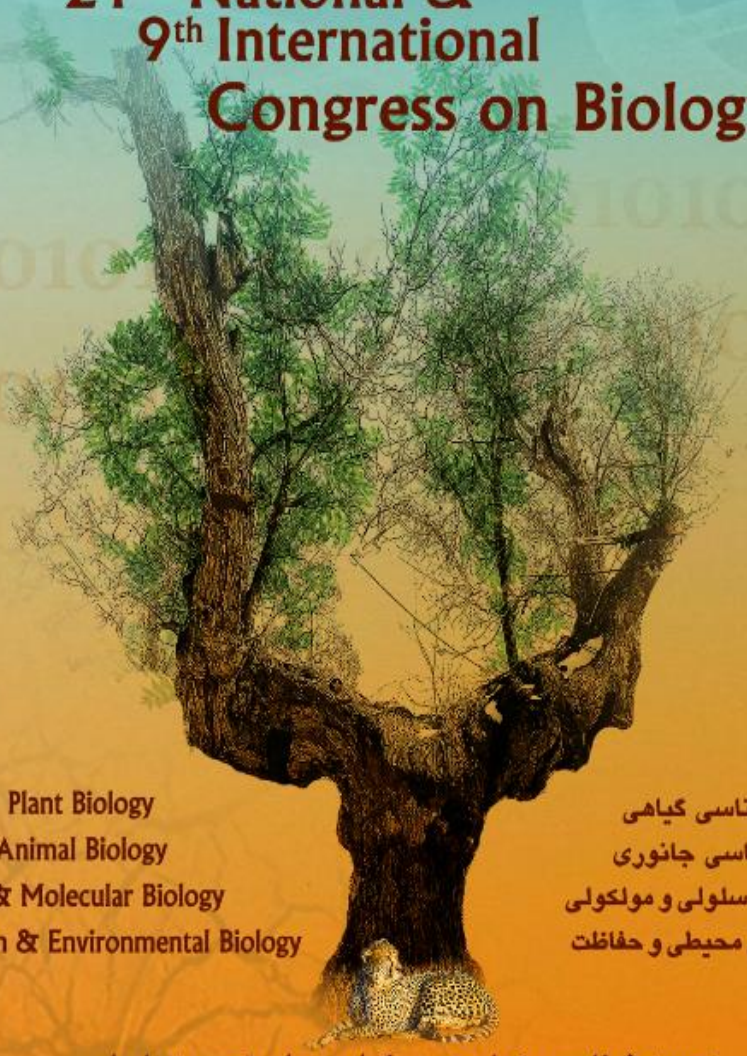

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