ABSTRACT BOOK

3rd International Conference

One Health: Problems & Solutions

1-2 June 2023

Baku, Azerbaijan

CO-ORGANIZERS:

Azerbaijan Medical University

Azerbaijan National Research Institute (NRI) of Medical Prevention named after Vali Akhundov

Food Safety Agency of the Republic of Azerbaijan

Department of Molecular Sciences, Swedish Centre for Animal Welfare of Swedish University of Agricultural Sciences SLU, Sweeden

National University of Life and Environmental Sciences, Ukraine

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"This conference is dedicated to children affected by wars, violence, natural disasters, and hunger on our planet. We should start taking responsibility and preserving our planet for future generations."

ABOUT THE CONFERENCE

Khazar University is proud to host the 3rd International Conference on "One Health: Problems & Solutions" during June 1-2, 2023, in Baku, Azerbaijan. As a member of the Planetary Health Alliance (PHA) consortium and following the success of the 1st conference on June 1-2, 2018, as one of the Satellite Partner Meetings of the second PHA Annual Meeting on May 29-June 1, 2018, in Edinburgh, UK, we are started our series of Planetary Health and One Health meetings. The second meeting was held on 24-25 May 2019.

Our goals are to enhance better cooperation and collaboration between health and environmental professionals to promote an understanding of the importance of Planetary Health, exchange data, and knowledge to recognize and improve human health, animal health, and ecosystem health issues in Azerbaijan and globally.

Our co-organizers are Azerbaijan Medical University, Azerbaijan National Research Institute of Medical Prevention named after Vali Akhundov, the Food Safety Agency of The Republic of Azerbaijan, the Department of Molecular Sciences at the Swedish University of Agricultural Sciences (SLU) together with SLU Swedish Centre for Animal Welfare of SLU who works together with Khazar University in a joint project (HanimSPAC) on animal welfare and sustainability, the faculty of Livestock Raising and Water Bioresources from the National University of Life and Environmental Sciences of Ukraine, and the Poltava State Agrarian University of Ukraine.

We are delighted to have participants, scholars, speakers, health professionals, researchers, students, societies, delegates, and exhibitors from around the world attend the conference. The conference will bring together multiple health science professionals, together with their related disciplines and institutions operating at local, national, and global levels to achieve the best for humans, animals, wildlife, plants, and our environment.

The conference intends to use discussions and presentations on Climate Change, Health, Food Security, Public Health, diseases control and prevention strategies, policies, new One Health Approaches, and One Health capacity building to achieve the best health for people, animals, and our environment.

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THE ISTHMUS

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Contemporary public health practitioners have been educated on the premise that their major professional functions are rooted in assessment, assurance, and policy development. While this remains true, society has entered the Anthropocene era in which the health, safety, and economic prosperity of nations will be increasingly rooted in the fabric of ecosystem diversity and resiliency. Effective environmental public health practitioners and thought leaders will recognize and operate in the space between the professions to advance sustainable economic growth. This strategy will maximize the likelihood that the essential health links between humans, wildlife, domesticated animals, and plants are identified, recognized, evaluated, and nurtured to the benefit of all.

THE SAFEGUARD OF GENOME STABILITY AND INTEGRITY

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DNA replication is a complex and systematic process that ensures faithful duplication of the genome and subsequent cell division only once per cell cycle, however, it is constantly challenged by various endogenous and exogenous stressors. Proper DNA replication and replication stress response safeguard the genome's stability and integrity. Protein post-translational modifications (PTMs), such as phosphorylation and ubiquitination, are key regulators of the DNA replication stress response. The ataxia-telangiectasia and RAD3-related kinase (ATR)-CLASPIN-checkpoint kinase 1 (CHK1) signaling cascade is a pivotal mechanism that ensures proper response to replication stress.

Keywords: DNA replication, stress response, cancer therapy, endogenous and exogenous stressors

CHARACTERIZATION OF ANTI-TUBERCULOSIS IMMUNITY AND ITS APPLICATION IN HOST-DIRECTED THERAPY (HDT)

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Research on cellular immunity and translational medicine of tuberculosis: (1) Characterization of anti-tuberculosis immune peripheral blood by single-cell sequencing: Frequency of CD3-CD7+GZMB+ cells was significantly decreased in patients with TB, compared to HC and LTBI. Induction of CD8 T-cell differentiation by *Mycobacterium tuberculosis* (Mtb)-infected tissues; CD8 TCR-specific amplification in TB-infected tissues; high CD8 expression of GZMK in TB-infected tissues (GZMK is a good diagnostic marker); (2) HIV infection weakens host anti-TB macrophage immunity: HIV infection increases TB risk factor-CD4 T cell depletion; RBC autoantibody-mediated erythrophagocytosis in HIV/AIDS patients impairs macrophage anti-TB function, thereby increasing TB susceptibility; HIV infection suppresses anti-TB immunity and increases TB susceptibility;（3）Screening of HDT drugs targeting host anti-tuberculosis immunity: Previous results revealed that *Mtb* infection enhanced HRH1 expression, which in turn restrained macrophage bactericidal activity by modulating the GRK2-p38MAPK signaling pathway, inhibiting NOX2-mediated cROS production and phagosome maturation.

Keywords: Host-Directed Therapy, tuberculosis, anti-tuberculosis immunity, HIV infection

THE IDIOSYNCRASIES OF GETTING PUBLISHED IN THE INTERNATIONALLY ACCLAIMED JOURNALS

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Da Vinci Editing's seminar and master class on how to enhance your chances of publication success in the international academic arena. To start, I will outline what motivates journals and publishing companies and how they ensure their own success in terms of business profits. By knowing exactly what journals, as well as reviewers and readers, are looking for in a scientific paper, you will see how you can tailor your submissions to maximum effect. This seminar gives a realistic guide on how to prepare, submit and publish papers and some key details that only professional editors have access.

Having heard about what journal editors are looking for, you are ready to learn how to construct an appealing manuscript. Researching and writing are diverse activities requiring different skills; what is more, writing in a language that is not your mother tongue can be a challenge. In my accompanying master class, I will guide you through each key component of a standard, primary research article. I will break down each section, pull out the key points and provide a key list of "do's and don'ts" when writing.

APPLICATION OF TELEMEDICINE AND PORTABLE ULTRASOUND EQUIPMENT BASED ON NEW GENERATION INFORMATION TECHNOLOGY IN INTENSIVE CARE UNITS (ICU) DURING THE GLOBAL COVID-19 EPIDEMIC

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Shanghai Medical College, Fudan University (SMCFU) was founded in 1927, the first-ever national university medical school founded by Chinese people. During the global COVID-19 epidemic, all 18 affiliated hospitals of Fudan University undertook a large number of medical tasks for severe patients. We apply various new technologies, including utilizing 5G, AI, and next-generation information technology to carry out remote medical services, for instance, telemedicine between Shanghai and Xinjiang, China (2000 km away); applying portable ultrasound equipment in the ICU department which supporting doctors to make quick judgments.

POST COVID-19 ERA: NEW MEASURES FOR BUILDING A GLOBAL INNOVATION AND ENTREPRENEURSHIP CLUSTER IN UNIVERSITY SCIENCE PARKS

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In the past three years, China and the world have suffered from the COVID-19 epidemic, and international scientific and technological cooperation, young scientists exchanges, and technological docking are at a standstill. At present, both the Shanghai government & Pan-SHU Sci-Tech Park have taken new measures to build a global innovation and entrepreneurship cluster, which include the introduction of high-level overseas talents, providing scientific and technological innovation funds, space for industrial transformation, and inviting global university students to innovation competitions. Pan-SHU Sci-Tech Park invites Azerbaijani teachers, students, and entrepreneurs to come to Shanghai, China for development.

EPIDEMIOLOGY OF ACUTE MYOCARDIAL INFARCTION IN KAZAKHSTAN: DATA FROM NATIONWIDE ELECTRONIC HEALTHCARE REGISTRY 2014-2019

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Background and purpose: Cardiovascular diseases (CVDs) continue to be a prominent cause of premature death. The Global Burden of Disease (GBD) Study has indicated that in 2019, there were 523 million prevalent cases of CVDs worldwide. Although it is only 7% of the world, the burden of disease has become more overwhelming than ever due to the extended lifespan and aging population. Based on the findings of the GBD Study, from 1990 to 2017, Kazakhstan had 714,104 disability-adjusted life years (DALYs) lost to ischemic heart diseases. With these considerations in mind, the objective of this study was to analyze the epidemiology of acute myocardial infarction (AMI) in Kazakhstan, the largest country in Central Asia.

Methods: This retrospective study analyzed data from the Unified National Electronic Health System from 2014-2019. The study included patients with the ICD-10 code of I21 as the main diagnosis, focusing only on the first-ever event of acute myocardial infarction (AMI). The study evaluated the incidence, mortality rates, and comorbid conditions of the cohort based on hospital admission and discharge status. The study used years of life lost due to premature death (YLL) and years lived with disability (YLD) to calculate DALYs. The significance level was set at 0.05, and all statistical analysis was done using STATA 16.1.

Results: Between 2014 and 2019, there were 79,172 hospital admissions due to acute myocardial infarction, with 33% of patients being female and 67% male. Among the cohort, 86% were over 50 years old, and 53% were retired. Concurrent cardiovascular accidents, diabetes, hypertension, and chronic kidney disease were present in 5%, 17%, 78%, and 12% of the patients, respectively.

Figure 1 presents the incidence rate (IR) of myocardial infarction (MI) among patients stratified by age and sex during the observation period. The diagram

illustrates that the IR among males experiences a sudden rise till the age of 60-65 years, whereas for females, the increment is more gradual, and it reaches its peak at 75-80 years of age. Notably, the IR based on hospital admission and discharge status showed no significant alteration over the study period, with a consistent rate of 727 individuals per million population (PMP) in 2014 and 739 PMP in 2019. However, there was a marked increase in the all-cause mortality rate from 101 PMP in 2014 to 210 PMP in 2019.

Keywords: Cardiovascular diseases, myocardial infarction, incidence rate, Kazakhstan

THE STUDY OF THE EFFECTIVENESS OF THE BIOLOGICALLY ACTIVE SUBSTANCE NAMED "ANTI-BRUCELLA" AGAINST ANIMAL BRUCELLOSIS

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Introduction. In modern conditions, brucellosis remains an endemic infection in many regions of the globe and in Azerbaijan. The main purpose was to study the results of the use of the biologically active substance "Antibrucella", selected for its therapeutic efficacy against *Brucella species* pathogenic to humans and animals.

Material and methods. A new biologically active substance (BAS), a drug used in practice under the code "BEF-59" in 1988 at the Research Institute of Technology and Safety of Medicines of the Medical Industry in Moscow, the biologically active substance named "Anti-brucella" received a state registration number (No.8805088). Clinical and laboratory experiments (PCR and serological methods) on large and small cattle (N=1500) were carried out in 2 stages (first - before and second - 3 months after the applying of BAS) at concentrations of 2.0; 2.2; 2.3; 2.6 ml Used 0.5 ml of 2.8 and 3% aqueous solutions, the control group consisted of 500 heads of healthy cattle.

Results. The percentage of clinical signs of primary brucellosis (weight loss, abortion, etc.) before the use of BAS was 52.5%. In the second stage, the same indicators decreased to 37.9%. These indicators were higher (74.9%, $p<0.05$) compared to the control group. Statistically significant results were also obtained in laboratory studies: high levels of IgG were recorded in 60% of the cattle in the BAS applied group prior to the experiment. This indicator dropped sharply (22.5%, $p<0.05$) in the second stage. In the control group, the level of IgG was at the same level (49% of all tests). Complications are not registered.

Conclusion. The results of the study of clinical and laboratory indicators were lower after the use of the biologically active substance named "Antibrucella". Taking into account the high efficiency of studied BAS it is recommended to study it among patients with confirmed chronic brucellosis.

Keywords: the biologically active substance, animal brucellosis, therapeutic efficacy

ANTIMICROBIAL PEPTIDES AS AN IMPORTANT REGULATORY IMMUNE MARKERS IN THE DIAGNOSIS OF COLORECTAL CANCER

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Recently, immune mechanisms in the pathogenesis of colorectal cancer have been the focus of special attention and are widely studied. Cytokines and antimicrobial peptides (AMP) play an essential regulatory role in immune mechanisms. According to the results of many studies, cytokines play an essential role in the monitoring and prognosis of malignant oncological diseases.

As a result of numerous studies have found that the weakening of the humoral immune system in patients with CRC results in an acute imbalance of many cytokines, including AMP. They determine calprotectin, fecal calprotectin, and cathelicidin play great practical importance in the differential diagnosis of benign and malignant derivatives of the bowel. The study of IL-6 and TNF-α inflammatory cytokines and AMP is of great scientific and practical importance in investigating pathogenetic immune mechanisms of CRC and adenomatous polyps and conducting morphological and clinical-biochemical studies. Complex analysis of biochemical and immunological indicators, cytokines, and AMP during colorectal neoplasia has diagnostic information in determining the histological type and stage of the disease.

Materials of 79 patients who were examined and treated with the diagnosis of colorectal cancer and adenomatous polyps at the Oncology Clinic of Azerbaijan Medical University were included in the present study; the control group consisted of 14 healthy adults. The age of the patients varied between 36-65, 58 of them were men, and 21 were women. 10 of the healthy persons were female, and four were male.

The concentration of calprotectin and cathelicidin in blood serum was carried out by immunoenzymatic method using the reagent kit of the company "Eastbiopharm" (Spain). The principle of the method is based on the use of specific antibodies against the peptide sequence of the studied antimicrobial peptides and their determination by recognizing different epitopes in the polypeptide chain.

The principle of cathelicidin determination is based on the "sandwich" reaction between human cathelicidin antibodies combined with Streptovidin-

HPR and biotinylated monoclonal antibodies against cathelicidin in the serum. Immunoenzymatic tests were performed on an immunoenzymatic analyzer, Stat Fax 303 Plus (USA) (λ= 450 nm, differential filter 650 nm). The thickness of KP is higher than the control in 14 patients (56.0%) and lower than the control in 11 patients (44.0%) (χ=12.23, $p<0.001$). In this group, the concentration of KP increased by 30.9% compared to the indicators of the control group and is 119.6±5.5 ng/ml on average. This difference is statistically reliable.

The coefficient of honesty is calculated as $p\leq0.004$. Its minimum level is 79.9 ng/ml, and its maximum level is 161 ng/ml. Accordingly, the concentration of Calprotectin in the control group varies from 67.8 to 110.6 ng/ml and is 91.4±4.0 ng/ml.

In the research work, it is determined that the concentration of cathelicidin in the blood serum of group I patients is higher than the control limits in all patients. Hence, its concentration increases statistically reliably by 2.2 times compared to the control. The reliability coefficient of the difference is calculated as $p<0.001$. Its average statistical value is 2.10 ± 0.09 pg/ml. The group's minimum value is 1.3 pg/ml, and the maximum value is 2.8 pg/ml.

Keywords: Colorectal cancer, cytokines, calprotectin, cathelicidin, immunoenzymatic test

TIME-SERIES ANALYSIS AND FORECASTING OF VIRAL MENINGITIS IN KAZAKHSTAN FROM 2014 TO 2025

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Background: Meningitis is a global public health concern, causing morbidity and mortality in different age groups [1]. Kazakhstan is no exception, where viral meningitis has been a major cause of illness, particularly in children [2]. Therefore, time-series analysis is essential for forecasting the incidence, identifying trends and seasonality, and predicting future outbreaks [3]. This study aims to perform a time-series analysis of viral meningitis (VM) data in Kazakhstan from 2014 to 2025 using the SARIMA model, assess the accuracy of the model, and make predictions for future outbreaks.

Methods: We collected the monthly data of VM in Kazakhstan from 2014 to 2019, and a descriptive and time series analysis was carried out using the SARIMA (2,0,1)(1,0,0,12) model. R-squared score, mean absolute error, mean squared error, and mean absolute percentage error were used to evaluate the accuracy of the model. In addition, we performed autocorrelation function (ACF) and partial autocorrelation function (PACF) analysis to determine the autoregressive and seasonal autoregressive order: p, d, q and P, D, Q and S for the length of the seasonal period.

Results: From 2014 to 2019, 10,251 cases of VM were reported. The SARIMA model accurately captured the trend and seasonality of VM in Kazakhstan (Figure 1). The ACF and PACF analysis (Figure 2) showed that the optimal parameters for the SARIMA model were (2,0,1)(1,0,0,12), indicating that there is a seasonal pattern in the incidence of VM in Kazakhstan. The model has a good fit with the r-squared value of 0.85, a mean absolute error of 41.36, a mean squared error of 6728.28 and a mean absolute percentage error of 26.79%.

Conclusion: The SARIMA model accurately predicted the incidence of VM in Kazakhstan from 2014 to 2025 and can be used to predict future outbreaks. The seasonal pattern identified in the incidence of VM suggests the need for enhanced surveillance during the peak season to detect outbreaks early and initiate appropriate interventions. Our study highlights the importance of time-series analysis in forecasting disease incidence and developing public health policies to control the spread of infectious diseases.

Keywords: viral meningitis; time-series analysis; SARIMA model; Kazakhstan

PAKISTAN COVID -19 PANDEMIC READINESS & RESILIENCE EXERCISE AND THE WAY FORWARD

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Background: To assess readiness and resiliency in Pakistan, POHA conducted a During Action Review and Tabletop Exercise (DART) from November 2020—January 2021. DART allowed for both retrospective evaluations of strengths and gaps in the response up and prospective testing of potential scenarios that might complicate resiliency in years to come. The first case of COVID – 19 pandemic surfaced in December 2019 in Wuhan, China. It rapidly spread across the globe. Pakistan got afflicted by the Pandemic in February 2020. By December 2020 the pandemic has spread all over the country with more than 450,000 cases in the country and more than 10,000 deaths. This figure alarmingly rose to 1,144,000 confirmed cases with 25,000 deaths by August 2021.

Scientists apprehended that COVID was likely to last longer and a policy shift from emergency mode to enhancing resilience was required. Pak One Health Alliance (POHA) – an NGO – with the support of Ending Pandemics and local stakeholders conducted an in-depth analysis for ensuring readiness and resilience to combat the Pandemic.

Methods: Experts representing roles of Epidemiologist, Laboratorian, Animal Health, Emergency Responder and Communicator, and Airport Response Team/Point of Entry participated in the retrospective analysis which consisted of a role-based questionnaire and participant-led analytic discussion. Participants then played remote, multirole, multisector tabletop exercise looking at scenarios 3 months, 6 months, and 3 years in advance to explore readiness for situations such as vaccine-resistant, more severe variants; internet outages, economic recessions, limited surge capacity and supply chain. A participant led After Action Session allowed all to identify key priorities and recommendations for how to best prepare moving forward. The DART addressed both national and Punjab province responses.

Results: Participants identified centralized response and political commitment and uniform risk communication as key strengths in the response. Numerous recommendations amongst others pertaining to strengthening of legislation coverage, human resources, laboratory services, and vaccination drives were developed.

Conclusions: A combined retrospective and prospective approach was adopted by provincial and national experts to recommend planning priorities for improving readiness and resiliency to meet future challenges of the pandemic. It was inferred that a centralized national response coupled with well–structured operational plan can improve provincial-level logistics, communication, and epidemiology response.

Keywords: COVID–19, DART, Pak One Health Alliance

HERITAGE CEREALS – USING HISTORY TO FORM THE FUTURE

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Throughout history, cereals have been an important source of protein in human nutrition. Cereals are also rich in dietary fibre and bioactive compounds with health-promoting effects. Nowadays, there is a tendency to consume less wheat because of the blooming of modern "low-carb" and "gluten-free" trends. This, however, mainly concerns modern wheat varieties because of believe in its association with the prevalence of obesity, type 2 diabetes, allergy, and intolerances. Even though this reputation is questionable, the concerns about the consumption of wheat have led to the promotion of "alternative" cereal-based products. Heritage cereals (populations that were not subjected to modern breeding or selection) have shown great potential in the development of nutritious, tasty, safe, and affordable foods. Moreover, the cultivation of heritage species requires less intense use of mineral fertilizers, which makes them more suitable for organic farming. Thus, increased production and consumption of heritage cereals are in line with the Swedish food strategy and the current government goal to increase organic food production. Heritage cereals also have shown more resilience to soil quality and extreme weather conditions such as drought. Finally, it is essential to keep a divergent pool of wheat genotypes that can be grown under various environmental conditions and serve as a genetic bank for later improvements. Until now, the main research focus was directed toward the positive contribution of heritage cereals on the environment and human health. Studies on the safety aspects of heritage cereals, such as levels of contaminants and other potential risks, are sparse. Furthermore, further research is needed to identify opportunities and approaches to increase the efficiency of heritage cereal production as well as promote education on healthy food choices among consumers.

Keywords: Wheat; consumption; sustainability; climate change; human health

FLUORINE CONTENT IN THE OBJECTS OF THE EXTERNAL ENVIRONMENT AND ITS EFFECT ON THE CHILDREN'S HEALTH CONDITIONS IN THE REPUBLIC OF TAJIKISTAN

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According to the World Health Organization (WHO), millions of people are exposed to excessive amounts of fluoride through drinking water from contaminated natural geological sources. As a result, many people suffer from various health problems - from mild forms of dental fluorosis to deforming skeletal fluorosis. This problem has not yet received adequate attention, so there is an urgent need for guidelines in this area [WHO, 2012].

During scientific and technical progress, fluorine is one of the most common environmental pollutants. The accumulation of fluoride is not only a danger to human health but can also cause the spread of fluorosis. It is estimated that more than 10 million people in China alone suffer from skeletal fluorosis. (Al-Galban L.N. et al., 2020; Berezhnova V.V. 2017).

The main objective of this study was to evaluate the water supply system and to investigate the fluorine content in environmental objects and its impact on children's health.

Research methods: chemical, sanitary-hygienic, statistical, potentiometric, collometric.

Research findings: Only 30% of the population in the Bokhtar region is supplied with centrally piped water, 70% use water from open water sources. The lack of quality drinking water in rural areas is mainly due to the lack of water and the poor state of infrastructure.

There are public water taps on water pipes in damaged sanitary condition, water disinfection is not carried out and there is no laboratory control of water quality. Of the 125 functioning water mains in the Bokhtar region, 63% do not meet sanitary and hygiene requirements and 69 water pipelines are not in working condition.

Compounds of gaseous fluorine and salts of hydrofluoric acid were found in the atmospheric air in the populated areas of Tursunzade city, and traces of them in the Bokhtar. The highest number of fluorine compounds was found in the experimental zone (Jamoat Navobod) of Tursunzade. In 92.2% of the examined water samples from Bokhtar, the fluorine content was below 0.3 mg/l.

The total impact of fluorine in water on the population of the city of Tursunzade with a high content of fluorine was consumed by 1177 people, which amounted to 2.0%. Most of the population of Bokhtar is exposed to the use of water with a very low fluorine content in the water. Among schoolchildren in the Bokhtar with an insufficient content of fluorine, are mainly diagnosed with dental caries, and in the Tursunzade, with a relatively high content of fluorine, fluorosis of the teeth and the skeletal system.

The probability of developing dental fluorosis is 2.1 times higher in the exposure category (0.51-1.50 mg/l) than in the other exposure categories. A dynamic phenomenon was observed: the higher the fluoride concentration in drinking water, the higher the risk of acquiring fluorosis.

Keywords: fluorosis, water supply system, fluorine compounds

INSIGHT INTO COVID-19 AND MALARIA IN PREGNANT WOMEN AND CHILDREN: ANALYZING THE HYDROXYCHLOROQUINE AND COVID VACCINE INTERACTION

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Background: Hydroxychloroquine is a lysosomotropic drug that increases the pH of the lysosome, thus affecting the functions of proteins involved in antigen-presenting pathways and B-cell activation. This drug, one of the main treatments for malaria has garnered unprecedented attention as a potential therapeutic agent against COVID-19 following several small clinical trials, uncontrolled case series, and public figure endorsements. Additionally, in areas where malaria transmission is high, there is a need to understand how the current COVID-19 vaccines and treatments may interact with existing malaria treatments. In this article, we will explore the interaction between Hydroxychloroquine and the COVID-19 vaccine, and its impact on pregnant women and children.

Method: We searched PubMed, Web of Science, and Scopus from inception to April 2023. Here, we perform a rapid narrative review and discuss the strengths and limitations of existing in vitro and clinical studies.

Result: We found Despite initial reports suggesting that Hydroxychloroquine may be effective in treating COVID-19, subsequent studies have shown that it is not an effective treatment for the virus. There is limited data on the interaction between Hydroxychloroquine and the COVID-19 vaccine, there is some concern that the combination of the two may increase the risk of side effects.

Hydroxychloroquine has been shown to cause QTc prolongation and cardiac arrhythmias problems in some patients, and there is some concern that the combination of Hydroxychloroquine and the COVID-19 vaccine may increase the risk of these problems. the FDA has revoked the Emergency Use Authorization (EUA) for Hydroxychloroquine for the treatment of COVID-19. While Hydroxychloroquine may not be effective in treating COVID-19, but it remains an important drug in the treatment of Malaria. Pregnant women and children are particularly vulnerable to Malaria, and Hydroxychloroquine is effective in preventing and treating the disease.

Conclusion: In conclusion, pregnant women and children are vulnerable populations that require special consideration in the context of the COVID-

19 pandemic and Malaria. While Hydroxychloroquine is effective in the treatment of Malaria; it is not effective in the treatment of COVID-19 and may even be harmful in some cases. Pregnant women and children who are taking Hydroxychloroquine for the treatment of Malaria should continue to take the drug as prescribed and should discuss the risks and benefits of the COVID-19 vaccine with their healthcare provider. It is important to continue researching the interaction between Hydroxychloroquine and the COVID-19 vaccine to ensure the safety and efficacy of these treatments in vulnerable populations.

Keywords: COVID-19 vaccine, hydroxychloroquine, malaria, pregnant women, children

THE IMMUNOLOGICAL RESEARCH OF DIFFERENT LEVELS OF EXPRESSION OF CD104 IN BLADDER CANCER STEM CELLS IN THE TCGA PRAD DATABASE: A BIOINFORMATICS' STUDY

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Background: Bladder cancer (BC) is one of the most common cancers for both women and men all over the world. Unfortunately, the number of BC deaths is increasing rapidly each year so early diagnosis of BC can be lifesaving. Progression in BC is related to the presence of malignant growth foundational microorganisms in the cancer mass, which are impervious to current and flow therapies. Various markers have been suggested to identify bladder cancer stem cells, CD104 is one of the most significant of these markers. CD104 is very important because of its effects on tumor progression, metastasis, and Epithelial-Mesenchymal Transition (EMT). The aim of this study is to investigate the effect of PRAD on the expression level of CD104 stem cells in bladder cancer in terms of gender, individual cancer stages, molecular subtypes, sample types and nodal metastasis status, and histological subtypes.

Methods: We achieved a comprehensive bioinformatics analysis of the expression of the CD-104 across TCGA cancers (with tumor and normal samples) in Bladder cancer.

Results: Our results verified that the expression level of CD-104 is different (decreased or increased) in various tumor tissue compared with normal tissue depending on the cancer type. Moreover, TCGA analysis revealed that showed a positive correlation with CD-104 across TCGA tumors.

Conclusion: Our study revealed that CD-104 can be measured as an influential biomarker in numerous cancer progressions such as Bladder Cancer with diagnostic and prognostic benefits.

Keywords: Cancer, CD104, bladder cancer, the Cancer Genome Atlas (TCGA)

HYPOTHESIS ABOUT THE CYCLIC LABILITY OF PROOXIDANT-ANTIOXIDANT HOMEOSTASIS IN SOWS

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The considerable attention of researchers is focused on solving the problem of biological science - the peculiarities of the formation of pro-oxidant-antioxidant homeostasis (PAH) in humans and animals. For a long period of time, pigs have been widely used as an experimental model in biological and medical research, due to their proximity to the human body. Based on many years of research on the study of metabolic processes in the body of sows during the reproductive cycle, a theory was formulated about the cyclic lability of PAH in gilts during the reproductive cycle. The essence of which is a change in PAH in the body of gilts with certain periodic fluctuations caused by a change in the physiological state of sows, which are aimed at maintaining the normal course of processes, both in a separate organ and in the whole body. A characteristic feature of the determined peculiarity is a sharp shift in the homeostatic constants of the intensity of peroxide oxidation processes in the uterus compared to other organs and tissues, for example, the liver, and blood when the physiological state of the animal changes. Our studies of the dynamics of metabolism in the blood serum of sows testify to the relative stability of these processes in single and farrowing sows. Noticeable changes in the state of PAH are noted in different phases of the reproductive cycle. It has been determined that in pigs during the estrus period, peroxide oxidation processes are accelerated in blood: the activity of xanthine oxidase increases ($p<0.01$), the content of diene ($p<0.01$) and triene ($p<0.05$) conjugates and TBC-active compounds increases ($p<0.001$). These changes are accompanied by a decrease in the resistance of erythrocytes to peroxide hemolysis ($p<0.05$) and an increase in the level of antioxidant protection - catalase activity ($p<0.01$), the content of ascorbic acid ($p<0.01$), vitamin A ($p<0, 05$) and vitamin E ($p<0.01$). It was found out the fact that in pregnant sows, the last decade of pregnancy is characterized by a probable decrease in the activity of catalase ($p<0.05$), the content of vitamin A ($p<0.05$), and vitamin E ($p<0.01$) in blood and an increase in the activity of superoxide dismutase ($p<0.01$). These changes occur against the background of the acceleration of the peroxide oxidation process - an increase in the concentration of triene ($p<0.01$), oxidiene ($p<0.01$) conjugates, and TBC-active compounds ($p<0.01$). Significant physiological changes are observed in the uterus, the acceleration of peroxide oxidation processes in the endometrium can be traced during the periods of estrus, placentation, and

before farrowing. Despite the significant lability of homeostatic constants in the body of gilts, such a state of homeostasis should be recognized as a physiological norm, since with the subsequent reoccurrence of the same phase of the reproductive cycle, the indexes of peroxide oxidation become similar to the initial ones. In single gilts, the high lability of the homeostasis of physiological processes is aimed at ensuring the normal alternation of individual phases of the reproductive cycle, providing appropriate conditions for fertilization processes. In pregnant sows, this contributes to ensuring a certain level of homeostasis, maintaining fertility, and meeting the needs of growing embryos. The determined peculiarity of the cyclic lability of the homeostasis of physiological processes in the body of pigs reveals more deeply the general regularity of the cyclic nature of the reproductive function in animals. Each reproductive cycle consists of separate phases with a specific dominant. The first of them – the sexual one ensures the rapprochement of the sexes and the formation of a zygote. After the implantation of the embryos, the second phase occurs, which is regulated by the gestational dominant (pregnancy dominant); it is replaced by the third - generative, which turns into the fourth - lactating dominant. The results of the experiments reveal the phenomenon of cyclic lability of the homeostasis of physiological processes in gilts, where the transition from one phase to another is accompanied by corresponding changes in the PAH state.

Keywords: pro-oxidant-antioxidant homeostasis, sows, peroxide oxidation, reproductive cycle

EXPRESSION PROFILING OF SURVIVIN-RELATED MIRNAS FOR COLORECTAL CANCER DISEASE CONTROL AND PREVENTION IN ONE HEALTH STUDY

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Background with purpose: Colorectal cancer (CRC) is known as the most common gastrointestinal malignancy and the main cause of mortality and morbidity in the world. The high prevalence of CRC has been observed in the ages of 60 to 70 years and less than 20% happened before the age of 50. Men are slightly more affected than women. Studies on CRC showed heterogeneous molecular events including genetics and epigenetics mechanisms in cancer progression. The two most important genetic signaling pathways and dysregulation in APC/β-Catenin enhancer WNT signaling pathway and disruption of DNA repair system and surviving-related miRNAs participated in the pathogenesis of CRC in the population. For this purpose, miRNA profiling is essential for designing new preventive and therapeutic strategies in health studies. Considering the high prevalence of gastrointestinal cancers in south Azerbaijan and personalized medicine based on individual genetic background, and unknown diagnostic biomarkers in early stages, the aim of this study is to investigate the expression profile of surviving-related miRNAs in patients with CRC.

Methods: The miRNAs selected by bioinformatics databases from NCBI miRNA target prediction(http://miRdb.org), miRTarBase. In this study, the expression of *miRNA*s in tissue samples of a selected population of patients was investigated by Real-time PCR, and the data were compared with non-tumor tissues. The miRNA profile in a selected group was aggregated with clinical data and performed the correlation analysis.

Results*:* MiRNAs have a critical role in maintaining cell growth and physiological and pathological processes. Therefore, dysregulation in the miRNA expression profile is significantly associated with cancer and

malignancy**.** In this study, we found two miRNAs with significantly altered expression in patients with CRC.

Conclusion: Considering the role of miRNA expression profile and regulatory molecular mechanisms in CRC pathogenesis, cancer prevention, and new therapeutic approaches are very promising to increase population health in a health program.

Keywords: Colorectal cancer, miRNA, expression profile, health study

THE INCORPORATION OF LEGUMES INTO ONE'S DIET IS AN IMPERATIVE PREREQUISITE FOR THE ATTAINMENT OF OPTIMAL HEALTH THROUGH NUTRITION

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One of the global problems and responsibilities of humanity in the modern era is to ensure reliable and sustainable food supplies for the population. Improper mineral fertilizer use harms soil health and food quality. The research aims to optimize fertilizer use, preserve degraded soil fertility, and ensure quality products.

The object of study and methodology: The research focused on irrigated gray-brown soils and their impact on the protein vegetable bean (Phaselous L.). The experiment was conducted with five different schemes: 1) control (without fertilizer); 2) 10 tons of manure (farm option); 3) $N_{30}P_{30}K_{30}$; 4) $N_{60}P_{60}K_{30}$; and 5) $N_{90}P_{60}K_{60}$. Ash elements were removed through combustion. Nitrogen was determined using the micro method by Kjeldahl method, while phosphorus was measured using a photoelectrocolorimeter, and potassium was determined with a flame photoelectrocalorimeter.

Experimental results: The application of organic and mineral fertilizers had a significant impact on the amount of nitrogen collected in the main and by-products of the vegetable beans. In the control version, the amount of nitrogen collected was between 0.84% to 3.51%, whereas, in the manure variant, it was between 0.95% to 3.73%. The amount of nitrogen increased in variants with different doses of mineral fertilizer, reaching its highest point (1.28% to 4.03%) in the $N_{60}P_{60}K_{30}$ variant, and 1.22% to 3.92% in the $N_{90}P_{60}K_{60}$ variant. Although the amount of nitrogen was relatively high at the beginning of vegetation, it decreased in the flowering phase, with the maximum amount coinciding with the formation of beans and fruits. The average amount of nitrogen was 2.26% and 2.59% in the manure variant, 2.80% to 2.93% in the variants with different doses of mineral fertilizer, and 3.51% in the seed. The highest amount of nitrogen was observed in the $N_{60}P_{60}K_{30}$ variant. The amount of phosphorus accumulated in the bean plant in the control variant was between 0.78% and 0.80% in the bushing, flowering, and pod development phases, while in immature phases, it was between 0.40% and 0.48%. It was between 0.83% and 0.87%, and 0.72% and 0.76%. The amount of potassium accumulated in the bean plant organs was between 0.86% and 1.30% in the control option, 0.96% and 1.70% in the 10-ton manure option,

1.01% and 1.82% in the $N_{30}P_{30}K_{30}$option, 1.07% and 1.92% in the $N_{60}P_{60}K_{30}$ option, and between 0.94% and 1.86% in the $N_{90}P_{60}K_{60}$ option. The highest accumulation of potassium was observed in the bushing phase, while its intensity decreased during the ripening stage. Mineral fertilization resulted in the highest potassium accumulation in the plant, especially in the $N_{60}P_{60}K_{30}$ variant.

Conclusion: The results of the study suggest that the accumulation of nutrients in the vegetative organs of the plant is a dynamic process, and their amount varies significantly depending on the plant's developmental stage compared to the control. The nitrogen and potassium accumulation were higher during the bushing and bean formation phases, compared to phosphorus.

Keywords: irrigated gray-brown soils, vegetable beans, organic and mineral fertilizers, nutrients accumulated in plant organs, plant development phase

DIGITAL PCR: A COMPREHENSIVE GUIDE TO THE TECHNOLOGY AND ITS APPLICATIONS

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Digital PCR (dPCR) is an innovative molecular biology technique that offers significant advantages over traditional PCR methods, including remarkable sensitivity, specificity, and reproducibility. This comprehensive guide explores the principles of digital PCR technology, comparing it to conventional PCR methods, and provides an overview of different dPCR platforms, such as chip-based and droplet-based systems. The article also delves into the diverse applications of digital PCR in research and diagnostics, including rare genetic mutation detection, viral load, and pathogen detection, non-invasive prenatal testing, and cancer diagnosis and monitoring. Finally, the article discusses future developments and potential breakthroughs in the field of digital PCR, highlighting its role in advancing precision medicine and personalized therapies**.**

Introduction: Digital PCR is an advanced form of quantitative PCR (qPCR) that relies on the partitioning of nucleic acid samples into thousands or millions of individual micro-reactions. This partitioning makes it possible to identify target nucleic acid molecules at their endpoint and quantify them absolutely without the requirement for a standard curve. The key advantage of dPCR is its ability to provide precise and accurate quantification, even in the presence of small amounts of target molecules or high background noise.

Comparison to Traditional PCR Methods: While traditional PCR methods, such as qPCR, have significantly advanced molecular biology research, they have certain limitations. The quantification of target molecules in qPCR relies on the use of a standard curve, which introduces potential inaccuracies and requires well-defined reference materials. Moreover, qPCR may be less sensitive in detecting rare or low-abundance targets and can be affected by the presence of inhibitors or reaction efficiencies. In contrast, digital PCR overcomes these limitations by partitioning the sample into numerous micro-reactions, which enables the direct quantification of target molecules without a standard curve. This partitioning also enhances the sensitivity and specificity of the technique, allowing for the detection of rare or low-abundance targets and reducing the impact of inhibitors or variations in reaction efficiencies.

Different Types of Digital PCR Platforms: There are two primary types of digital PCR platforms: chip-based and droplet-based systems. Chip-based digital PCR systems: These platforms utilize microfluidic chips containing thousands of microwells to partition the sample. Each well serves as an individual reaction chamber, and the chip is scanned after PCR to detect the presence of target molecules. Droplet-based digital PCR systems: These platforms create a water-in-oil emulsion, generating millions of individual droplets that act as separate reaction chambers. After PCR, the droplets are analyzed using a flow cytometry-like detection system to determine the presence of target molecules. Both chip-based and droplet-based dPCR platforms have their unique advantages and are suited for different applications based on factors such as throughput, dynamic range, and sensitivity.

Various Applications in Research and Diagnostics: Digital PCR has found utility in a wide range of research and diagnostic applications, including: Detection of rare genetic mutations: dPCR's high sensitivity allows for the detection and quantification of low-frequency mutations in heterogeneous samples, facilitating early diagnosis and targeted therapies for genetic disorders.

Quantification of viral load and pathogen detection: dPCR enables accurate and sensitive measurement of viral and bacterial loads, improving the diagnosis of infectious diseases and monitoring treatment efficacy.

Non-invasive prenatal testing (NIPT): The technique can detect and quantify fetal DNA in maternal blood samples, allowing for early and non-invasive screening for genetic abnormalities.

Cancer diagnostics and monitoring: By quantifying circulating tumor DNA (ctDNA) and monitoring cancer-related mutations, dPCR can provide insights into tumor burden, treatment response, and disease progression.

Gene expression analysis: Digital PCR can be employed for the accurate quantification of gene expression levels, offering a valuable tool for studying gene regulation and function.

Future Developments and Potential Breakthroughs: As digital PCR technology continues to evolve, several areas of research and diagnostics are poised for significant advancements and breakthroughs: Single-cell analysis: The high sensitivity and precision of digital PCR make it a promising tool for analyzing gene expression, mutations, and copy number variations at the single-cell level, providing deeper insights into cellular heterogeneity and function. Liquid biopsy: As a non-invasive diagnostic method, liquid biopsy

has the potential to revolutionize cancer diagnostics and treatment monitoring. Digital PCR, with its high sensitivity and specificity, is well-suited for detecting and quantifying circulating tumor DNA (ctDNA), tumor-derived exosomes, and circulating tumor cells (CTCs) in blood samples. Microbiome analysis: Digital PCR can be applied to study the composition and diversity of microbial communities in various environments, including the human body. This could lead to a better understanding of the role of the microbiome in health and disease and help develop new therapeutic strategies targeting specific microbial populations. Gene therapy and CRISPR-based applications: The accurate quantification capabilities of digital PCR can be employed to assess the efficiency of gene-editing tools like CRISPR-Cas9 and to monitor the delivery of therapeutic genes in gene therapy applications. Environmental DNA (eDNA) research: Digital PCR's sensitivity and specificity make it a valuable tool for detecting and quantifying eDNA, which can be used for biodiversity assessment, monitoring of endangered species, and tracking the spread of invasive species in various ecosystems.

Conclusion: Digital PCR has emerged as a powerful tool in molecular biology research and diagnostics, offering unprecedented sensitivity and specificity in various applications. The technique's ability to overcome the limitations of conventional PCR methods has positioned it as a cornerstone technology for the future of precision medicine and personalized therapies. As digital PCR technology continues to advance, it is expected to drive new discoveries, improve diagnostic capabilities, and contribute to a deeper understanding of biology and human health. With ongoing research and innovation, digital PCR is poised to unlock new frontiers in molecular diagnostics and facilitate breakthroughs in diverse fields, including single-cell analysis, liquid biopsy, microbiome research, gene therapy, and environmental DNA analysis.

Keywords: Digital PCR, Application, Research, Detection, Diagnostics

RELEVANCE OF LABORATORY EXAMINATION IN PERFUMERY AND COSMETIC PRODUCTS IN AZERBAIJAN

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We have researched 96 samples of perfume and cosmetic products imported from abroad to the territory of the Azerbaijan Republic for the detection of yeast like Candida albicans and mold fungi Aspergillus and Penicillium, causing serious allergic skin diseases and mucous membranes for the period from January to May 2023.

As is known fungal infections are a common global problem not only in Azerbaijan but also in the world, and therefore we set the task of laboratory diagnostics of cosmetic products associated with the actual problems of spreading dermatosis and lycosis.

The yeast-like fungus Candida spp is more common than other ones. They are found on the skin and mucous membranes and are opportunistic infections that persist in immunocompromised individuals. Identifying molds and yeasts in cosmetics around the eyes, lips, and intimate cosmetics as well as in various skin care products for the face, body, and feet we used the classical method of deep seeding and the two-layer agar method using modern nutrients of world-leading companies "Liofilchem" and "BD": tryptic soy broth and agar; Saburo agar, Potato Dextrose Agar; Endo Agar. There were identified 5 items of cosmetic products which are not up to the standards forced in the territory of our republic. The detection of other types of microorganisms, in particular *E. coli* is the indicator of fecal contamination indicating non-compliance with hygiene requirements in production.

The pathological immune process begins to damage the skin in the repeated use of contaminated cosmetic products. Considering all of the above we need to use further microbiological control to detect skin pathogens such as *S.aurens*; *Ps. aeruginosa* and many other kinds of Enterobacteriaceae.

Keywords: detection, cosmetic products, opportunistic infection, *Candida albicans*, Aspergillus, Penicillium, *S.aureus, Ps. aeruginosa,* contamination

GPTEACHER: EXPLORING THE EFFECTIVENESS OF CHATGPT IN PUBLIC HEALTH EDUCATION

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Introduction:

Learning medical terminology is an essential aspect of public health education. Medical terminology is the language used in the healthcare industry to describe diseases, medical procedures, and treatments. The ability to understand and use medical terminology effectively is critical for public health professionals to communicate with patients, colleagues, and stakeholders. Effective learning of medical terminology in public health education involves the use of various teaching methods such as lectures, group discussions, and hands-on practice. Students are also exposed to medical terminologies used in different healthcare settings, including hospitals, clinics, and community health centers.

By mastering medical terminology, public health professionals can communicate effectively with their peers and patients, reducing the likelihood of errors, misunderstandings, and misinterpretations. This, in turn, improves the quality of care provided, enhances patient satisfaction, and promotes better health outcomes. However, learning medical terminology can be challenging due to its complex and extensive nature. ChatGPT is an artificial intelligence language model that can simulate human-like conversations and provide personalized feedback, making it a promising tool for medical terminology learning. This study aims to investigate the effectiveness of using ChatGPT for medical terminology learning.

Objectives:

This study aimed to:

- Develop a ChatGPT-based platform for medical terminology learning:
- Evaluate the effectiveness of the ChatGPT-based platform in improving learners' knowledge and understanding of medical terminology:
- Compare the effectiveness of the ChatGPT-based platform to traditional teaching methods.

Methods:

This study used a randomized controlled trial design. Public Health students (n=60) were assigned randomly to one of two groups: the ChatGPT-based

platform group (n=30) or the traditional teaching group (n=30). The ChatGPT-based platform group used the ChatGPT-based platform for learning medical terminology, while the traditional teaching group received lectures and textbook readings. Both groups completed a post-intervention test to assess their knowledge and understanding of medical terminology.

Results:

After the intervention period, the control group's passing rate was 72%, while the intervention group's passing rate was 89%.

This study found that the ChatGPT-based platform is more effective in improving learners' knowledge and understanding of medical terminology than traditional teaching methods. The ChatGPT-based platform group showed a significant improvement in their test scores compared to the traditional teaching group.

Conclusion:

ChatGPT has the potential to enhance medical terminology learning by providing interactive and personalized feedback to learners. The findings of this study contribute to the development of innovative and effective teaching approaches that integrate artificial intelligence in education.

Keywords: Artificial Intelligence, ChatGPT, education, terminology, learning

SPREAD OF DISEASES ROTAVIRUS AND CORONAVIRUS AMONG CALVES IN NORTH REGION OF AZERBAIJAN

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Along with other areas of the agricultural production complex, one of the most important areas of modern animal husbandry is the improvement of the breed composition of large ruminants. Since calves obtained from purebred animals are animals with high average daily live weight gain, rapid growth, and high milk yield compared to local breeds, the further development of this direction mainly depends on the acquisition of healthy breeding offspring and its preservation. In addition, the implementation of continuous epizootic measures against infectious diseases in farms is of great importance.

Calf enteritis caused by rotavirus and coronavirus is one of those diseases that are often registered in the livestock farms of the republic and cause a decrease in breeding quality and death in newborn calves.

The burden and mortality of both diseases depend on various factors, including immunity to this virus, the amount of virus in the body, the serotype of the virus, the microbial environment of the gastrointestinal system and other systems, stress, etc. The aim of the study was to study the incidence of rotavirus and coronavirus enteritis in calves in the livestock farms of Gilan Dairy Farms LLC in the Gabala district of the North-Western region of Azerbaijan.

The research work was carried out in 2018-2019 at the Gilan farm in the Gabala region of the North-West region of Azerbaijan. The main pathological material was faeces collected from calves.

As a result of the study, it was found that rotavirus infection was 45.0% in 0-14-day-old calves, 15.0% in 15-30-day-old calves and 10.0% in 31-60-day-old calves. It has been established that the infection with coronavirus in calves 0-14 days of age is 30.0%, in 15-30-day-old calves - 10.0%, in 31-60-day-old calves - 5.0%. These figures confirm that both viruses are circulating on the farm and causing serious economic damage.

Keywords: rotavirus, coronavirus, infection, calves, Gabala

STUDY OF CALCIUM, PHOSPHORUS METABOLISM, AND HORMONES INVOLVED IN THIS PROCESS IN PATIENTS WITH OSTEOPOROSIS OF DIFFERENT ORIGIN

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Introduction and purpose. Osteoporosis is a very common bone disease. Osteoporosis has become a significant problem due to the increase in life expectancy in developed and developing countries. Osteoporosis, a widespread metabolic disease of the skeletal system, is a disease that results in a decrease in the total mass of the skeleton, and an increase in bone fragility, deformation, and fracture. Osteoporosis is especially common in women during menopause, with the most common areas being the femoral neck, wrists, and spine.

The purpose of the research work is to study calcium and phosphorus metabolism and the hormones involved in this process in postmenopausal, diabetes mellitus, and osteoporosis patients with chronic renal failure through biochemical methods, and to determine the role of the determined parameters in the diagnosis and prognosis of the disease.

A brief description of the methods used**.** In the study, the activity of calcium, phosphorus, parathormone, and calcitonin in the blood serum of practically healthy and osteoporotic patients was determined by biochemical methods. Patients included in the study were divided into 3 groups: post menopause (12 people), diabetes (12 people), chronic kidney failure (12 people) with osteoporosis, and patients without fractures. At the same time, 7 practically healthy people were included in the control group. The groups were divided by age and gender in the same number. Metabolism of calcium, phosphorus, parathormone, and calcitonin was determined in the blood serum of the patient group consisting of 36 people and practically healthy people consisting of 7 people.

Final results. The average concentration of calcium in the blood serum of 7 people in the control group was 2.47 mmol/l. The average concentration of calcium in the blood serum of 12 people with osteoporosis and no fractures in the postmenopausal period is 1.54 mmol/l, the average concentration of calcium in the blood serum of 12 people with diabetes with osteoporosis and no fractures are 2.07 mmol/l, those with osteoporosis and chronic renal failure

and no fractures The average concentration of calcium in the blood serum of 12 people was 1.68 mmol/l.

The average concentration of phosphorus in the blood serum of 7 people in the control group was 1.20 mmol/l. The average concentration of phosphorus in the blood serum of 12 postmenopausal people with osteoporosis and no fractures was 0.84 mmol/l, the average concentration of phosphorus in the blood serum of 12 people with diabetes with osteoporosis and no fractures were 1.06 mmol/l, those with osteoporosis and chronic renal failure without fractures. The average concentration of phosphorus in the blood serum of 12 people was 0.93 mmol/l.

The average concentration of parathormone in the blood serum of 7 people in the control group was 39.29 pg/ml. The average concentration of parathyroid hormone in the blood serum of 12 postmenopausal people with osteoporosis and without fractures was 54.4 pg/ml, the average concentration of parathyroid hormone in the blood serum of 12 people with diabetes with osteoporosis and without fractures was 56.9 pg/ml, with osteoporosis and chronic kidney failure and without fractures The average concentration of parathormone in the blood serum of 12 people was 49.6 pg/ml.

The average concentration of calcitonin in the blood serum of 7 people in the control group was 3.1 pg/ml. The average concentration of calcitonin in the blood serum of 12 postmenopausal people with osteoporosis and no fractures was 3.45 pg/ml, the average concentration of calcitonin in the blood serum of 12 people with diabetes with osteoporosis and no fractures, 3.53 pg/ml in the blood serum of 12 people with osteoporosis and chronic renal failure with osteoporosis and no fractures The average concentration of calcitonin in the blood serum of 12 people was 3.48 pg/ml.

Overall summary. In patients with osteoporosis of various origins, the amount of calcium and phosphorus decreased compared to healthy people. During osteoporosis, the amount of parathormone increased compared to healthy people, while the amount of calcitonin did not change significantly.

Keywords: Osteoporosis, calcium, phosphorus, parathormone, calcitonin

COMPARATIVE EVALUATION OF AMINO ACID CONTENT OF NOVOALEXANDROVSK HEAVY DRAFT MARE'S MILK AND KUMISS

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Amino acids – organic (aminocarbonyl) acids, that contain molecules with one or more amino groups (NH2 groups). They occupy an important place in the nitrogenous metabolism, of which all proteins are built. And if the majority of amino acids are synthesized in the body in sufficient quantity, in the event of the lack or absence of essential amino acids, the synthesis of many hormones, enzymes, pigments, and other biologically active substances will be impossible.

The body's intake of amino acids is limited by the quantity and quality of food proteins, which must be taken into account when organizing proper healthy nutrition for different age groups of the population. The mare's milk is consumed as food down the ages. This drink was considered medicinal and was used in folk medicine for the treatment of pulmonary diseases, as well as for supplementary or full nutrition of infants.

The first consumers of mare's milk were the ancient nomads. They could feed on the horse beef and milk only for a long period, and later they learned to "preserve" these products for longer storage. By using the method of vigorously shaking the milk was turned into kumiss - a dairy and alcohol fermentation product.

The modern production method of kumiss is no different from the ancient one. As before, the only additive in the processing of milk is the leaven, prepared on pure cultures of lactic Bulgarian Bacillus and yeast milk.

In the process of production and maturation of kumiss, there took place complex biochemical reactions, which occur quantitative and qualitative changes in the chemical composition of the product, in particular changes in the content of amino acids, especially, according to E E. Gladkova, increases the amount of lysine, tryptophan, and methionine. She notes that the increase in the content of amino acids in mare's milk during the process of maturation promotes the transaminase activity of milk enzymes and microflora of sourdough.

The aim of our study was to investigate the amino acid composition of Novoalexandrovsk Heavy Draft mare's milk and kumiss, obtained from the

same milk, and to investigate the dynamics of changes in the number of amino acids in both products and the following its comparison.

The mare's milk and kumiss, received and fermented on Dibrivsky stud kumiss farm, were used as data for the study.

The samples of products had been taken for analysis at the end of each month of lactation. Laboratory analysis, aimed to determine the content of amino acids in mare's milk and kumiss, was conducted in a specialized laboratory of the Palladin Scientific Research Institute of Biochemistry with the help of special automatic devices – analyzers of amino acids.

The obtained data were processed by the variation statistics method of N.A. Plokhinsky (1969) used the standard package of Microsoft Excel.

The research results. The obtained laboratory findings of Novoalexandrovsk Heavy Draft mare's milk and kumiss indicate that amino acid composition during lactation is constantly changing, or rather gradually reduces during five months of milking. As in the milk, the richest amino acid content was in kumiss, produced in May.

If the daily requirement of an adult in essential amino acids is 1 g, then one liter of kumiss, which was produced in May, can ensure one hundred percent intake of lysine, valine, and leucine. And if in July the content of valine decreased to 0.9 mg, leucine was kept at a consistently high level until the end of lactation, although its content for five months decreased by 42%. In addition to the abovementioned essential amino acids, there was observed a high content of proline and glutamic acid, which precedes proline and keeps the highest-level positions among all other amino acids during the entire period of production of kumiss.

As noted above, the amino acid composition of the products tends to decrease its content during lactation. The reduction intensity of the quantitative content of different amino acids in milk and in kumiss is not the same, but the difference is not much – for a month it declines from 5% (aspartic acid, tyrosine) to 15-16% (arginine, histidine).

An interesting fact can be observed when comparing the amino acid composition of kumiss and milk: 70% of amino acids had a higher content in kumiss compared to milk. Especially significant is the difference in lysine content (compared to milk in kumiss its content differs more than 0.11 mg), alanine (difference in 0.16 mg), valine (difference in 0,15 mg).

In our opinion, the enrichment of kumiss with amino acids occurs by adding to the milk ferment, that consists of yeast and live bacteria. As it is known,

microorganisms have a protein nature, that contributes to an increase in the content of certain amino acids in kumiss.

Conclusion. Mare's milk and kumiss are very valuable products in terms of amino acid supplementation, including irreplaceable. These products contain especially high quantities of lysine, valine, and leucine. The content of amino acids in milk and kumiss during lactation is unstable. Products with the highest level of amino acid enrichment are obtained during the early lactation period, in May.

The high content of amino acids in milk during the spring period can be explained by the fact that new-born foals grow intensively at this time. It means that in the first month of life, milk is the main feed for foals, and they require a higher level of nutritional value of milk. Fermenting agents, that contain Bulgarian dairy wand, are added to the milk during the process of kumiss production. Due to its protein nature microorganisms enrich kumiss with amino acids.

Keywords: Amino acids, milk, kumiss, lactation, mares

THE ROLE OF DEFENSINS IN THE PATHOGENESIS OF RHINOSINUSITIS

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The most common types of ENT Problem are chronic purulent rhinosinusitis. The disease has a chronic and relapsing nature and has not yet been fully resolved. One of the reasons for the chronic course of the disease is the increase in the resistance of microorganisms during the uncontrolled and long-term use of antibiotics. During the disease, the level of secretion of endogenous antimicrobial peptides (AMP) is of particular importance as a criterion for the development of the inflammatory process. It is known that defensins, which belong to the group of cationic peptides, are synthesized by neutrophils during the inflammatory process, activate their migration and phagocytosis, and increase vascular permeability. Antimicrobial neutrophil peptides have chemotoxic, immunomodulating, and cytotoxic effects. It has been established that individuals with impaired synthesis of defensins suffer from severe and frequent bacterial infections. The main goal of the study was to determine the level of secretion of defensin, which is AMP, in the blood of patients with SARS before and after treatment. The research group was composed of 47 patients with SARS, and the control group was composed of 15 healthy volunteers without any ENT pathology. The age of the patients varied between 25 and 60. All patients underwent a standard otolaryngological examination. Determination of biochemical indicators and defense It was conducted in 3 groups: 1st group - of 47 patients before treatment, 2nd group of 42 patients after the course of treatment, and 3rd group - of 15 people included in the control group. The blood plasma of patients was used as research material. The treatment was carried out traditionally, consisting of the use of antibiotics, antihistamine drugs, and vasoconstrictor nasal drops. Defensin was determined by immunoenzyme analysis method with the help of a special reagent kit. The concentration of HNP1-3 in the control group was 75.14±5.2 ng/ml. Thus, defensins are a highly informative criterion of the degree of severity of the inflammatory process, as they have a marked bactericidal effect on the one hand, and the other hand, they strengthen the alteration as a result of cell damage in the inflammatory zone. A decrease in the concentration of HNP1-3 in the blood plasma against the background of treatment indicates a decrease in the intensity of the inflammatory process.

Keywords: chronic suppurative rhinosinusitis, antimicrobial peptides

MICROORGANISMS ISOLATED FROM WOUND CULTURE AND THEIR ANTIBIOTIC RESISTANCE

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Wound infections are one of the main causes of delayed wound healing, chronicity, increased morbidity, and mortality. These infections create a significant financial burden on the health system by prolonging hospital stays. Increasing antibiotic resistance in bacteria is an important health problem in Azerbaijan as in other countries. These infections are estimated to kill more than 10 million people by 2050. (O'Neill, 2014; Aslam et al. 2018). Therefore, in the treatment of wound infections, culture, and antibiotic susceptibility testing is believed to prevent the spread of resistant bacteria, helping the clinician to treat the wound successfully. The goal of our study is to retrospectively evaluate pathogenic microorganisms isolated from wound samples, to determine antibiotic resistance, and to guide empirical treatment selection.

A brief description of the methods used: bacteria isolated from the wounds of 134 patients between January 2020 and January 2023 in the Education-Surgical Clinical Diagnosis Laboratory of Azerbaijan Medical University and their antibiotic susceptibility are evaluated retrospectively. Samples from skin infections such as folliculitis, carbuncle, impetigo, surgical site infections, traumatic wound infections, decubitus ulcers, and closed abscesses are included in the study. All samples are incubated on 5% sheep blood, Eosin Methylene Blue (EMB), Sabouraud Dextrose, and 5% horse blood Brucella (carbon dioxide enriched) agar at 35 ± 2°C in an aerobic atmosphere for 18-24 hours. Meanwhile, gram-stained preparations of the samples are also examined. Culture Petri dishes are evaluated with Gram stain results after 24 hours. Colonies of up to three microorganisms are identified and antibiotic susceptibility tests are performed. Cultures producing >3 microorganisms are considered as contamination. Traditional methods and the automated system VITEK 2 (bioMerieux/France) are used to identify the growing colonies and determine their antibiotic susceptibility. Antibiotic susceptibility tests are interpreted according to EUCAST (European Committee on Antimicrobial Susceptibility Testing) criteria.

Results: Microorganisms grew in 88 (65.6%) of 134 wound samples. One microorganism developed in 64 (72.7%) of 88 samples, two microorganisms

in 22 (25%), three microorganisms in 2 (2.3%), and a total of 114 bacteria developed. Out of these, 65 (57%) were gram-positive, 41 (36%) were gram-negative bacteria and 8 (7%) were candida. 62.5% of *Staphylococcus aureus* strains were methicillin-resistant *(MRSA)* and 59% of the *CNS* were methicillin-resistant *(MRCNS)*. 73% of *E. coli* strains were ESBL-positive.

The most common bacteria in the wound samples examined were *S. aureus* and *Escherichia coli*. *CNS* and *S. aureus* were non-resistant to vancomycin, teicoplanin, linezolid, and tigecycline. Amikacin was the most effective antibiotic against non-enzymatic gram-negative bacilli.

Conclusion: Antibiotic prophylaxis, judicious use, and implementation of organized wound observation systems were concluded to be the most effective ways to reduce the rate of wound infection to the lowest pathophysiologically possible. For the rational use of antibiotics, microorganisms causing wound infections and antibiotic susceptibility should be determined. Thus, it is believed to prevent the inappropriate use of antibiotics and the formation of resistance.

Keywords: Wound culture, wound infections, bacteria, antibiotic resistance

DEVELOPMENT OF ANIMAL HUSBANDRY IN UKRAINE DURING THE WAR

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In the modern world, Ukraine is fighting for the right to its existence. The natural and climatic resources of Ukraine allow to provide products of animal husbandry and plant breeding to a significant part of regions suffering from a lack of food. More than 250,000 animals were destroyed in Ukraine due to the war, and there were more than 5 million animals in total. Today, a new concept of "ecogenocide" has emerged in the field of animal husbandry. Among the main reasons for the reduction in the volume of livestock production, we can highlight the damage and destruction of farms in the wake of rocket and artillery attacks, as well as the mass resettlement of people who before the war were engaged in cattle breeding, pig breeding and other types of livestock farming.

The war has a negative effect on the foreign trade balance of animal husbandry. The blockade of the ports stopped the export of agricultural products. This has not only negatively affected domestic prices, but is also considered a bad trend, with pork imports increasing year by year and pork exports banned due to African swine fever. Despite the business risks associated with the war, the loss of skilled agricultural personnel due to mobilization and displacement, the growing pressure of pork imports, the fall in pork consumption due to the migration of millions of Ukrainians, and the loss of purchasing power due to reduced incomes and forced unemployment, most producers continue to operate steadily on territories controlled by Ukraine. About 20% of companies engaged in pig farming have plans to expand capacity. The stimulus is a 26% increase in prices for the live weight of pigs compared to the pre-war period and a decrease in grain prices on the domestic market due to difficulties in exporting by sea (*O. Yurchenko, 2023)*.

Today, on every kilometer of the territory of Ukraine where active hostilities are not carried out, development is flourishing in all possible areas, including animal husbandry. Producers of livestock products are united in associations and create new development strategies based on production certification, innovative technological approaches, animal welfare and ecological production. Young experts in the industry strive for modern approaches in animal husbandry management, which is why a wide grant program for

training specialists in the management of the industry according to the standards of the European Union is currently operating.

Among the main directions of the development of animal husbandry in Ukraine during the war, we can highlight the reconstruction of destroyed enterprises and the increase of the animal population through genetic diversity, the increase of farming forms of management, and resource-saving production. As a result of the contamination of the territory of Ukraine with mines and objects that are explosive, special attention is paid to the return of the territories to normal use. The problem of preserving water resources in the production of animal husbandry products is solved by using methods of economical use of water and purification of used resources.

Despite the daily struggle for existence, Ukraine is developing, and the livestock industry does not stop its development, providing millions of people with food. We believe that victory is near and we will implement all plans, which means making the world safer, overcoming the problem of hunger, and ensuring the well-being of animals on the basis of sustainable production.

Keywords: animal husbandry, ecology, war, sustainable production, welfare, food products

ECOLOGICAL AND HYGIENIC ASPECTS OF THE IMPACT OF NOISE AND ELECTROMAGNETIC RADIATION ON THE HEALTHY LIFESTYLE OF STUDENTS

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The target installation of this work was a comparative evaluation of the functional state of the cardiovascular system of students exposed to adverse factors in the conditions of modern man-made environmental pollution.

The materials of our research were measurements of the main factors of students' working conditions such as microclimate parameters (temperature, relative humidity, air mobility), light environment level, noise, and vibration. In some cases, we evaluated the levels of ultraviolet radiation and electromagnetic fields in the classrooms where the learning process provides the use of personal computers. In the dynamics of the school day and the working week, systolic (SBP) and diastolic blood pressure (DBP), heart rate (OPA), and pulse pressure were determined in boys and girls of 3-4 courses.

Thus, the data show that the complex effect of adverse factors in the educational process is not offset by the positive components of a healthy lifestyle for students. Teaching students the basics of a healthy lifestyle allow you to preserve and strengthen their health in education and in future careers.

The growth of the potential danger of electromagnetic radiation requires the development of precise criteria for assessing its biological effect. The difficulties in solving this problem are caused by the qualitative and quantitative diversity of the body's responses to the effects of electromagnetic radiation, which depend not only on their physical parameters but also on the state of health, age, sex, and hereditary characteristics of the individual. The research shows that even low-intensity electromagnetic radiation negatively affects offspring.

Keywords: noise exposure, health, students, environment, electromagnetic radiation, air mobility, personal computers, ecology, hygiene

IMPACTS OF GLOBAL CLIMATE CHANGE TO THE URBANIZED TERRITORIES OF THE CITY OF KYIV

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The acceleration of urbanization in recent years and global climate changes lead to completely new challenges for urban areas and their actively growing population. If areas are growing rapidly and do not match current and future resources, and also do not take into account the future impacts of climate change, a large number of people and their assets become vulnerable to various man-made and natural disasters. These threats are not only physical risks associated with climate change, such as rising sea levels or natural disasters, and difficulties in providing basic services to residents (Abbas, and oth., 2023). Climate change affects the system water supply, ecosystems, goods and services, energy, and industry in all cities of the world, in particular the capital of Ukraine – Kyiv. It disrupts economic activity and deprives the population of their usual way of life, and in some cases leads to mass migration to countries near and far abroad.

So, the aim of this investigation was to determine aspects of the impact of global climate change on the urbanized territories of Kyiv in order to develop recommendations for their minimization.

Studies in the period 2002-2022 showed that as a result of human activity is causing the atmosphere to warm and the ocean while changing the frequency and intensity of precipitation, the frequency of formation of cyclones, the speed of melting ice, and rising sea levels (Dileep, 2022). So, within Kyiv, thermal expansion or an increase in the volume of water in the ocean, as it warms, is considered the main cause of the rise in the level of the Black Sea and the Dnieper River, but in the future, it is likely that ice melting process.

Observations show that the number of cases of intense one-day and multi-day precipitation has increased significantly over the past 20 years, which leads to floods and landslides. Only in Kyiv, 4 massive floods were recorded (2006, 2009, 2013, and 2016) and 2 large-scale landslides – in 2006 and 2017, when 2 people died. It is likely that such periods of extremely hot weather will become more frequent, intense, and prolonged in most regions of Ukraine, including in mountain ranges. Extreme hot weather causes the greatest harm to large cities such as Kyiv (the so-called "heat island" effect), we recorded

an objective increase in air temperature by 2-4 °C higher than in the surrounding areas.

Temperature increases air, in particular, long periods of drought and more high average temperatures also damage the pavement and lead to the need for more frequent repairs. The frequency of damage to asphalt pavement in Kyiv over the past 20 years has increased by 21% and continues to grow, which is primarily due to increasing drought and water shortage. At the same time, global climate change is a key factor leading to the destruction and degradation of ecosystems - oxygen production is falling, carbon accumulation min, natural filtration of toxins and pollutants decreases, etc (Muthoni, 2023). The process of climate change and environmental degradation, drought, and water scarcity leads to an increase in internal and international migration, which within Kyiv is up to 28 thousand people annually, and across Ukraine – up to 250 thousand a year.

So, as the world and local climate of Kyiv continues to change, natural disasters of various factors will happen more often and become more intense. The stability of large cities such as Kyiv to climate change depends on the degree of preparedness for natural disasters: regulation of management systems; creation of eco-friendly clusters in Kyiv for reducing the effect of water deficit; reducing the amount of asphalt and replacing eco-paths where possible and planting resistant trees: meat-red chestnut, silver maple, Robinia pseudoacacia, and others.

Keywords: global climate changes, urbanization, drought, population migration, Kyiv

BUILDING ECOLOGICAL CULTURE THROUGH GAMES AT PRESCHOOL AGE

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The interaction of man with nature is an extremely urgent problem in today's world. Without changes in the culture of nature management, it is impossible to expect positive changes in the environment. The most important aspect in addressing the issue of nature protection is the ecological education of people, including the younger generation. Preschool childhood can rightfully be considered the beginning of the formation of the ecological orientation of the individual. Based on the relevance of the chosen topic, the purpose of this scientific work is to study the role of games in building the ecological culture of preschool children, the ability to realize the consequences of their actions in relation to the environment and live in harmony with nature. Tasks are: (1) building the initial system of values, the perception of being a part of nature, and the relationship between man and nature; (2) developing children's abilities to know nature; (3) teaching elementary norms of behavior in nature, forming the skills of rational use of natural resources in everyday life; (4) educating a humane attitude towards living organisms. Since the leading activity of children in the preschool period is the game, building an ecological culture is more efficient through the gaming process. The following game-oriented methods are used when arranging ecological education for preschool children: 1. Visual: In the form of observations of objects of nature; 2. Verbal: In the form of a) dialogue with children, b) fiction readings; 3. Practical: a) experimenting, b) modeling the objects of nature. The types of games, such as travel games, task games, suggestion games, puzzle games, and talk games contribute to the development of ecological culture. Also, through the gaming process, teachers are to continue the teaching process; develop creative imagination; expand ideas about nature; contribute to the further development of communication skills. Key elements of the game structure consist of a) the goal of the game, b) the number of players, c) game rules, d) selecting didactic material, e) time factor, and f) summarizing. Conditions ensuring efficient ecological gaming: 1. Teachers' gaming knowledge and skills. 2. The expressiveness of the game. 3. Teachers' capability to be both a participant and the leader of the game. 4. Combination of entertainment and learning elements. 5. Means and methods that increase the emotional attitude of children to the game. 6. Atmosphere of mutual respect, understanding, and trust between teachers and children.

Conclusion. Games in preschool childhood are of paramount importance for psychological development, intelligence, perception of the world, and the emotional well-being of children creating optimal conditions for education and learning. Building an ecological culture is more efficient through the gaming process. Ecological games serve as a form of ecological education and building ecological culture. The knowledge about nature acquired by children through the game forms their caring attitude toward the objects of nature.

Keywords: ecological culture, games, preschool age, children, psychology

FOOD WASTE PROCESSING METHODS BASED ON THE REQUIREMENTS OF INTERNATIONAL STANDARDS FOR BIODIVERSITY PROTECTION

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More than four billion tons of food are produced worldwide each year, and about one-third of it is wasted. A minimal portion of food waste is incinerated or sent to landfills to prevent contamination and disease, and the remainder is disposed of elsewhere. In short, when food is wasted, all the resources used to produce that food - water, energy, land, labor, and capital go to waste. In addition, the disposal of food waste in landfills directly leads to the emission of greenhouse gases that cause climate change. In addition, food loss and waste can negatively impact food security and food availability, including increasing food prices. Thus, food waste undermines the sustainability of our food systems.

Emphasis should be placed on adopting planned integrated approaches to minimize food loss and also waste. Global and local action is required to make widespread use of the food we produce. The application of technologies as well as innovative solutions, modern work methods, and forward-looking practices to manage food quality and minimize food loss and waste is key to realizing this transformative change. Empirical, experimental, and innovative methods were widely used in conducting the research. The current review aims to broaden the picture regarding the potential of agro-industrial by-products in applications such as biomaterials, biofuels, biocompounds, pharmaceuticals and even foodstuffs. It also reveals the chemical, biochemical, and biofuel treatments needed to convert by-products into value-added raw materials through environmentally friendly processes.

By-products are waste materials that have lost their efficiency or economically consumed value from human activities such as trade, animal husbandry, industry, and agriculture.

In general, waste consists of large volumes of garbage transported from industries or households to landfills or processing facilities to avoid environmental impact due to the maximum degree of contamination. Important resources affected by such wastes are air, soil, and aquifers. Waste disposal is expensive and does not solve the problem.

A report by the Food and Agriculture Organization of the United Nations to the media shows that on average, about a third of the food produced for humans in the world is wasted. The current method of disposal of agro-industrial by-products is open-air burning and landfilling, which cause pollution and do not produce effective products. There should be a rational strategy for converting by-products into effective products or biorefineries.

Recently, scientists and businesspeople have been working together to identify the physical, chemical, and biochemical treatments necessary for agro-industrial by-products to transform them into more efficient products such as nutrients, chemicals, and fuels. This review aims to show the diversity of agro-industrial by-products transport methods and also the diversity of non-traditional resources for raw material collection and to expand the panorama towards the effectiveness and evaluation of those products.

The research aims to end food industry waste and the irrational use of local and global food systems, including reshaping the right to food. In addition, important measures are being taken to prevent climate instability caused by the greenhouse gases generated as a result of food industry waste. The most important thing is to involve the waste of the food industry, which causes the deterioration of the ecology, in the recycling processes, and thanks to this, to ensure the restoration of the ecological biodiversity.

During the research, attention was paid mainly to scientific evidence, the methods used in the transformation of those products, as well as their effects on the environment.

Keywords: agriculture, biochemical treatment, food waste, environment, disposal

IMPACT OF MODERN COMPUTER TECHNOLOGY ON HUMAN HEALTH

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Modern computer technology has had a profound impact on many aspects of human life, including health. While computers have revolutionized the way we work, communicate, and access information, their impact on human health has been a topic of concern for many years. In this paper, we will examine some of the impacts of modern computer technology on human health. One of the main concerns around modern computer technology is its impact on physical health. Many people spend hours each day sitting in front of a computer, which can lead to poor posture, back pain, and other musculoskeletal issues. Additionally, prolonged use of computers can strain the eyes, leading to eye fatigue and headaches. It is important for computer users to take regular breaks, adjust their posture, and use ergonomic equipment to minimize the risk of these health problems. Another concern is the impact of computer use on mental health. Studies have linked excessive computer use with anxiety, depression, and other mental health issues. The constant stimulation of computers and the internet can lead to addiction, which can have negative effects on mental well-being. Therefore, it is important to use computers in moderation and to engage in other activities that promote mental health, such as exercise and socializing with friends and family. Modern computer technology has also had an impact on sleep. The blue light emitted by computer screens can interfere with the body's natural sleep patterns, leading to difficulty falling asleep and poor-quality sleep. To minimize the impact of computers, use on sleep, it is recommended to avoid using computers for several hours before bedtime and to use apps or software that reduce the blue light emitted by screens. Computers have improved many aspects of our lives, they also have the potential to cause physical, mental, and sleep-related health problems. It is important for computer users to be aware of these risks and to take steps to minimize their impact, such as taking breaks, using ergonomic equipment, using computers in moderation, and engaging in activities that promote mental and physical health.

Keywords: Modern technology, mental health, physical health, human life, negative effects.

NATURAL CONDITIONS OF HEALTH AND RECREATION ON THE COASTAL AREAS OF THE REPUBLIC OF AZERBAIJAN OF THE CASPIAN SEA

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Introduction: The coastal areas of the Caspian Sea, the largest lake on the planet, has wide sandy beaches, abundant solar radiation, a small number of cloudy and rainy days, and other factors which allow for the wide use of health-tourism complexes in these areas. The length of the Caspian coastal areas in our republic is approximately 750 km at the current sea level, of which up to 650 km is considered favorable from the point of view of tourism and health. The complex natural health-tourism resources located in these areas: thermal mineral waters, healing mud, beaches with different compositions of sand, etc., are currently not used enough. In this regard, it is important to study the health and recreation resources of the Caspian coastal areas of our Republic and assess the potential for future development. Main part**:** Natural - climatic resources of the shores of the Republic of Azerbaijan of the Caspian Sea. According to the climate, the coastal region of the Republic of Azerbaijan is divided into 2 parts: northwest and southwest. In this article, the results of research on climate elements are presented on the basis of long-term data from Nabran, Siyazan, and Sumgait stations and points located in the Northwestern coastal zone. The monthly average values of the following hydrometeorological parameters and their dynamics are analyzed as climate factors: sea water surface temperature, sea water level value, air relative humidity, air temperature, wind speed, and solar radiation indicators. This information shows that the natural climatic conditions in the coastal zone of the Republic of Azerbaijan in the northwest of the Caspian Sea are very favorable for the creation and development of health resorts in these areas. Thus, the temperature of air and sea water, which determines the weather conditions, does not change drastically during the year. The wind speed varies a little according to the season. The coastal zone of Siyazan is an exception due to the wind regime, where the wind speed is characterized by relatively large and sharp changes. The main reason for this is that the coastal zone is wide, the relief of the coast and the proximity of the Caucasus Mountains to the coast have a significant impact on the wind regime.

In the prospective development of coastal territories, it is necessary to take into account changes in sea level, since the areas of these territories change

depending on the state of the level. When the sea level rises, the area of the coastal zone decreases, and when it falls, it increases. Depending on the morphology and topography of the coast, beach areas may increase or decrease in some places, and sea water quality may also change. Multi-year measurement data show that the value of the annual changes of the sea water level is in the range of 30-35 cm, which has low- impact on the infrastructure of health facilities on the coast. The level of the Caspian Sea has been falling regularly for the last 27 years (1995-2022), and during this period the sea level has decreased by 190 cm compared to 1995. As a result, the coastal territory of the Republic of Azerbaijan of the Caspian Sea has been significantly expanded. As a result of the receding of the sea, the coastal zone has increased by approximately 37,000 ha, an important part of which is the share of the northern-western coastal zone. The long-term forecast of the level of the Caspian Sea shows that the process of lowering the level will continue until the 2050s. This process shows once again that the coastal areas will become important from the point of view of tourism - health in the near future. Mineral waters with various hydrocarbons operate on the Gilazi-Zarat, Siyazan-Shabran, Khachmaz-Khudat coasts of the northwest coast of the Caspian Sea. Moreover, the long duration of abundant solar radiation on the coastline of the sea and the pomegranate sands on the wide beaches are very useful for people's relaxation and treatment. Nabran recreation area, which is one of the regions with great tourism potential in our country, is always ready to welcome local and foreign guests in the summer season. It is more expedient to develop tourism - health and recreation corners in such directions as Chelgushchu-Niyazova, Yashma-Shurabad, Ashagioba-Nabran, Zarat-Siyazan, Gilezidili-Shurabad, Khudat-Mughtadir, and Yalama-Nabran. There are also several historical-architectural monuments and religious shrines on the northern-western Caspian coast of the Republic of Azerbaijan. These monuments in the area include the remains of the Shah Abbas caravanserai in the direction of Sumgayit-Gilezi, the Beshbarmag reserve in the Zarat-Siyazan area, the Chirag castle in the Siyazan-Shabran area, and the Chilguil-chai dam.

Conclusion: The northwest Caspian coastal zone of the Republic of Azerbaijan, which is approximately 200 km long, is a favorable area from the point of view of health and tourism due to its natural climate. Here, there are favorable natural conditions for the creation and operation of the health resort infrastructure in all seasons of the year. Also, the presence of numerous historical architectural monuments and religious shrines in the area greatly increases the perspectives of tourism and health potential.

Keywords: Caspian Sea, coastal areas, Climate characteristics, tourism - health potential

THE EFFECT OF 2-DG ON THE MITOCHONDRIAL ACTIVITY OF STEM CELL LIKE AND NORMAL CELLS DERIVED FROM KG1-A

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Backgrounds: Cancer is a malignant disease, that may have a recurrence and resistance. It is believed that cancer stem cells (CSC) contribute to resistance and recurrence. CSCs are flexible in terms of metabolism; they can easily shift their energy-deriving mechanisms in response to changes in the microenvironment. Mitochondria play important roles in cell development, metabolism, apoptosis, and Reactive Oxygen species (ROS) production.

Aim: the current investigation was conducted aiming at the effect of glycolysis inhibition on normal and CSCs. The effect of 2-deoxy D-glucose (2-DG), a glycolysis inhibitor, on the ROS production and mitochondrial membrane potential (MMP) was investigated in, crude, stem-like, and non-stem-like cells isolated from AML-derived KG1-a cell line.

Material and methods: KG1-a cells were treated with different concentrations of 2-DG, and cell viability was assayed using MTT 48 hours after treatment. Stem-like cells ($CD34^+$) were isolated from crude KG1-a cells using Magnitude Antibody Cell Sorting (MACS). The mitochondrial membrane potential (MMP) and ROS production were measured using Flow cytometric dyes; Dcfh-da, and rhodamine 123, respectively.

Results: EC_{50} of 2-DG was calculated by MTT assay. Further tests were conducted on cells treated with EC_{50}. 2-DG led to increment in ROS production, and decrement in MMP though these changes were less in CD34+ relative to CD34- and crude cells.

Conclusion: KG1-a cell line is sensitive to inhibition of glycolysis by 2-DG. $CD34^+$ cells are less sensitive to glycolysis inhibition. ROS and MMP were less affected in CD34+ cells compared to KG1-a and $CD34^-$ cells upon 2-DG treatment proving their resistance to glycolysis inhibition. It is suggested to

use combination therapies to target $CD34^+$ stem-like cells in order to combat cancer stem cell metabolic flexibility.

Keywords: Mitochondria, 2-DG, $CD34^+$ stem-like cells, reactive oxygen species, mitochondria membrane potential

THE TRACKING OF SEASONAL DYNAMICS IN RABIES DISEASE

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Rabies (lat. rabies) is an infectious disease of viral origin, characterized by inflammation, degenerative and necrotic lesions of the nervous system. It is transmitted through contact with an animal infected with rabies. Without vaccination, the disease can develop and become dangerous for the infected. At present, the growing number of foci of rabies infection is one of the most important problems of both public health and veterinary medicine. Its epidemiological and epizootic significance is determined by absolute lethality, subject to the manifestation of clinical signs, ubiquitous distribution, latent incubation period, and lack of specific treatment. According to the World Health Organization (WHO), rabies is the tenth leading cause of human death from infectious diseases and is registered in more than 160 countries around the world. The disease is widespread among wild, domestic, and farm animals in tropical countries Most of the territory of the Republic of Azerbaijan is located in the subtropical climate zone, only the northeast of the Greater Caucasus is in the temperate climate zone. The temperature regime of air and distribution over the territory is formed depending on the characteristics of the air masses entering here, the relief of the territory, and the proximity of the Caspian Sea to individual regions. The Caspian Sea somewhat lowers the air temperature in summer and raises it in winter in coastal areas (up to about 20 km from the sea).

Taken into account the above temperature factors, the main purpose of this study was to research the spread of rabies disease in different seasons of the year. We analyzed the reporting of cases of rabies among animals over the past 4 years (2018-2021) by season.

The results of the research showed that, over the past 4 years (2018-2021), based on the statistics of cases of rabies among animals in the country, it has been established that the disease is more common in spring.

Keywords: rabies, season, incidence, dynamics

CLINICAL, LABORATORY FEATURES AND TREATMENT OF DOMESTIC DOGS AND CATS WITH *MICROSPORUM CANIS*, IN GANJA CITY

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Dermatophytosis is a disease caused by dermatophytes, a group of fungi that can cause disease both in humans and animals (Vena Chupia, Jirapat Ninsuwon et al., 2022). *Microsporum canis* (57.1%) was the most common species isolated from dogs and cats. The isolation rate of dermatophytes was relatively high in the spring and winter for dogs and in the spring, summer, and autumn for cats in western Turkey (Esra Seker, Nurhan Dogan, 2010). For the treatment of dermatophytosis, griseofulvin, ketoconazole, itraconazole, and terbinafine are the drugs most commonly used in veterinary medicine (Boothe, 2012). This research focused on performing clinical, laboratory examination, isolation, identification, and successful treatment of *M. canis* infection in cats and dogs in Ganja. Totally 6 dogs and 14 cats were caught, 20 samples were collected. 11 cultures were isolated. *M. canis* isolated from 6 domestic cats and 5 domestic dogs. 4 cats were asymptomatic infected animals presenting discrete Wood's-positive lesions disseminated on the whole body. As a result of our study, twice weekly applications of lime sulfur, a mionazole/chlorhexidine shampoo are currently recommended effective topical therapies in the treatment of generalized dermatophytosis in cats and dogs. In our study, 11 infected cats were treated with itraconazole and one of two topical therapies including 2% chlorhexidine and 2% miconazole shampoo. The median time to clinical cure was six weeks and the median time to mycological cure was six weeks (range 7–21 weeks).

Keywords: Dermatophytosis, chlorhexidine, miconazole shampoo, treatment, Ganja

ASSESSING THE SHORT-TERM EFFECTS OF EXPOSURE TO PARTICULATE MATTER ($PM_{2.5}$) ON EMERGENCY HOSPITALIZATION RATE DUE TO RESPIRATORY DISEASES IN ASTANA, KAZAKHSTAN

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Background: Respiratory disease remains a strong cause of high mortality rates. A handful of studies have been done in trying to evaluate the association between respiratory morbidity and exposure to air pollutants. However, for the city of Astana, this appears to be a trailblazing study. Thus, our research was targeted at investigating the correlation between $PM_{2.5}$ exposure and the risk of emergency hospitalization cases as a result of respiratory diseases in Astana.

Materials and Method: Daily $PM_{2.5}$ concentration and emergency hospitalization cases due to respiratory diseases were collected from June 5, 2018, to November 30, 2018, in the Astana metropolis. A single-pollutant conditional logistic regression model alloyed with a time-stratified case-crossover study design and a lag model (nonlinear) were utilized to gain insight into the effect of $PM_{2.5}$ exposure on respiratory morbidity emergency hospitalization cases. A stratified analyses using age and gender were also carried out. Statistical analysis was done using STATA 17.0.

Results: A total of 35805 emergency hospitalization cases due to respiratory morbidity were used for the study. The ORs linked with exposure to different daily mean concentrations of $PM_{2.5}$ on different lag days (0-2 days) for emergency hospitalization cases due to respiratory diseases were 1.023 (95% CI:1.0201.026), 1.019 (95% CI:1.016-1.022), 1.016 (95% CI:1.012-1.018) respectively. In the same vein, the ORs linked with exposure to different daily maximum concentrations of $PM_{2.5}$ on different lag days (0-2) for emergency hospitalization cases due to respiratory diseases were 1.002 (95% CI:1.001-1.003), 1.001 (95% CI:1.001-1.002), 1.001 (95% CI:1.001-1.002) respectively. Stratified analysis depicted that preschooler (0-5 years) appeared to be more sensitive to $PM_{2.5}$ exposure when compared to other age categories. Furthermore, males (50.7%) appeared to be more affected by an exposure to different $PM_{2.5}$ concentrations in comparison with females

(49.3%). For all lag days used in the study, the effect of $PM_{2.5}$ exposure on emergency hospitalization cases due to respiratory diseases, the outcome was statistically significant.

Conclusion: There exist an association with daily emergency hospitalization cases due to respiratory diseases and exposure to varying concentration levels of $PM_{2.5}$.

Keywords: Particulate Matter ($PM_{2.5}$), pollutants, Case Crossover Study Design, air pollution, respiratory diseases

THE STUDY OF MOOD CHANGES IN YOUNG PEOPLE BASED ON QUANTITATIVE INDICATIONS

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Nowadays many types of research are dedicated to studying mood changes in young people. Studies of reasons that made mood changes and disturbances derived from these changes are continuing. Mood changes appear like some psychological disorders (such as depression, stress, anxiety, and so on) in youth. According to the statistical calculation performed in 2021 (by American Psychological Health), the spreading of depression among the youth has risen to 9.7%. Psychological disorders are observed in every one out of seven people at the ages of 10 - 19. According to the investigations, suicide takes fourth place among the reasons for death among youth at the ages of 15 – 29.

Changes in the Body Mass Index (BMI) are the focus of special attention among the reasons that cause mental disorders and at the same time the complications that occur as a result of mental disorders. So, changes in Body Mass Index (overweight, underweight, and obesity) most of the time cause mood changes in the young. If it is not cured in time, it may lead to deep psychological disorders and obsessions. Sometimes it happens vice versa psychological disorders lead to hormonal dysfunctions in the young. Hormonal dysfunctions lead to changes in food requirements and Body Mass Index.

The main aim of the research consists of a comparative analysis of mood changes in the young based on quantitative indications. A questionnaire has been taken among the 963 students of Khazar University in order to assess the psychological state of the young. Students' psychological state has been assessed according to the international scale DASS21 (this scale is one of the best ways of grouping stress, depression, and anxiety in mood changes).

According to the results of this scale, anxiety was registered in 289 students, depression in 124 students, stress in 99 students, depression and anxiety in 106, depression and stress in 30, anxiety and stress in 50, and the highest degree of depression, anxiety, and stress altogether in 89 students. Students' Body Mass Index is calculated for their weight and height (underweight < 18,5 kg/m^2, normal weight – 18,5 kg/m^2 – 24,9 kg/m^2, overweight 25 kg/m^2

-29,9 kg/m^2, obesity > 30 kg/m^2). As a result, underweight was found in 195 students, overweight in 79 students, and obese in 11 students. Anxiety was found in 41%, depression in 30%, and stress in 24% of students with weight changes. Only in 5% of these students, no problem has been found. Anxiety was found in 37%, depression in 27%, and stress in 26% of male students that have changes in Body Mass Index (underweight, overweight, and obesity altogether). However, anxiety was found in 41%, depression in 31%, and stress in 23% of female students.

So, anxiety is first, and depression is in second place among the students who are underweight and overweight among both male and female students. At the same time, the majority of male students suffering from psychological disorder have overweight, but female students have underweight problems.

Keywords: mood changes, Body Mass Index, anxiety, psychological disorders

INSIGHT INTO VARIABLE GENE EXPRESSION IN MULTI-DRUG RESISTANT *PSEUDOMONAS ARUGINOSA* CLINICAL ISOLATES FROM BAKU, AZ & TYLER, TX, USA

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Background - Nearly 1.27 million deaths were attributed, globally, to difficult-to-treat bacterial infections in 2019. Accordingly, the increasing prevalence of nosocomial infections by antimicrobial-resistant pathogens (ARM) resulting in higher mortality rates and global financial burden is of great concern. *Pseudomonas aeruginosa* represents one of six highly virulent "ESKAPE" pathogens that exhibit considerable intrinsic drug resistance as well as mechanisms for acquiring further resistance.

Methods - As many of these mechanisms are regulated through gene expression, we sought to identify regulatory strategies and patterns at play in 23 clinical isolates collected from Baku, Azerbaijan, and Tyler, Texas, USA. Real-time quantitative polymerase chain reaction was performed on six gene targets implicated in resistance and contrasted with antibiotic phenotypes.

Results - We found AmpC cephalosporinase production to be far less determinant of β-lactam resistance than previously indicated. The relative expression of the outer membrane porin channel, OprD, appears to have a much greater influence on phenotype. Both intrinsic efflux pump systems, MexAB-OprM and MexXY, proved necessary for resistance despite the degree of membrane impermeability. The induction of the acquired MexCD-OprJ and MexEF-OprN systems were found to considerably downregulate and impair the intrinsic efflux pump genes and proteins, respectively.

Conclusion - Complex differential gene regulation that was phenotype dependent as well as highly correlated regulatory expression values continue to suggest higher ordered mechanisms yet to be understood. In addition, the inhibitory overlap between the various resistance mechanisms supports the need for further expansion of gene targets as well as the modular response to treatment by *P. aeruginosa*. Further understanding could provide exploitation of regulatory feedback loops in which reversion of susceptibility towards intended agents may be achieved.

As for One Heath Initiative, understanding the root causes of the antibiotic resistance phenomenon and developing an evidence-based action plan across human and animal health and the agriculture sector are of paramount

importance in minimizing the emergence and spread of ARM in Azerbaijan and around the globe.

Keywords: *Pseudomonas aeruginosa,* drug resistance, gene expression, clinical isolates

ZOONOSES ECTOPARASITIC DISEASES: THE ONE HEALTH CONCEPT

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Introduction: The concept of "One Medicine" was coined in 1984 by Calwin Schwabe, known as the "father of veterinary epidemiology". The One Health Senior Expert Panel (OHHLE) has redefined the One Health approach. One Health is defined as an integrated, unifying approach that aims to balance and optimize the health of people, animals, and ecosystems in a sustainable way. As defined by the World Health Organization, zoonoses are “diseases that can be transmitted via an arthropod or naturally transmitted between vertebrate animals and humans without an arthropod”. According to a study investigating the global impact of zoonotic diseases in terms of morbidity and mortality; A total of 56 zoonoses have been found to cause an estimated 2.7 million deaths and approximately 2.5 billion human diseases annually. 60% of current human infections are zoonotic. Approximately 1.4 billion people are affected by mosquito-borne diseases each year. One Health is an important preventive medicine approach that envisions different disciplines and sectors working for a common goal to address complex health threats.

Purpose: It is to provide information about zoonotic ectoparasitic diseases and explain the importance of zoonotic ectoparasitic diseases on health. Zoonoses are infectious diseases transmissible from vertebrate animals to humans and vice versa under natural conditions. They may confront veterinarians as well as general practitioners, pediatricians, infectious and parasiter disease specialists, and microbiologists with special diagnostic and therapeutic problems. Zoonoses include not only certain diseases of importance, but also rare diseases that may be of importance to active physicians and travellers in developing countries. Zoonotic infections cause great economic losses in both low- and middle-income countries and high-income countries. Global warming, ecological changes, environmental pollution, illegal human and animal movements, regional civil wars predispose to the occurrence and spread of zoonotic parasitic infections to the world, and they are a great threat to humanity in the future. As a result of regional refugee migrations and animal movements such as migratory birds, Turkey is at risk for zoonotic infections. Combating parasitic zoonoses is also extremely difficult, and the control measures are mainly related to the management of livestock, chemical usage, and vector control. Vaccines are not available for immunization

against zoonotic parasitic disease in Turkey. Arthropods can be found on humans and/ or animals as ectoparasites and can adversely affect both humans and animals in several ways. The ectoparasites or vectors can contaminate stored food and transmit many pathogens or introduce diseases in new or instable geographic areas epidemiologically. A total of 107 different zoonotic infections, including 37 bacterial, 13 fungal, 29 viral, 28 parasitic (3 trematodes, 7 cestodes, 10 nematodes and 8 protozoa) infections, have been described in Turkey so far. It has been described as many ectoparasitic zoonoses, including 15 different arthropod groups from Turkey. The "One Health" initiative is particularly relevant for developing strategies to combat zoonotic diseases. Besides being vectors for various diseases, the species of arthropods that have zoonotic importance in the orders of Blattaria, Diptera, Coleoptera, Hemiptera, Hymenoptera, Lepidoptera, and Siphonaptera can cause direct infestations in humans and animals. Of particular zoonotic importance are arachnids with ticks and mites as pathogens. Ticks are obligate, bloodsucking ectoparasites, with sometimes low host specificity and vectors of a variety of important pathogens of humans and animals (viruses, bacteria, rickettsiae, protozoa, and helminths). Ticks are obligate bloodsucking zoonotic ectoparasites belonging to the families Argasidae, Ixodidae and Nuttalliellidae. They are very important biological vectors for human and veterinary pathogens. Siphonaptera (fleas) are hematophagous and they feed by sucking blood on different warm-blooded hosts, including man, worldwide. Humans are frequently infested by fleas of domestic or wild animals, for instance, the dog flea *Ctenocephalides canis*, the cat flea *C. felis*, the oriental rat flea *Xenopsylla cheopis*, the human flea *Pulex irritans*, the northern rat flea Nosopsyllus fasciatus and the sticktight flea Echidnophaga gallinacea. Heteroptera represent two families, Cimicidae and Reduviidae, include bloodsucking species and are of medical importance as transmitters of diseases. The most important genera are Triatoma, Rhodnius, Panstrongylus and Dipetalogaster; 12 species are known to transmit *T. cruzi. S. scabiei var. canis* may transmigrate onto humans handling dogs, or butchers or hog growers may be infested by *S. scabiei var. suis*. Myiasis is the infestation of living vertebrate tissues by first-stage dipteran larvae and the development to third-stage larvae. Lucilia sericata causes myiasis in animals, and rarely in humans as an ectoparasite. Infestation in humans and domestic herbivorous animals occurs in wounds, mouth, eyes, and nose. Zoonosis control is based on the control of microorganisms in animals, the food chain and humans. Since many zoonoses originate in animals before they are transmitted to humans, the most effective source of intervention is achieved by preventing transmission to animals or, when not possible, to humans. In the last decades, WHO has generated a new concept based on One

Health for combating infectious, particularly zoonotic diseases. WHO has purposed to generate “Healthier livestock and Wealthier People in a Reliable Ecosystem” For this aim, primarily, to prevent and control many infectious diseases and ectoparasites, including vectors, has been re-evaluated by the international coordination of the FAO, the OIE, and WHO. A network named “Global Early Warning System (GLEWS)” has been established by WHO, OIE, and FAO for combating major animal diseases, including zoonoses.

In conclusion: Within the concept of one health; Veterinary scientists have the responsibility to protect human health and well-being by ensuring food safety and safety, preventing and controlling infectious zoonoses, supporting the prevention of bioterrorism and agricultural terrorism preparation, controlling advanced treatment and zoonotic diseases, contributing to public health, and engaging in medical research.

Keywords: zoonoses, infection, ectoparasites, humans, animals

7,12-DİMETHYLBENZ[A]ANTHRACENE AS POTENTİAL CHEMİCAL CARCİNOGEN AND İTS TOXİCİTY

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7,12-Dimethylbenz[a]anthracene (DMBA) is a polycyclic aromatic hydrocarbon (PAH) known as an agent causing stress in livings. PAHs, such as petroleum and petroleum derivatives, are widespread organic pollutants entering the environment, through oil spills and incomplete combustion of fossil fuels. Since most PAHs persist in the environment for a long period of time, bioaccumulation occurs which causes environmental pollution and affects biological equilibrium drastically. The toxic effect of DMBA causes stress and tumors in people and animals. DMBA exposure causes both a number of serious behavioral dysfunctions and physiological disease processes, including cancer, hypertension, and aging. DMBA is known to generate DNA-reactive species, which may enhance oxidative stress in cells, during its metabolism. Besides the formation of DNA adducts, oxidative products derived from mutagen metabolism, such as DMBA, might impair vital cellular functions by damaging proteins and lipid membranes. DMBA exerts its effects as mini nucleases and induces single and double strand breaks in nuclear as well as mitochondrial DNA. Finally, these changes induced by environmental pollutants such as the chemical carcinogen DMBA exert to be intensive health problems leukemia, the development of anemia, other disorders, and the development and progression of many disease processes. In this regard, DMBA as a potential chemical carcinogen has a great interest in the development of cancer in medical toxicology as an active field of toxicology.

Keywords: Environmental pollutants, polycyclic aromatic hydrocarbon, DMBA, oxidative stress, cancer

DEVELOPMENT VACCİNES AGAİNST LEİSHMANİASİS AND CURRENT STATUS

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Leishmaniasis is a major public health problem in the world and Azerbaijan. WHO identified six major tropical diseases, where leishmaniasis was listed as the second disease after malaria. *Leishmania* parasites the causative agent of leishmaniasis, is an intracellular parasite transmitted by the bites of female *Phlebotomus sandflies*. Leishmaniasis is endemic in more than 102 countries. The main reasons for the widespread spread of the disease in the world and in our country are the emergence of resistance to the drugs used in the causative agents of the disease and insecticides in their vectors. Therefore, in recent years vaccine development against leishmaniasis is gaining more importance. There are 3 generations of vaccines against leishmaniasis. First-generation vaccines are killed or live attenuated parasites; second-generation vaccines are recombinant or native antigens and live genetically modified parasites (knockout and suicidal cassettes), third generation vaccines are deoxyribonucleic acid (DNA) vaccines. Also, vector salivary proteins, dendritic cells, and non-pathogenic *L. tarentolae* have been used as vaccine candidates. However, there is still no effective vaccine against leishmaniasis. Since polymer conjugates considerably increase immunogenicity, polymer-based vaccine studies have gained importance in recent years. In our studies, the results obtained by encapsulating soluble and autoclaved leishmania antigens and lipophosphoglycan into PLGA nanoparticles revealed that nano-vaccine formulations are also very promising. Such nanoparticles can enhance humoral and cellular immune responses without causing any side effects.

Keywords: Leishmaniasis, *Phlebotomus sandflies,* vaccine development, nanoparticles

FREQUENCY OF ANTIBIOTIC-RESISTANT SALMONELLA SPP. ISOLATED FROM POULTRY SAMPLES IN BAKU, AZERBAIJAN, AND TYLER, TEXAS, USA

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Introduction

The modern intensive integrated livestock production systems require regular antibiotics used at farms to maintain animal health and production. The use of antibiotics in food animal production has been implicated as a contributing factor to the emergence of drug resistance in human foodborne pathogens (Davies & Wray, 1997). Certain antibiotics, when given in low, subtherapeutic doses, are known to improve feed conversion efficiency (more output, such as muscle or milk, for a given amount of feed) and may promote greater growth, most likely by affecting gut flora (By Christopher D. Reinhardt, 2013). The regular and irresponsible use of antibiotics in modern veterinary practices is associated with the emergence of different multidrug-resistant (MDR) bacteria. These MDR pathogens of animal origin may be disseminated to humans via the wider environment including food products, sewage, and agricultural system. Salmonella is an important pathogen highly associated with poultry products such as eggs and chicken meat (Velasquez et al., 2018)

Salmonella organisms may become resistant to antimicrobials by modifying or inactivating the antimicrobial agent, modifying the antimicrobial target, the action of the efflux pumps, or cell membrane permeability. (Hawe et al., 2022; Mulvey et al., 2006) Genomic events constitute a central process in the mobilization of genetic elements and associated mobile antibiotic resistance antibiotic resistance-encoding genes in different settings (Burrus & Waldor, 2004). The movement of bacteria from the environment to animals and humans (and vice-versa) contributes to an increase in the mobilome (mobile gene pool) (Kav et al., 2012). These genetic exchanges have been significantly reported among human and animal guts (Devirgiliis et al., 2011).

Material and Methods

The fresh chicken meat was collected from retail markets in the city of Tyler, Texas (the USA), and Baku, Azerbaijan. The samples were processed in Dr.

Azghani's Laboratory at the University of Texas at Tyler and the Laboratory of Khazar University, Baku Azerbaijan.

TSB, TSA, Mueller-Hinton Agar, and MacConkey Agar, were used for *Salmonella spp.* isolation and counting CFU. Difco Salmonella O antiserum Poly A – I and Vi serum was used as a screening test, and PCR (16S) was implemented for conformation. QIAamp ® DNA Mini and Blood kit were used for DNA extraction. Cefotaxime 30ug, Imipenem 10ug, Colistin 10ug, Amoxicillin+Clavulanic acid 20ug/10ug, Aztreonam 30ug, Chloramphenicol 30ug, Sulfamethoxazole+Trimethoprim 23.75ug/1.25ug, Ciprofloxacin 5ug, Gentamicin 10ug antibiotic discs were used for phenotypical identification to AMR ability to be isolated *Salmonella spp. 16S*, *blaIMP blaNDM-1 mcr-1 aadB* genes are considered a gene of interest, *Cyber green Super Mix* was used for the recognition AMR genes.

Results.

1. AMR *Salmonella spp*. was detected in both countries
2. Mobile genetics elements were separated from isolated *Salmonella spp.*
3. Bacteria isolated from Azerbaijan and Tyler (the USA) demonstrated different phenotypes and genotypes AMR ability
4. *aadB/* Gentamicin, *mcr-1/* Colistin, *blaIMP/* Imipenem, mobile genetic elements were detected in both countries' samples however *blaNDM-1* beta lact mobile genetic element result was negative in conjoint countries
5. Different mobile genetic elements were detected based on phenotype antibiotic resistance variation in *Salmonella spp.*
6. Various resistance to unique antibiotics were dissimilar for these countries

Outcomes

- Alarm of misused antibiotics in veterinary sites and their corrupt impact on public health
- AMR mechanism can be contagion and produce a financial burden on health systems worldwide
- This practice can be implemented in other countries or surveillance systems
- It is simple, flexible, acceptable, and can implement, or integrate other systems.

Keywords: Salmonella, poultry products, AMR ability, mobile genetic element

DIVERSITY ANALYSIS OF *AEGILOPS* L. SPECIES OF DIFFERENT ORIGINS USING SSR MARKERS

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Background: *Aegilops* species are involved in wheat evolution and exhibit wide diversity for various desirable traits providing an invaluable gene pool for wheat breeding. Although various studies have examined the diversity of *Aegilops* species from different regions, little attention has been paid to the Transcaucasian area. The study evaluated the genetic diversity of *Aegilops* species, including those from the Transcaucasian region, using SSR markers.

Methods: Seven microsatellite (SSR) markers were used to evaluate the genetic diversity of eighty-eight Aegilops accessions representing eight species from eight different countries.

Results: A total of 58 alleles were generated with an average of 8 alleles per primer. Out of them, 19 were species-specific, and 12 were accession-specific. The mean polymorphism information content (PIC) and expected heterozygosity (He) values for the entire collection were 0.540 and 0.563, respectively. The average PIC value was the highest in accessions from Azerbaijan (0.494) and Turkey (0.478). The genetic distance (GD) indices based on 7 SSR markers ranged from 0 to 1, and the mean value was 0.51. The highest genetic similarity was noted between *Ae. neglecta* and *Ae. biuncialis* (GD=0.227), and the lowest between *Ae. speltoides* and *Ae. umbellulata* (GD= 0.786). The dendrogram created based on SSR data grouped 88 *Aegilops* accessions into nine clusters according to their taxonomic classification. The PCoA analysis could differentiate *Aegilops* accessions according to their sections and confirmed subgrouping obtained by cluster analysis.

Conclusion: The evidence from this study supports a high variability in *Ae. speltoides* from Turkey and Israel. Although Azerbaijan is commonly recognized as the center of origin for diploid *Ae. tauschii*, the tetraploids *Ae. biuncialis* and *Ae. triuncilais* from this country also exhibit significant genetic diversity. The studied gene pools can provide useful alleles for wheat adaptation and improvement programs and provide information for their effective conservation and management.

Keywords: *Aegilops*, genetic diversity, SSR markers

CASPIAN SEA AND ITS VALUES: IMPACT OF POLLUTION ON ECOSYSTEM BENEFITS

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In the past, the sturgeon resources of the Caspian Sea accounted for 90% of the world's sturgeon resources. Currently, sturgeon and black caviar production in the Caspian Sea has almost declined due to pollution and illegal fishing. Due to the loss of this use value, the non-use values associated with these sturgeons have also been lost. Currently, pollution of the Caspian Sea and its coastal areas is widespread in the Azerbaijani sector, and the possibility of future rehabilitation of the sea and coastal areas is highly questionable. At the same time, the occupation of the coast by artisanal tourism facilities and individuals, while reducing its natural value, has a serious impact on the development of tourism in the country. The main purpose of this section is to compare oil production with fisheries, which are a stable source of income. In this chapter, the authors want to convey to the reader that while oil production in Azerbaijan is profitable in the short term, it leads to environmental pollution and loss of sustainable income in the long run.

STUDYING GOLD ADSORBED ON GRAPHENE SUPERCELL AS A DRUG CARRIER FOR ANTICANCER DRUG B-LAPACHONE

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The fact is that there is always a high need for medical purposes development sensitive detectors for monitoring and collection of initial information demonstrating the current condition of the patient. For the time being, graphene-based materials have been widely used in biomedicine as drug delivery systems.

In this work, the possibility of using pure and gold atoms adsorbed on graphene supercell [1,2] was studied as a carrier anticancer drug [3] based on Density Functional Theory. The intermolecular interactions between β-lapachone and the graphene supercell were explored by analyzing adsorption energy and electronic density between the drug and the graphene supercell. As the gold atom replaces with one of the carbon atoms in the graphene supercell, the metallic dopant is moved out from the supercell.

The adsorption mechanism of the drug for being loaded on the graphene supercell was studied with gold adsorbed on perfect and graphene supercells with a monovacancy. Our calculations displayed that gold adsorbed on graphene supercells have much higher adsorption energy and shorter binding distances compared to pure graphene supercells. Similarly, to the adsorption energy, the magnetic moments calculated in the LSDA for 5×5 graphene supercells with a monovacancy and a defect-free cell with the adsorbed gold atom differ from each other.

Keywords: graphene, drug delivery, gold, β-lapachone

ANALYSIS OF CD-133 AND E-CADHERIN IN ESOPHAGEAL SQUAMOUS CELL CARCINOMA – ASSOCIATION WITH HISTOLOGICAL CHARACTERISTICS

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Objectives: Esophageal Squamous Cell Carcinoma is one of the common malignant tumors of esophagus which is associated with poor prognosis. This study was thus designed to evaluate CD-133 and E-Cadherin in the treatment of esophageal squamous cell carcinoma.

Material and methods: A total of 100 Esophageal Squamous Cell Carcinoma were identified. Hematoxylin and eosin staining were done to identify the basic pathological characteristics followed by immune-histo-chemistry for analysis of CD133 and E-Cadherin. The data were analyzed by using Statistical Package for Social Sciences version 21.0.

Results: It was observed during the research that the majority of patients (83%) were found to have less than 10% positive expression and negative staining of the CD 133. Furthermore, the majority of the patients (65%) were found to have E-Cadherin expression that was less than 10% positive and negative stained, whereas only 30% had the expression of CD 133 that was 10% to 30% positive and mildly stained.

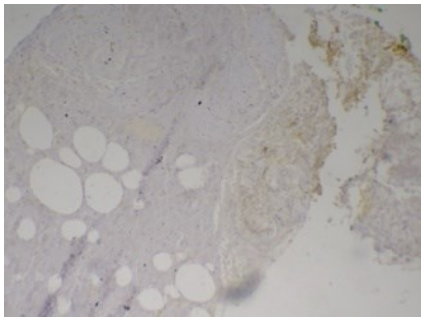

Fig 1. Less than 10% Staining of Cells by CD 133 at DR LUMHS Lab

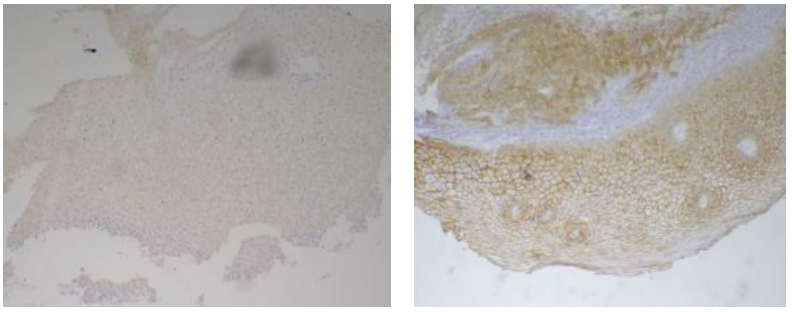

Fig.2 Staining of Cells by E-Cadherin at DR LUMHS Lab a) Mild Staining b) Moderate Staining

Conclusion: The findings revealed that CD-133 and E-Cadherin have no significant link with the presence of ESCC in patients. Further, this study provides an essential claim that the expressions of CD-133 and E-Cadherin differ in their behavior, as they did not demonstrate significance. So, it may be concluded that genetic variables and the human development environment, which vary depending on geographic location, may play an essential part in the varied behavior of CD-133 and E-Cadherin in Pakistani patients.

Keywords: Esophageal Squamous Cell Carcinoma, Immuno-Histochemistry, Haematoxylin, and Eosin, CD-133, E-Cadherin

THE IMMUNOLOGICAL INVESTIGATION OF DIFFERENT LEVELS OF EXPRESSION OF CD44 IN PROSTATE CANCER STEM CELLS IN THE TCGA PRAD DATABASE: A BIOINFORMATICS' STUDY

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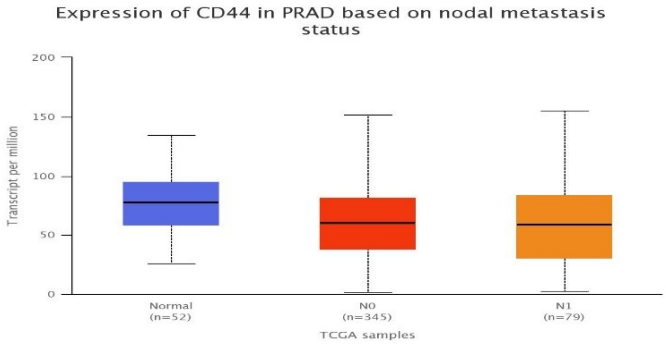
Background: Prostate cancer is the most common non-skin cancer and the second leading cause of cancer-related death in men, after lung cancer. The prognosis of the disease varies from an asymptomatic localized lesion that does not cause any harm, to invasive and fatal tumors, which are more common in African-Americans. The 5-year survival rate for patients diagnosed with a localized lesion is 99%, while this rate drops to 28% in metastatic cases. Tumor recurrence and progression in prostate cancer is associated with the presence of cancer stem cells in the tumor mass, which are resistant to current treatments. Various markers have been proposed to identify prostate cancer stem cells, CD44 being one of the most important of these markers. CD44 is very important because of its effects on tumor progression, self-renewal ability, metastasis, and Epithelial to Mesenchymal Transition (EMT). Based on this, the aim of this study is to investigate the effect of PRAD on the expression level of CD44 stem cells in prostate cancer in terms of nodal metastasis status (Fig.1a), molecular signature (Fig.1b), gender (Fig.1c), Gleason (Fig.1d) and sample types (Fig.1e).

Methods: We performed a comprehensive bioinformatics analysis of the expression of the CD-44 across TCGA cancers (with tumor and normal samples) in Prostate cancer.

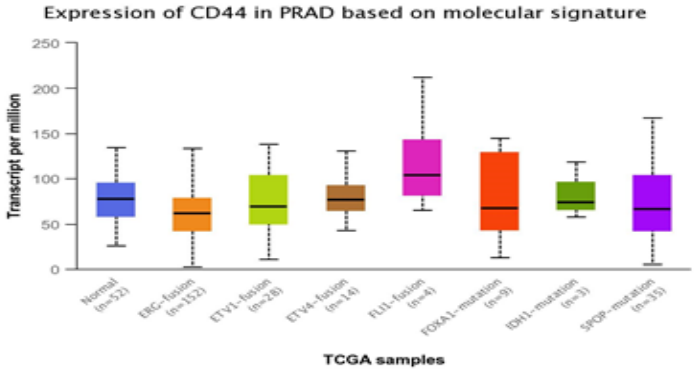
Results: Our results demonstrated that the expression level of CD-44 is different (decreased or increased) in various tumor tissue compared with normal tissue depending on the cancer type. Moreover, TCGA analysis revealed that exhibited a positive correlation with CD-44 across TCGA cancer.

Conclusion: Our study displayed that CD-44 can be considered an influential biomarker in various cancer progression such as Prostate Cancer with diagnostic and prognostic advantages.

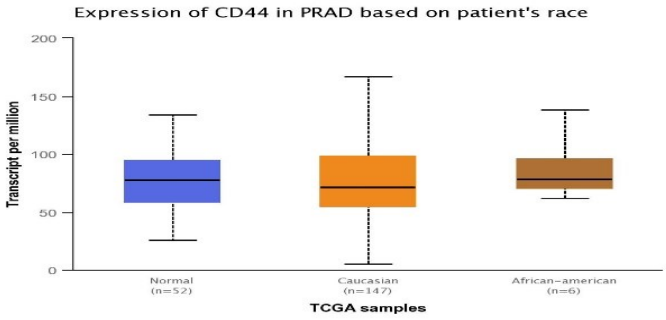
Keywords: Cancer, Prostate Cancer, the Cancer Genome Atlas (TCGA), CD44



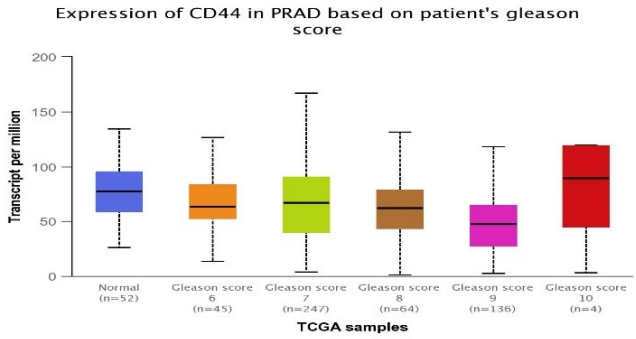
(Fig.1a)



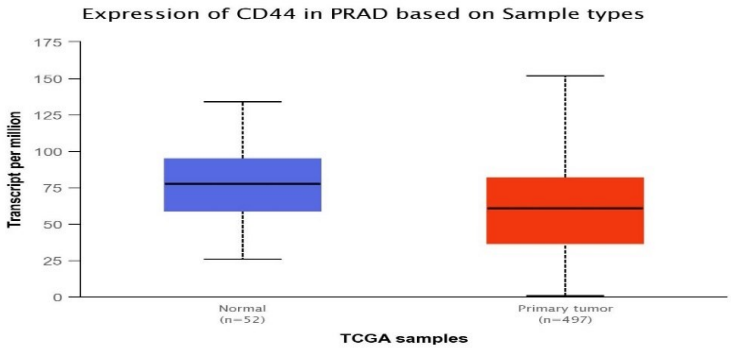
(Fig.1b)



(Fig.1c)


Expression of CD44 in PRAD based on patient's gleason score
Transcript per million
200
150
100
50
0
Normal (n=52)
Gleason score 6 (n=45)
Gleason score 7 (n=247)
Gleason score 8 (n=64)
Gleason score 9 (n=136)
Gleason score 10 (n=4)
TCGA samples

(Fig.1d)


Expression of CD44 in PRAD based on Sample types
Transcript per million
175
150
125
100
75
50
25
0
Normal (n=52)
Primary tumor (n=497)
TCGA samples

(Fig.1e)