

International Scientific Conference

**Green Medications – By Green
Technologies – For Healthy Life**

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**The conference is dedicated to the 100th anniversary of
pharmaceutical education in Georgia**



**The conference is held in the frames of the ‘Science and
Innovation Festival’ organized by the Ministry of
Education, Science, Culture and Sport of Georgia**

CONFERENCE ORGANIZERS

- Tbilisi State Medical University**
- Georgian Pharmacists Association**

Oral Presentations

Abstracts

1. Berashvili D.

•Centennial Georgian Pharmaceutical Education

Tbilisi State Medical University, Faculty of Pharmacy
d.berashvili@tsmu.edu

Pharmacy education in Georgia has a hundred-year history. The beginning of pharmacy education is related to Ivane Javakhishvili State University. In 1919 the Department of Pharmacy and Pharmacognosy was established at the TSU Medical Faculty, chaired by Professor of the University of Odessa Ivel Kutateladze since 1921. He has greatly contributed not only to the formation, but also to the development of pharmaceutical education, scientific pharmacy and industrial pharmacy in Georgia.

Throughout the history, the structural units of the educational process have changed, particularly by the September 15, 1922, according to the resolution of the TSU board of professors: the department of chemistry and pharmacy was opened at the pedagogical faculty of State University.

In 1925 the department of chemistry and pharmacy was converted into a faculty of pharmaco-chemistry, in 1930 it was joined to Tbilisi State Medical Institute as a faculty. From 1937 till 1948 Pharmaceutical Institute was established as independent unit. After that time, it still joined to Tbilisi State Medical Institute and continues to exist as the Faculty of Pharmacy until now.

Throughout centennial history of pharmaceutical education in Georgia there are thousands of highly qualified graduates.

Nowadays, pharmacy in Georgia is represented by numerous pharmaceutical institutions, where graduates of TSMU Faculty of Pharmacy are employed.

Along with the academic activities, special attention was paid to the scientific staff and the implementation of scientific projects.

Of great interest are studies dedicated to the study of natural medical materials for their medical application. When it comes to studies natural resources Ivel Kutateladze Institute of Pharmacochemistry is predominant.

It should also be noted that for over a hundred years, the material and technical base has been developed and expanded to meet the needs of modern education.

2. Buko V., Lukivskaya O., Kirko S., Naruta E., Belonovskaya E., Zavodnik I.

•Beneficial Activities of Natural Antioxidants in Experimental Liver Pathology and Type 1 Diabetas

Institute of Biochemistry of Biologically Active Compounds, National Academy of Sciences, 230030 Grodno, Belarus

Objectives: Natural antioxidants are considered to be potential therapeutic agents for treatment of different diseases. Bearing in mind the key role of oxidative stress in the pathogenesis of alcoholic (ASH) and non-alcoholic (NASH) steatohepatitis, liver fibrosis and type 1 diabetes, we studied the effects of some plant-derived antioxidants on the progression of these diseases in rat experiments.

Methods: ASH was simulated by feeding a liquid ethanol-containing diet and NASH was induced by a high-fat diet. Liver fibrosis was induced by intraperitoneal thioacetamide (TAA) injections. Type 1 diabetes was provoked by a single streptozotocin injection. Some individual compounds were complexed with β -cyclodextrins to enhance their solubility and pharmacological activity.

Results: Cranberry peel polyphenols (CPP) administered to rats with ASH partially prevented liver damage, ameliorating steatosis and inflammatory signs in the liver via prevention of liver mitochondria dysfunction. The treatment of these rats with CPP restored mitochondrial functional activities, inhibited Ca^{2+} - induced mitochondrial permeability transition and free radical generation in mitochondria. Simultaneously, CPP showed immunomodulatory properties significantly increasing phagocytosis and decreasing of circulating immune complexes.

Pentacyclic triterpene betulin (BT) isolated from birch bark significantly attenuated the histological signs of both ASH and NASH, lowered liver triglyceride contents and production of $TNF\alpha$ and $TGF\beta$, demonstrating hepatoprotective, anti-inflammatory, and antifibrotic properties. We suggest that the beneficial effect of BT in ASN and NASH is connected with its ability to improve the mitochondrial function, which was attributed to the inhibition of the mitochondrial permeability transition. Since BT has very low water solubility, we prepared the nanocomplex of BT and 2-hydroxypropyl- β -cyclodextrin (HP- β -CD) to enhance its solubility and bioavailability. The formation of an inclusion complex between BT and HP- β -CD was confirmed by differential scanning calorimetry and Fourier transform infrared spectroscopy. The nanocomplex had a pronounced protective effect on rats with NASH where the complex decreased lipid accumulation in the liver and developed a significantly higher anti-inflammatory effect, compared to that of BT alone.

We evaluated antifibrotic effects of coffee and cocoa extracts (both from green and roasted beans) on liver fibrosis progression in rats with TAA-induced fibrosis. Among the

	<p>investigated substances only green coffee extract developed more pronounced antifibrotic effect partially preventing TAA-induced liver fibrosis, confirmed by the significant decrease of both total and relative hydroxyproline content, "gold markers" of fibrosis, in the liver. The high content of phenolic substances, mainly chlorogenic acids (CGA), in this extract indicated that this group of compounds may exhibit the highest protective effect on the liver. CGA isolated from green coffee beans showed promising hepatoprotective effect in rats with ASH. The treatment with CGA significantly decreased signs of steatosis and inflammation in the liver of these animals.</p> <p>The treatment of diabetic rats with a red cabbage extract (RCE) lowered blood glucose and glycated hemoglobin concentrations, improved glucose tolerance and considerably raised serum insulin level. Simultaneously, RCE improved pancreatic islets morphology, increasing the amount of pancreatic β-cells in diabetic animals. The RCE administration prevented anemia in rats with diabetes, enhanced erythrocyte resistance to acid hemolysis, and normalized its increased lectin-induced aggregation and sialic acids content in erythrocyte membranes.</p> <p>Conclusions: Natural plant-derived antioxidants are promising agents in treatment of ASH, NASH, liver fibrosis and type 1 diabetes. The pharmacological efficacy some of these compounds was markedly enhanced after their nanocomplexation with β-cyclodextrins.</p> <p>Reference: Buko V, Zavodnik I, Kanuka O, Belonovskaya E, Naruta E, Lukivskaya O, Kirko S, Budryn G, Źyżelewicz D, Oracz J, Sybirna N. Antidiabetic effects and erythrocyte stabilization by red cabbage extract in streptozotocin-treated rats. Food & Functions 2018; 9(3):1850-1863.</p>
3.	<p>Zarnadze I., Zarnadze Sh.</p> <p>•The Essence of Algorithms in Healthcare and Modern Information Technologies in Maintaining a Healthy Life</p> <p>Tbilisi State Medical University Irine.zarnadze@yahoo.com</p> <p>Introduction: Health is the human condition when the organism is free from disease and human behaviour provides a reduction in the risk of harmful factors, with the support and care of the health system. Healthy living is perceived by various scientists as, for example, 4 basic steps: whether you smoke, your body mass index is up to 18-25, whether you consume 5 kinds of vegetables daily, whether you exercise at least 30 minutes a week. Some scientists believe that healthy lives are ensured and that diseases such as circulatory diseases, diabetes, and others can be avoided. This requires quality and good nutrition, good nutritional behaviour, balanced and healthy eating ration, healthy weight</p>

	<p>management, physical activity and exercise, sleep planning, alcohol control, tobacco control, emotional detection including stress and depression.</p> <p>What do the scientists in the algorithm mean? The algorithm is part of a clinical process that is formal or informal. The algorithm has a useful value; it can be used for monitoring, data evaluation, decision validity, for example the validity of the smoker prevention method can be determined by the end result.</p> <p>Research Objective: To study and evaluate the use of information technologies and algorithms in the learning process to facilitate rational decisions and valid recommendations.</p> <p>Research Method: Descriptive research.</p> <p>Results: Student's individual and team papers were studied and evaluated according to problem definition, extent of use of the database, and decision-making validity. The use of information technologies in the so-called learning process Machine learning allows the student to make the right decision based on the algorithm, based on individual patient data and community health needs.</p> <p>Conclusions Recommendations: Developing a modern and future healthcare system requires professionals to be patient, well informed, timely, and patient, and to both participate in making the right and valid decision. Information systems, information technologies and so-called machine learning ensure the correct perception of data as well as decision-making and recommendations for both individuals and the public.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Healthcare Sensing and Monitoring - George Vasilev Angelov, Dimitar Petrov Nikolakov, Ivelina Nikolaeva Ruskova, -2019 2. Information Technology in Research - Elitsa Emilova Giev, Maria Liubomirova Spasov-2019 3. Algorithms for Smartphone- 2:831-840 · January 2014 <i>with</i>955 Reads DOI: 10.1109/ACCESS.2014.2348943 4. Smart Healthcare-Prof. Dr. Wenbing Zhao Department of Electrical Engineering and Computer Science, Cleveland State University, Cleveland, OH 44011, USA. 5 .Healthcare Informatics and Analytics -January 2015 <i>with</i>652 Reads DOI: 10.1109/ICCCI.2015.7218108 Conference: 2015 International Conference on Computer Communication and Informatics (ICCCI -2015).
4.	<p>Maskhulia L.</p> <p>•Evaluation of Relationship Between Oxidative Stress and Antioxidant Status in Georgian Elite Athletes with Overtraining Syndrome</p> <p>Tbilisi State Medical University, Department of Physical Medicine</p>

I.maskhulia@tsmu.edu

Background: Progress of performance as a result of athletic training is achieved through increased training loads. Every athletic training program includes a component of repetitive overloading, but with an inadequate recovery time or an abrupt increase in training load, overloading may produce undesired effects. If overloading is extreme and combined with an additional stressor, non-functional overreaching (NFO), and then overtraining syndrome (OTS) may result. Oxidative stress (OS) has been suggested as one of the causes of overtraining syndrome (OT). OS could occur due to an imbalance between oxidant production and the antioxidant capacity of the tissue. Impaired antioxidant capacity and increased oxidative stress, where the production of reactive oxygen species overwhelms antioxidant defence, could be predisposing factors to overtraining.

Purpose of the study was to examine the relationship between oxidative stress and overtraining syndrome in Georgian elite athletes by evaluation in serum oxidative and antioxidant status.

Methods: Diagnosis of OTS was based on the checklist provided by the consensus statement of the European College of Sports Science and the American College of Sports Medicine. In 43 athletes with NFO/OTS and 40 athletes without NFO/OTS –control athletes (CA), diacron-reactive oxygen metabolites (d-ROMs) and biological antioxidant potential (BAP) in serum, as well as ratio of d-ROMs and BAP test measurements - marker of oxidative stress, were assessed. Oxidative stress assessment was performed by means of an integrated analytical system composed of a photometer and a mini-centrifuge (FRAS4, H&D s.r.l., Parma, Italy) using d-ROMs and BAP test kits (Diacron International s.r.l., Grosseto, Italy). Baseline data collection performed in both groups of athletes - with NFO/OTS and CA, followed by data collection in athletes with NFO/OTS after 28 days of rest. In athletes suspicious for OTS all measurements were performed after 2 more months of rest.

Results of the study showed higher baseline d-ROMs in NFO/OTS athletes than in athletes without NFO/OTS ($340,1 \pm 41,5$ vs. $296 \pm 32,6$ CARR U, $p < 0,05$), whereas antioxidant potential in CA was significantly higher, than in NFO/OTS athletes ($3205 \pm 375,3$ vs. $2147,8 \pm 411,7$ $\mu\text{mol/L}$ $p < 0,01$). After 28 days of rest there was significant decrease in d-ROM values in both: athletes with NFO and with OTS, to $291 \pm 26,7$ and $302,5 \pm 22,0$ CARR U respectively, as well as normalization of antioxidant status in athletes with NFO ($2536 \pm 346,4$ $\mu\text{mol/L}$). Total 3 month of rest showed improvement in the oxidative status of athletes with OTS, reaching normal values ($276,5 \pm 23,1$ CARR U, $p = 0,005$), though antioxidant status remained without significant improvement, showing subnormal BAP values ($1965,7 \pm 173,1$ $\mu\text{mol/L}$) and decreased BAP/d-ROM ratio ($7,1 \pm 0,9$). The results

	<p>demonstrate increased oxidative stress in overtraining state, creating disbalance between d-ROM production and antioxidant capacity.</p> <p>Conclusions: Thus, prolonged imbalance between oxidant production and antioxidant protection via attenuation of antioxidant capacity can be a cause of overtraining in highly trained athletes. Monitoring physiological responses to long-term physical exercise, including oxidative stress and antioxidant capacity, could be useful additional tool to determine the need for adequate recovery to avoid OTS in athletes.</p> <p>References:</p> <p>Meeusen R, Duclos M, Foster C, Fry A, Gleeson M, Nieman D, et al. Prevention, diagnosis, and treatment of the overtraining syndrome: joint consensus statement of the European College of Sport Science and the American College of Sports Medicine. <i>Med Sci Sports Exerc</i> 2013; 45(1):186-205</p> <p>Kajaia T., Chelidze K., Akhalkatsi V, Kakhabrishvili Z., Maskhulia L. Detection of overreaching and overtraining due to physical activity in high level Georgian athletes with use of contemporary diagnostic criteria. <i>Collection of Scientific Works, Tbilisi State Medical University</i>. XLIX,2015, Tbilisi, p. 122-125;</p> <p>Kajaia T., Maskhulia L., Chelidze K., Akhalkatsi V., Kakhabrishvili Z. The effects of non-functional overreaching and overtraining on autonomous nervous system function in highly trained Georgian athletes. <i>Georgian Medical News</i>, №3 (264), March 2017, p 97-103.</p>
5.	<p>Tabidze D., Sikharulidze Z., Baramidze L.</p> <p>•Medical Tourism in Georgia - Analysis of Social Research Results about Development and Perspectives</p> <p>Tbilisi State Medical University d.tabidze@tsmu.edu</p> <p>Introduction: Georgia has great tourism potential thanks to natural and climatic diversity and geographical location of the country. The mountain and seaside recreational and wellness zones situated in one space represent the best infrastructural environment for healing and rehabilitation activities. 180 resort zones are reported in Georgia, where up to 100 are for medical purpose with the specific air, water, sand, mud, medicinal herbs and so on. These rich resources underlie development of such important segment of tourism in the country as medical tourism. According to the 2016 WHO’s definition, the medial tourism is a target migration for complex obtaining of the recreation and treatment services, in the specific place where the treatment and recreational (rehabilitation) infrastructure facilities are located.</p>

Research: The TSMU Department of Public Health, Health Care Management, Policy and Economy conducted the sociological research aimed at the study of the current state of medical tourism in Georgia and elaboration of the development prospects charts based on the analysis of its outcomes. The tourist companies (3 companies) involved in medical tourism in Tbilisi and multifunctional hospitals (2 large clinics) participated in this research. The data of the Tourism Department of Georgia and the Report of the Georgian Statistics Agency for 2017 in line of the medical tourism in Georgia were also used.

Four groups of medical tourists were identified during the research process:

1. Outgoing tourists - Georgian citizens seeking treatment abroad
2. Incoming tourists from other countries seeking treatment in Georgia
3. Emergencies of medical assistance for foreign citizens during international (general) tourism: a. in Georgia and b. abroad
4. Migration of persons with disabilities for long rehabilitation activities.

Research results: These groups have clearly identified the visitors' areas of demand and consumption as well as expenses, list of diseases, selection of country and clinics, geographic location, religious preferences, language barrier, qualitative assessment of medical services.

Medical tourism is the most specific form of the general tourism and it requires high financial costs. The majority of the respondents pays great attention to the financial aspect of the treatment (rehabilitation) and the quality of the service provided. In many cases a lack of confidence to medical care is revealed. The patients receiving treatment emphasize on the assessment of the infrastructure of clinics. One of the main concerns of the research was the foreign countries where our citizens go for treatment and their diseases. The top five countries are: Turkey, Israel, Germany, Austria, Ukraine, and the diseases are: oncology, blood pathologies, infant diseases, severe comatose conditions (traumas and accidents), rehabilitation, long-term unspecified diagnoses, laboratory studies (high quality).

The research also focused on the shortcomings in the sport medicine. 75% of rehabilitation activities are conducted abroad. In the research process the unfavourable situation was evidenced during visits to the recreational and health facilities in Georgia. It appears that investors and sponsors have no interest in their rehabilitation. The reason is the low ROI and long process of investing.

Findings and recommendations: The research raises the important issues that require the state approach and their subsequent solution together with NGOs. The sphere is facing such challenges as systematization of the legal framework for tourism and health care and bringing it in line with the international standards, clinic infrastructure improvement and provision of high quality medical services, more focus of travel agencies on developing medical tourism in Georgia, upgrade of security of tourists at resort facilities, provision of

transport and other means of communication, development of the human resources base of resorts and in particular of medical tourism in Georgia, elaboration of the correct targeted strategy for PR company, training of competent personnel in the medical field that will meet international standards within the process of retraining citizens in the field of tourism. By addressing these challenges, the country will become interesting and attractive for medical tourism. Development of medical tourism in Georgia and its real problems include: regulation of price, affordability of services, high quality of service, improvement of personnel policy, joint efforts of governmental and nongovernmental organizations in this sphere.

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4. P. Ratiani - Organization and Principles of Treatment Abroad, 2018
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6. Promoting Tourism Development in Georgia - Analysis of Consumer Survey Results. Report of the Ministry of Economy of Georgia, 2017

6. Akhalkatsi V., Matiashvili M., Akhalkatsi L.

Contemporary technique and strategy of mechanotherapy for rehabilitation after knee arthroplasty

Tbilisi State Medical University, Department of Physical Medicine;
Sports Medicine and Rehabilitation Clinical Center
nekoltd.val@doctor.com

Background: We have gathered data from multiple trauma clinics in Georgia during a 32-month-period (2016 – 2018) and found that out of 2055 performed knee surgeries 65 (3.16%) had been conducted because of knee arthrofibrosis. The examples of risk factors for knee arthrofibrosis include: Complex and severe lesions of the knee, infection, faulty technique during a conducted knee surgery, incomplete or a total lack of rehabilitation procedures. However, development of scar tissue, which takes place after great stress, can also depend on biological specificities of individual tissues and despite having performed sufficient medical procedures, we still get a joint contracture as a result. Obviously the risk remains high even after a timely and technically well-conducted surgery if appropriate rehabilitation procedures have not been carried out. The risk of scar tissue production and

	<p>therefore, developing a joint contracture, is especially high in middle aged and elderly patients.</p> <p>Purpose: The research below will be mostly dedicated towards extraarticular, post-traumatically and post-surgically developed fibrotic processes in the knee that impede movement and their rehabilitative management as well as rational utilization of therapeutic exercise and modalities. This research is being carried out at.</p> <p>Methods: Taking part in the research are patients between the ages of 18 and 50 who have been suffering from post-traumatic or post-surgical contracture of the knee for over 4 months with varying levels of passive knee extension limitations (Types/Levels of joint contractures – I, II, III, IV). This research encompasses the evaluation of knee functional status by measuring ROM with goniometry and utilization of the Modified Cincinnati Rating System Questionnaire (CSc). As a result, we divided the patients into two main groups: Group A – patients with type 1 and 2 arthrofibrosis and Group B – type 3 and 4. Moreover, each of these groups are divided into two subgroups – A1, A2, B1 and B2. At the current stage of research, we are conducting a 3 week-long therapeutic home exercise program with ambulatory static progressive mechanical stretching within A1 and B1 subgroups. The change in the rate of movement of the knee is evaluated with the a-b-c system and measured in degrees where a stands for hyperextension, b – deficit of knee extension and c – flexion measured in degrees (3°-0°-140° is considered to be normal).</p> <p>Results: The results will be will be considered: Great - if ROM of the knee according to the a-b-c system is 3°-0°-140° and the CSc score > 80; Good – ROM is 0°-0°-130° and CSc > 55 and Fair – ROM is 0°-2°-120°, CSc > 30.</p> <p>Conclusion: The aforementioned research is moving along as planned and after having received statistically trustworthy results we will be able to form an effective strategy for the rehabilitation of knee arthrofibrosis with static progressive mechanical stretching.</p> <p>References: Brown CA, Toth AP, Magnussen B. Clinical benefits of intra-articular anakinra (Kineret) for arthrofibrosis. Orthopedics. 2010;33;</p> <p>Cheuy V.A, Foran J.R, et al. Arthrofibrosis Associated with Total Knee Arthroplasty. Journal of Arthroplasty, 2017, Volume 32, Issue 8, Pages 2604–2611;</p> <p>Clement N.D, Michelle Bardgett M, et al. Increased symptoms of stiffness 1 year after total knee arthroplasty are associated with a worse functional outcome and lower rate of patient satisfaction. Knee Surgery, Sports Traumatology, Arthroscopy, 2018.</p>
7.	<p>Dateshidze L.</p> <p>•Pharmaceutical Care Model to Provide Rational Symptomatic Pharmacotherapy of Acute Respiratory Viral Infection (ARVI) in Elderly</p> <p>AVERSI-PHARMA</p>

Lali.dateshidze@aversi.ge

Introduction and Purpose: Since the beginning of the 20th century there has been notable growing rate of the population aged over 65 years. The rate increased from 4.8% (1901) to 17% (2015) and predicted to continue to increase, reaching 28% in 2050. Elder population tends to use medicines more, than younger people and the medical expenditure of aged population is accordingly high and is expected to grow more. Thus, rational pharmacotherapy issue of the elder population deservedly is a special interest for social, financial, healthcare system providers.

On the other hand, the Acute Respiratory Viral Infection (ARVI) up to now remains a global healthcare challenge and elder population is considered as a high-risk group in this challenge. Under these circumstances designing the pharmaceutical care model, providing rational symptomatic pharmacotherapy for ARVI in the elderly, seems to have great importance.

Methodology: To provide effective, safe and accessible pharmaceutical care, it is necessary to take into account all possible criteria affecting on the pharmacotherapy process and result. A specificity of elder patients is related to various influencing criteria and moreover elevated sensibility to these multi-criteria. In this paperwork has been attempted the general criteria classification according to elder particularities. Based on these criteria analyses it has been formulated pharmaceutical care grades to provide a finding the balance between effectiveness, safety and accessibility. The consecutive analysis model is proven for releasing ARVI symptoms in elderly patients effectively and safely.

Results: On the basis of the influencing criteria analyses has been shown symptomatic rational pharmacotherapy of ARVI in elder patients. Considerable grades are: defining pharmacological effectiveness, safety – side effect minimization (hypersensibility, dose titration, accompanied disease and polypragmasia risks, compliance), preventing drugs undesirable interaction, accordance with psycho-social demands, offering comfortable administration drug, the rational estimation of finance.

Conclusion: Pharmaceutical care, providing rational pharmacotherapy in elder patients, should accurately consider biological, physiological, psychological, social, financial features of this population and from all these evidences should form possible criteria affecting on the pharmacotherapy process and result. Gradual multi-criteria selection should be regarded as a tool of the rational finding.

8. Gavini E., Rassu G., Giunchedi P.

•Drug Delivery Systems for Nose-to-brain Transfer of Potential Therapeutic Agents for Alzheimer’s Therapy

Department of Chemistry and Pharmacy, University of Sassari, via Muroni 23a, 07100
Sassari, Italy
eligav@uniss.it

Alzheimer's disease (AD) is a chronic neurodegenerative disease which affects nearly 44 million people worldwide; it is the fifth leading cause of death for adults aged 65 years and older, and the sixth leading cause of death for all adults. AD is the most common type of dementia within the elderly population characterized by memory loss, thinking disorders, impaired communication, difficulties in coordination and eating. This disease affects the normal life of the patients and their families with huge economic consequences [1].

Intranasal delivery is a noninvasive method to bypass the Blood Brain Barrier and directly deliver drugs to the brain due to the unique anatomic connections, provided by the olfactory and trigeminal nerves, that connect the nasal mucosa and the Central Nervous System (CNS) [2]. However, due to the mucociliary clearance and the poor mucosal permeability of several drugs, an important requirement for this route is the development of appropriate delivery systems [3].

An attempt to show the potential of this administration route in AD therapy will be made; the effect of different drug delivery systems from microparticles to nano-sized carriers and the polymer used will be illustrated [3-8]. Furthermore, results concerning hydroxypropyl- β -cyclodextrin, commonly used as excipient, as possible candidate drug for the prevention and treatment of AD, will be presented [9-10].

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9.	<p>Bezarashvili S., Kverenchkhiladze R.</p> <p>•Atmospheric air - an Important Determinant of Population Health</p> <p>TSMU, The Department of Environmental Health and Occupational Medicine r.kverenchkhiladze@tsmu.edu</p> <p>One of the leading problems of public health and, in particular, of environmental medicine is hygiene issues of ambient air. Ambient air protection is a matter of national importance. It requires complexity and consists of many interrelated moments [1]. Damage caused by ambient air pollution, experienced by humanity, hardly be expressed quantitatively, but there is no doubt that it is very high. Serious problem is the increasing trend of ambient air pollution in terms of population mortality and related economic problem. WHO reports that air pollution causes about 7 million deaths each year worldwide [2,3]. Reducing the negative impacts of polluted air on human health and ensuring a safe environment for human health is just as important for Georgia as it is for other countries in the world. Therefore, the purpose of the study is to analyse ambient air pollution in Tbilisi and identify possible impact on population health.</p> <p>The study analyses recent data from the National Environmental Agency of the Ministry of Environment Protection and Agriculture of Georgia concerning the ambient air condition</p>

	<p>in certain districts of Tbilisi. In order to determine the impact on the health status of its population, lead content of children's body in various districts of Tbilisi has been studied through hair analysis. In addition, a population survey was conducted to assess the state of ambient air and its impact on health.</p> <p>Ambient air has been found to be characterized by its variety of pollution and high levels of pollutants. It is characterized by a complexity of pollutants. Concentrations of solid particulate matter in the ambient air of the intense traffic areas of the vehicle exceed 4.0-5.7 times, which is significantly higher than the data of the suburbs.</p> <p>Of those respondents who believe that ambient air in Tbilisi is moderately or heavily polluted in its residential area, with 45.7% saying it has a strong impact on health. And from those who think that ambient air in Tbilisi is clean or slightly polluted in its residential area, with only 19.1% of respondents saying that its impact on health is very pronounced (the difference is statistically significant). The same dynamics were obtained by analysing lead content in children's hair. The objective and subjective data of the study are in some correlation.</p> <p>Thus, Ambient air of Tbilisi is affecting the health of the population, which requires complex of improvement measures.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Karelin A., Lomtev A., Mozhuxina N., Eremin G., Nikonov V. Methodological Problems of Monitoring of Small Dispersic Particles in Atmospheric Air.//Hygiene and Sanitary, 2016, № 10, p. 980-985. 2. http://www.myvideo.ge/tv/ertsulovneba/2018-09-05/19:13:19. <p>Science year 1997. A review of Science and Tecnology. World Book. Inc a Scott Fetzer company Chicago. London . Sidney. Toronto.</p>
10.	<p>Bäumler H.</p> <p>•What Happens with Nanoparticles in the Living Body?</p> <p>Charité – Universitätsmedizin Berlin, Institute of Transfusion Medicine, 10117 Berlin, Germany hans.baeumler@charite.de</p> <p>The rapid developing imaging and analytical technologies nowadays first provided the instruments for observations, measurements and manipulations on the Nanoscale, leading to the ability to design nanomaterial.</p> <p>Consequently, worldwide nanotechnology is rapidly developing a rising number of materials for a wide palette of applications. It ranges from well-established multi-ton production of carbon black and silica for application in plastic fillers and car tires to</p>

	<p>micrograms of fluorescent quantum dots for labelling in biological imaging. The effect on and the behaviour of these materials in biological environment are still largely unknown. Nanoparticles are a promising tool for the use in medical, agricultural, manufacturing, industry and in military branch. Also new types of Nanoparticles have been shown to be useful as drug delivery systems due to their unique physicochemical properties. Nano formulated drugs are recently gaining rising application in pharmaceutical industry for several therapeutic and diagnostic purposes. Additionally, using targeting to drug carrying nanoparticles, one hopes to enhance efficacy at lower doses and thus to diminish side effects. Many existing drugs are already available as Nano formulations and many more will become available for clinical applications in the near future. Therefore, thousands of tons of nanoparticles enter the environment annually around the world. This review provides information about nanoparticles and their effect on the health and pharmaceutical industry.</p>
11.	<p>Kakulia N., Masiukovich T., Gaprindashvili A., Kvinikadze I. •Peloides in Ajara Region and Perspectives for Their Use in Medicine Practice Tbilisi State Medical University nelly_kakulia@yahoo.com</p> <p>Introduction and purpose of research: Since the beginning of the 20th century began the scientific study of balneological resources of the country. Medicinal muds (pellets) and clays are widely used in balneology, resort therapy and cosmetology because of high therapeutic effect. The use of natural healing factors in a variety of diseases prevention and treatment is one of the actual problems of modern-medicine. Adjara - one of the richest areas of Georgia- clays, peloides, resources of mineral water are found both on the sea coast and in mountains.</p> <p>Purpose: Research of balneological resources of - Adjara region and establishment of possibility of their application in medical practice.</p> <p>Methods and results: While studying mineral water in the Adjara region, found that some mineral water is clean and transparent in the surface, but at the place of arrival (rich with sulfuric algae) leaves a fat mud that is rich in various kinds of animal and plant organisms. These types of peloids are successfully used in balneological practice and is known by the names of geographical location, for example "Barezhin" Pyrenees mountains. There is no data in the literature about the study of "Barezhin" type peloids for use in balneology practice. Peloids found in 5 municipalities of Adjara mountainous region were studied : Shuakhevi, Khulo, Keda , Khelvachauri, Kobuleti municipalities.</p>

	<p>The chemical compositions (micro- and macroelements of 17 so called “Barezhin “type peloids located in Adjara region have been studied by using the modern instrumental methods of analysis.</p> <p>It was found, that studied peloids are saturated with micro- and macroelements. The results of X-Ray phase Studies have shown, that Kvirike and Chakhati peloids mainly represents rentgenoamorphous mass. The contents of the following minerals have been established in the objects: Ca-Na feldspar, K feldspar, Cf montmorillonite, quartz (SiO₂), hematite (Fe₂O₃), chlorite, magnetite, amphiboles, trace amounts of mica and chlorite.</p> <p>The presence of bacteriophages has been established in the water extracts of Chakhati and Kvirike peloids, which have the ability of the lysis of <i>E. Coli</i> and <i>Staphylococcus</i> strains. It was also established, that the studied objects (Chachati and Kvirike peloids) are not characterized by general toxic, cumulative, local irritant, allergic, internal organs damaging and systemic actions during local application.</p> <p>Conclusions: Thus, based on the above, guidelines were developed for use in balneological practice for 2 types of peloids in the Adjara region.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Fedorov, Yury A; Ruban Dmitry A. - Peloids as important resource for regional sustainable development- conceptual considerations- J. Revista ESPACIOS, Vol. 39 (Number 51) Year 2018. Page 21 2. Vincevica-Gaile Z, Stankevica K - .Impact of micro- and macroelement content on potential use of freshwater sediments (gyttja) derived from lakes of eastern Latvia. Environ Geochem Health. 2018 Oct; 40(5):1725-1738. 3. Manuel Pozo, María Isabel Carretero. Francisco Maraver <i>et al.</i> - Composition and physico-chemical properties of peloids used in Spanish spas: A comparative study. Applied Clay Science/Volumes 83–84, October 2013, Pages 270-279 4. Balneotherapy- A. robakidze- 2004
12.	<p>Pruidze E.^{1,2}, Tchumburidze T.¹</p> <p>•The Ways of Implementation of Pharmaceutical Care at PSP Pharmacy</p> <p>¹Tbilisi State Medical University ²PSP Pharma e.pruidze@psp.ge</p> <p>In order to understand customer satisfaction, loyalty, behavior, and expectations, PSP performs specially designed studies every year, in order to create customer-oriented marketing strategy.</p>

	<p>In 2017 company had made rebranding and pharmacy had become more suitable to GPP guidelines on inner environment of the pharmacies. Pharmacies were divided by zones and specially designated pharmaceutical services were designated in the green zone. There are separate spaces for OTC medications where the pharmacy assistants are in charge and zones where only pharmacists with the proper qualification who can provide the pharmaceutical care are located. This approach PSP pharma the opportunity for the optimal division of the pharmacists' functions. Therefore, special locations were created for patients' services. This project (PSP rebranding) had won the nominee of the best business rebranding (Stevie Awards 2017).</p> <p>At PSP Pharmacy, more than 2,000,000 people receive a variety of pharmaceutical services each month, where pharmacist are in a new role, with increased functions, as full members of the multidisciplinary health care system. There is no doubt that pharmacists' competence, knowledge, and skills have a direct impact on the health of patients/costumers at pharmacies. After realizing this high responsibility, our job pushes us to follow the mentioned path and to apply the principles of appropriate practices in the company.</p>
13.	<p>Bakuridze A., Jokhadze M., Mshvildadze V., Ebralidze L., Bakuridze L.</p> <p>•Green Medications - By Green Technologies - For Healthy Life</p> <p>Tbilisi State Medical University, Department of Pharmaceutical Technology a.bakuridze@tsmu.edu</p> <p>Georgia is a distinctive resort country with medicinal climate, mineral waters, peloids and other unique natural resources.</p> <p>Rational, resource-saving recycling of natural medical resources - via green technologies to formulate green medications is a top priority issue in the medical, social and economic fields.</p> <p>One of the most important problems of medical therapy is formulation selective, targeted drug delivery.</p> <p>Most traditional medicinal dosage forms reach the target area and give the desired effect, but at the same time influence on other systems of the body and cause undesired complications.</p> <p>Nowadays it is a reality to incorporate therapeutic drug molecules into nanoparticles that achieve targeted area through the bloodstream, where the active substance is released and the pharmacological action is revealed.</p>

These types of drugs are called "Smart drugs" which selectively penetrate and act on the targeted organ and not on the whole organism. As a result, the therapeutic efficacy of the drug is increased and minimal adverse effects are occurred.

The objective of the research was to develop targeted therapeutics through green technologies from natural medical resources.

Based on the research performed an artificial gastric fluid is preferable solvent for the purpose to obtain tincture and transformation of the obtained tincture to a dry foaming system is promising alternative of the conventional dosage form.

Based on the biopharmaceutical research Saperavi emulgel is formulated, where active pharmaceutical ingredients are Saperavi wine and grapeseed oil. Furthermore, application of Saperavi emulgel for 21 days on the clean skin of volunteers resulted in: reduction in fat, clearing of pores, a decrease of keratinocyte, and a markedly discoloration of pigment spots.

Based on preliminary pharmacological studies the herbal composition has been prepared and the optimal extraction conditions of the complex of biologically active substances have been provided.

On the basis of the extract obtained from phyto-composition, a formulation of emulsion against acne is defined and the preparation technology is developed.

Based on biopharmaceutical studies, the composition of mucoadhesive films containing *Salvia Officinalis*, orodispersible films of *Valeriana officinalis* and *Eucalyptus* microaerosol powder formulation and their preparation technologies were developed.

Cytotoxic activity of the compounds from the herb of *Erysimum contractum* *Somm. Et Levier* has been studied on A-549 and DLD-1 tumor cells.

Declared cytotoxic activity was obtained for new-galenic preparation containing liposomes from herb of *Erysimum contractum* *Somm. Et Levier*. They are characterized with selective action towards cancer cells and are safe towards healthy WS–1.

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14. Kutkhashvili M.¹, Chorgolashvili D.¹, Tushurashvili P.^{1,2}

•Methadone Related Death Cases in Georgia

¹Levan Samkharauli National Forensics Bureau

²Tbilisi state Medical University, Department of Biochemistry

p.tushurashvili@tsmu.edu

Methadone maintenance therapy is a major treatment option for opioid-dependent individuals and is successful government program in Georgia.

Majority of drug users consider methadone as a “Safe Drug”. Until recently, there was no single case of the Methadone existence in postmortem blood and tissue samples in Georgia.

Recently, sudden “burst” of Methadone in postmortem samples was discovered. Concerns of “Methadone Safety” arisen and here we are summarizing:

1. Data of postmortem sample analysis where Methadone was found;
2. Data of Methadone related death cases from scientific reports;
3. Possible mechanisms of Methadone lethality.

	Case #												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Discovered Drugs													
Methadone	+	+	+	+	+	+	+	+	+	+	+	+	+
Methamphetamine	+	+	+										
MDA	+	+	+	+	+								
MDMA	+	+	+	+	+								
Fentanyl	+	+	+	+	+								
Diazepam						+	+	+					
Nordazepam						+	+	+					
Heroin									+				
Date	05.18	05.18	05.18	05.18	05.18	12.18	01.19	02.19	03.19	04.19	04.19	04.19	04.19

Materials and Methods: Standard procedure for the sample preparation was used.

Toxic compound content was analysed by LC-MS/MS:

Agilent Technologies 6460 Triple quad LC/MS Agilent Technologies 1290 Infinity Stationary phase - C18 (100 mm)

Mobile phase - 0.1 % HCOOH (H₂O): 0.1 % HCOOH (CH₃CN) =20:80 (V/V) (0.5 ml/min)

Scan Type – MRM

Table 1. Results of Blood Analysis of Postmortem Samples Related to Methadone

Results and Discussion: Data are summarized in the Table 1.

It is clear, that in the majority cases we can see exactly the same results of the methadone intoxication reported from the other studies – methadone is much more toxic when is used with other illicit drugs.

For the moment it is not clear what the source of methadone was. Was it used as such, or as prepared mix?

Methadone exists in two isomeric forms – Levomethadone (the R-(-)-enantiomer) is a μ -opioid receptor agonist, and Dextromethadone (the S-(+) enantiomer), which does not affect opioid receptors, but binds to the glutamatergic NMDA receptor and acts as an antagonist against glutamate. Methadone can act also as an uncoupling agent of oxidative phosphorylation.

In major cases racemic preparations of the Methadone are used.

Complex nature of the Methadone action should be responsible for its toxicity, mainly when used with other drugs.

Incidents of the methadone mortality look quite periodic for the moment. This can be related to some periods of the increased illegal supply of the methadone to the Georgian “black market”, but more data required for the final answer.

More information should be provided to the drug users about toxicity of the Methadone to avoid fatal cases.

15. Abuladze I., Matchutadze I.

IUCN Plants *Kosteletzkya pentacarpos*, *Hibiscus ponticus* and *Drosera rotundifolia* as a Perspective Species for Paludiculture in Kolkheti Lowland

Institute of phytopathology and biodiversity

Batumi Shota Rustaveli State University

irushaaaa@gmail.com

Introduction and goal. Paludiculture is the agricultural or silvicultural use of wet and rewetted peatlands (Wichtmann et al. 2016). Paludiculture uses spontaneously grown or cultivated biomass from wet peatlands under conditions in which the peat is conserved or even newly formed (Wichtmann & Joosten 2007). Various plants can be cultivated profitable under wet conditions. Beside peatlands also the alluvial soils surrounding the KNP could be used for a wet agriculture. Therefore, a paradigm shift from drainage-based land use to wet land use is necessary. Moreover, Kolkheti is extraordinarily suitable for the

	<p>cultivation of plant biomass, because of its ideal, warm and wet climate leading to high biomass yields.</p> <p>Methodology. <i>in-situ</i> & <i>ex-situ</i> conservation and creation of nursery for <i>Kosteletzkya pentacapos</i>, <i>Drosera rotundifolia</i> and <i>Hibiscus ponticius</i>.</p> <p>Results. IUCN threatened plant species <i>Kosteletzkya pentacapos</i>, <i>Drosera rotundifolia</i> and <i>Hibiscus ponticius</i> of certain interest as medicinal plants species still have to be tested.</p> <p>Conclusion. Creation of nursery will be first step for “paludiculture” development in Kolkheti</p> <p>References:</p> <ol style="list-style-type: none"> 1. Joosten, H., Kaffke, A. & Matchutadze, I. 2003. The mires of the Kolkheti Lowlands (Georgia). <i>IMCG Newsletter</i>, 2003/3, 19-23. 2. Grootjans, A.P., Krebs, M., Matchutadze, I. & Joosten, H. 2016. Percolation bogs in the Kolkheti lowlands (Georgia) in need of better protection. <i>IMCG Bulletin</i>: July-2016: 6-10. 3. Kaffke, A. 2008. Vegetation and site conditions of a <i>Sphagnum</i> percolation bog in the Kolkheti Lowlands (Georgia, Transcaucasia). <i>Phytocoenologia</i>, 38, 161-176. 4. Krebs, M., Kaffke, A., de Klerk, P., Machutadze, I & Joosten, H. 2009. A future for Ispani 2 (Kolkheti, Georgia) and adjacent lands. <i>IMCG Newsletter</i> 2009-2: 3-14. 5. Krebs, M., Matchutadze, I., Bakuradze, T., Kaiser, R. 2017. Georgia. In: Joosten, H., Tanneberger, F. & Moen, A. (eds.) <i>Mires and peatlands of Europe: Status, distribution and conservation</i>. Schweizerbart, Stuttgart, 403-412. 6. Wichtmann, W. & Schäfer, A. (2007): Alternative management options for degraded fens – utilisation of biomass from rewetted peatlands. In: Okruszko, T., Maltby, E., Szatylowicz, J., Swiatek, D. & Kotowski, W. (eds.): <i>Wetlands: Monitoring, Modelling and Management</i>. Taylor & Francis, Leiden: 273–279.
16.	<p>Kunchulia L.^a, Zazashvili N.^b, Imnadze N.^a, Chichakua M.^b, Chikaidze M.^b</p> <p>•The Modern Approaches of Standardisation of Substance of DAS</p> <p>^a Tbilisi State Medical University, Department of Pharmaceutical and Toxicological Chemistry, Tbilisi, Georgia</p> <p>^bBio-rational Technological Research Center (BrTRC), Tbilisi, Georgia</p> <p>I.kunchulia@tsmu.edu n.imnadze@tsmu.edu</p> <p>The substance of DAS is the multicomponent heterogenic product with content of one or two heterocyclic compounds with substituted nitrogen in it. Also, there are minor content</p>

of amino acid and phenolic compounds. So, substance is potentially is rich with a range of biological active compounds and the aim of our study was to separate from the fraction the individual constituents with one heterocyclic ring and nitrogen (pyridine compounds) and determine their structure with modern chromatographic - mass spectrometric method.

Initially with help of Thin Layer Chromatography in system: chloroform-methanol-acetic acid (8:1:1 v/v/v) was separated the multicomplex of pyridine derivatives fraction line (reference to standards). The line gives blue fluorescence at 254 nm wavelength.

The second stage was to scrape from the chromatographic layer the extract with methanol. For chromatographic-Mass Spectrometric analysis to the object of research was added the agent for derivatization Bistrimethylsilyl amide (BSTEA), and placed in thermostat during 20 min on 70°C.

The identification of the individual compounds was done by their retention time and by database (NIST-2010).

As a result of the conducted study was identified the pyridine compounds with six-membered heterocyclic compounds with one nitrogen: 1) 3-Hydroxypyridine (retention time 5.25 min); 2) 6-methyl-pyridine (picoline) (retention time 5.64 min); 3) 3-pyridinol (retention time 6.14 min); 4) 5-hydroxy-3-methylpyridine (retention time 6.87 min); 5) 6-amino-nicotinamide (retention time 8.30 min).

The pyridine derivatives, as it is well known, are very important compounds in biochemistry of alive organisms. And to summarize the DAS substance is rich with pyridine monocyclic compounds and in respect product will have the pharmacological efficacy of wide range and studies are conducted in this direction.

17. Meparishvili G., Gorgiladze L., Muradashvili M., Sikharulidze Z., Meparishvili S.

•Plants Quarantine an Essential Tools for Food Safety

Batumi State University, Institute of Phytopathology and Biodiversity, Georgia;
galinameparishvili@yahoo.com

Food plants of the world are damaged by of insects, of weeds, diseases (caused by fungi, viruses, bacteria and other microorganisms) and nematodes. Risk of appearing and invasion is great, as plant quarantine pests have no limits. Import of different kinds of them and their distribution could cause dangerous ecological catastrophes. Besides, plant diseases and insect pests could harm market safety of the country by means of crop decreasing and low quality of agriculture products and there are lots of historical facts of that.

Plant quarantine is defined as the legal enforcement of the measures aimed to prevent pests from spreading or to prevent them from multiplying further in case, they have already gained entry and have established in new restricted areas.

Subtropical zones are highly affected by different invasions. It is also caused by process of globalization. That is why the system of Plant Quarantine directed to the protection of country plant resources from invasions, is called the first line protection.

Our Organization has been conducting plant diseases monitoring and diagnostics of their causal agents. The Culture Collection of Plant Pathogens, established in 2005 through the ISTC G-1093p project comprises plant pathogens with various virulent and pathogenicity levels attributed to the risk group 2. Our culture collection involves also the other pathogenic microorganisms, such as *Ralstonia solanacearum* (1,2), *Pseudomonas syringae* *pv. actinidae* (3), *Erwinia amylovora*, *Synchytrium endobioticum* (4), *Fusarium oxysporum*, *F. sambucinum*, *F. solani*, *F. moniliforme*, *F. avenaceum*, *F. graminearum*, *Aspergillus sp*, *Mucor*, *Rhizopus*, *Cladosporium*, *Penicillium sp.* which at the same time cause the serious yield losses of agricultural crops and during their parasitism on plants produce dangerous toxins causing contamination, allergy and skin diseases of human and animals.

In 1993, the United Nations classified aflatoxins as carcinogens of the first class. Especially a lot of aflatoxins secrete fungi *Aspergillus flavus*, *A. parasiticus*. They are contained in products of plant origin, but on food chains fall into livestock products. The greatest risk is the consumption of milk, eggs and meat.

The Institute has been included into the net on global monitoring of cereal rust diseases. Since 2009 within the framework of BGRI program we have been conducting the research with the aim of monitoring of the new high virulent race Ug99, that in case of invasion into cereal sowing districts of Georgia, could completely destroy wheat yield.

During the framework of our Institute with the Department of Sanitary, Phytosanitary, and Veterinary Control, 6 parts of potato infected by Potato Wart (*Synchytrium endobioticum*) and 94 parts – infected by Potato Brown Rot (*Ralstonia solanacearum*) were banned to be imported into Georgia.

To treat diseases in time and study their causing pathogens, is fundamental for the country safety and makes it possible not to infect a huge territory.

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18.	<p>Rubashvili I., Karukhnishvili N., Ghudushauri N., Makharadze Kh.</p> <p>•Modern Approaches to Cleaning Validation in Pharmaceutical Industry</p> <p>Pharmaceutical company “Aversi-Rational” Ltd, Tbilisi, Georgia</p> <p>imeda.rubashvili@rational.ge</p> <p>Pharmaceutical industry is a vital segment of healthcare system. Manufacturing of quality pharmaceuticals remains a quest to achieve on a global platform of industry. Manufacturers must validate their critical processes to ensure compliance with GMP requirements. The current GMP regulations state that cleaning process is a critical issue to ensure product quality, the patient safety and drug efficacy. So, it is essential to validate the established cleaning procedures and methods within the pre-determined acceptance criteria and limits. Cleaning validation is a critical component of an effective quality assurance system and has the largest opportunity to prevent patient risk by assuring that there is no cross-contamination/contamination of drug products with variety substances such as contaminants associated with other active ingredients, cleaning agents, airborne materials and microbiological contamination as well. In this presentation, the scientific and risk based lifecycle approach for cleaning validation, its importance, recent requirements of GMP, the methods of sampling and residues determination, establishing the acceptance limits for cross- and microbiological contamination will be discussed in brief.</p>
19.	<p>Georgieva R.^{1,2}, Bäumlér H.¹</p> <p>•Application of Nanoparticles in Medicine</p> <p>¹Institute of Transfusion Medicine, Charité-Universitätsmedizin Berlin, Germany</p> <p>²Department of Medical Physics, Biophysics and Radiology, Medical Faculty, Trakia University, Stara Zagora, Bulgaria</p> <p>The use of nanoparticles in medicine offers exciting possibilities some of them being still only imagined, while others are at various stages of development. However, some are</p>

actually being used today. It is expected that nanotechnology and particularly nanoparticles can revolutionize detection and treatment of diseases in the future.

The main directions of research are concentrated on employing nanoparticles for drug delivery including oxygen delivery, for diagnostic purposes, antibacterial treatment, tissue engineering, wound treatment and cell repair. Nanoparticles have been shown to have a great potential as tools for triggered and targeted delivery of therapeutics as well as in cell-based therapies. The lecture includes an overview and some examples of own research in the field.



Fig. 1. Biomedical application of engineered nanoparticles
(from Rudramurthy & Swamy, J. Biol. Inorg. Chem. (2018) 23, 1185-1204)

20. Widelski J., Skalicka-Woźniak K.
•Green Anxiolytics – New Hope for Old Fears

Department of Pharmacognosy with Medicinal Plants Laboratory, Medical University of Lublin, Poland

According to the data of the World Health Organization at least one-third of the population in many countries experience at least one episode of pathologic anxiety. In turn some countries, among them Brazil, Canada or Holland have more cases of anxiety than mood disorders and drug abuse. In Europe and the USA, anxiety disorders represent the major

	<p>health problem in terms of healthcare costs, sick-leave from work, disabilities, and premature mortality (it is estimated that the direct and indirect costs of anxiety disorders is about 41 billion euros per year). There is therefore a pressing need to develop new, easily accessible anxiolytics with a new mechanism of action and the absence of the majority of side effects of the substances currently used.</p> <p>Results of previous researches have been proved, that coumarins can be source of new lead compounds for potential development of anxiolytic drugs.</p> <p>Combination of modern technique used for isolation natural compounds – High Performance Counter-current Chromatography (HPCCC) and animal model of anxiety (<i>Danio rerio</i> – zebrafish) is unique and innovative tool for new natural „green” anxiolytics.</p> <p>Acknowledgments:The work was financed from grant NCN no UMO-2017/25/N/NZ7/01899</p>
21.	<p>Kukula-Koch W.¹, Czernicka L.², Koch W.², Tarabasz D.¹, Urjin O.³, , Angelis A.⁴</p> <p>•The Application of Different Modes of Operation in the Centrifugal Partition Chromatography (CPC) Based Isolation of Natural Products</p> <p>¹Medical University of Lublin, Poland, Chair and Department of Pharmacognosy with Medicinal Plants Unit, 1 Chodzki str., 20-093 Lublin, Poland</p> <p>²Chair and Department of Food and Nutrition, Medical University of Lublin, 4a Chodzki Str., 20-093 Lublin, Poland</p> <p>³School of Pharmacy, Health Sciences University of Mongolia, 3 Zorig Street, 14210 Ulaanbaatar, Mongolia</p> <p>⁴Department of Pharmacognosy and Natural Products Chemistry, Faculty of Pharmacy, National and Kapodistrian University of Athens, Panepistimioupolis Zografou, Athens, Greece</p> <p>virginia.kukula@gmail.com</p> <p>Introduction: Centrifugal partition chromatography (CPC) is a type of counter-current chromatography (CCC), and the advanced form of liquid chromatography (LC) developed in 1964 and since then used for the separation and purification of compounds (mainly of herbal origin). It offers several advantages in terms of operation, including no need for the solid sorbent (the separation is performed between two immiscible solvent mixtures, one of which plays the role of a stationary phase and the other – a mobile phases), low operation temperatures, a wide range of separating solvents to be applied, low operational costs due to reagent grade purity of solvents required for the analysis, or an easy up-scaling protocol, which enables its application in industrial volumes. Typical CPC devices are constructed from a group of cable channels combined in a cascade, located in the cartridges forming circles around the rotor. When the rotor is in motion, the system is</p>

subjected to continuous centrifugal force and (by the action of pump) the mobile phase flows through the stationary phase. Several operating modes are possible when using CPC: ascending and descending modes, gradient modes, elution-extrusion mode or dual mode. Some of them will be explained during the presentation. The fractionated mixtures within the separation process are divided between the mobile and the stationary phases based on the differences in their partition coefficients. Distribution of the substances dissolved in the sample between the two liquid phases, on the basis of their partition coefficient values, is essential for the CPC separation. That is why the selection of isolation parameters such as the choice of solvent system, flow rate, operation mode and rotation speed are of the highest importance in the process of method optimisation.

Tasks: The aim of the lecture is to discuss about the capabilities of the hydrostatic counter-current chromatography (known as centrifugal partition chromatography – CPC) in its different operation modes and its application in the isolation protocols of plant derived secondary metabolites of pharmacological significance. Particular attention will be paid to polyphenols and alkaloids which were found by the authors to deliver Central Nervous System activity. This particular activity is of high interest these days. The World Health Organisation underlines an alarming evidence of an increased incidence of civilisation diseases, among which the disorders of the Central Nervous System play a leading role. In particular the anti-ageing properties of the isolated compounds will be discussed, including the detailed description of the evaluated *in vitro* bioactivity assessment protocols, like monoamine oxidase inhibitory properties determination, acetylcholinesterase inhibition and antioxidant assays. Some of the tests will be performed on the total extract or fraction of several compounds with no need for their isolation from the mixtures, but still using tests which give the capability to assess the pharmacological potential of a compound inside a mixture (hyphenated techniques like TLC-LC-MS or TLC-bioautography).

Methods: During the lecture the selection of the biphasic solvent systems composition will be discussed. Several models present in the scientific literature will be addressed (e.g. Arizona system), but also classical approach related to the titration methods applied in the search for biphasic mixtures composed of three or four solvents will be addressed (e.g. Sorensen diagrams). The lecture will show different operating protocols to purify single components of different chemical character, e.g. pH-zone refining chromatography applied in the analysis of isoquinoline alkaloids, or gradient separation for closely related phenolic compounds.

TLC-bioautography and TLC-LC-MS platforms will be discussed for their selectivity, sensitivity and success rate in the search for monoamine oxydase inhibitors, acetylcholinesterase inhibitors and free radicals' scavengers.

Also, a modern approach related to the application of bioreactors joined directly to the chromatograph prior to the inlet into the mass spectrometer will be presented. This

	<p>particular approach offers the possibility to directly screen the mixtures of secondary metabolites for their enzyme inhibitory properties and trace on the ion chromatographs the compounds which changed their m/z ratio after contacting the enzyme.</p> <p>Results: Details on the separation conditions, preparation of biphasic solvent systems and apparatus settings will be presented to discuss about the efficiency of separation procedures in the recovery of plant derived secondary metabolites known as antioxidants, e.g. from turmeric, horse chestnut, and barberry shrubs and or selected Zingiberaceae representatives. The elaborated isolation and bioactivity assessment protocols are of high value also for the industrial applications. The isolates were characterized by a high purity (exceeding 95%) obtained directly after an injection of the crude extract on a rotating column and often with no other step needed to increase their purity afterwards.</p> <p>Conclusions: CPC is a powerful time- and reagent- saving separation technique providing high purity natural products directly from crude extracts. CPC covers analytical, preparative and industrial scales and offers simple upscaling possibilities.</p> <p>Funding information: National Science Centre, Warsaw, Poland, Grant No: 2015/17/D/NZ7/00822; The National Centre for Research and Development Grant No 4/POLTUR-1/2016; Funding for Young Scientists, Medical University of Lublin Grant No: MNmb48.</p>
22.	<p>Abzianidze E.</p> <p>•Genomic Education for the Next Generation of Healthcare Professionals in TSMU: Key Messages / Core Ideas</p> <p>Tbilisi State Medical University, Department of Molecular and Medical Genetics eabzianidze@tsmu.edu</p> <p>Knowledge of the human genome and its impact of genetic mechanisms on human health and disease has tremendously expanded in the past decade. Rapid advances in genomic technologies combined with dramatic reductions in cost and a growing number of clinical genomic tests are have transformed medical practice. While expectations about applications of precision medicine is high, the existing clinical genetics battlefield is insufficient to meet present demands and will fall increasingly short as the use of genetic and genomic testing becomes more routine. The time has come for rapid growth of genetic and genomic services, but to outline these opportunities, we need to consider various educational mechanisms to approach professionals working in the field of genetic counselling and medical genetics as well as including nurses, physician assistants, and nongenetics physicians. Thus, undergraduate medical students need a solid foundation in genetics and genomics so they can apply genomic medicine across a range of specialties.</p>

	<p>In Georgia, Tbilisi State Medical University (TSMU) is one of the oldest higher education institutions in the whole Caucasus region. Here, in mid 90s, teaching of molecular and medical genetics gains priority and in past twenty years much work has been done in order to develop and teach genomic medicine in Georgia. We reviewed the literature in genetics and genomic medicine education and training at the undergraduate, graduate, and continuing medical education levels within the TSMU, in order to identify current trends and challenges in genomic medicine education in Georgia.</p>
23.	<p>Janikashvili N.¹, Odisharia K.², Odisharia V.³, Tsereteli P.⁴</p> <p>•Mathematical Models of Immunopathogenesis and Immunotherapy of Rheumatoid Arthritis</p> <p>¹ Tbilisi State Medical University ² Sokhumi State University ³ Iv. Javakhishvili Tbilisi State University ⁴ N. Muskhelishvili Institute of Computational Mathematics n.janikashvili@tsmu.edu</p> <p>Exploitation of pathogeneses of immune mediated disorders represents a critical task for their therapeutic management. Effective monitoring of immunopathological mechanisms in individual patients is of cardinal importance for the accurate diagnostics and the choice of personalized treatment. Currently, personalized care is the central focus of pharmaceutical companies and the clinics. However, it demands the long-term clinical trials requiring expensive experimental bases and, therefore, creates a high economic burden to the state. Whence, mathematical modelling of immunopathogenesis and immunotherapy represents an innovative area of investigation in the biomedical field. Such models function as alternatives to the experimental biomedicine. Mathematical models of immune mediated disorders provide an analytic framework in which we can address specific questions concerning disease dynamics and the treatment outcomes.</p> <p>We present a novel mathematical model that describes the immunopathogenesis of one of the most common autoimmune disorder - rheumatoid arthritis. The model represents a system of non-linear differential equations which describes the interaction of immune elements in patients with rheumatoid arthritis. Of importance, our model provides a mechanistic interpretation of personalized immunotherapeutic intervention. Software products are being developed for solving these mathematical tasks.</p>

	<p>Implementation of the present mathematical model and the corresponding software in clinic will significantly minimize the needs of experimental trials while supporting the effective use of targeted pharmaceutical agents.</p> <p>References:</p> <ol style="list-style-type: none"> 1. K. Odisharia, V. Odisharia, P. Tsereteli, N. Janikashvili. On the Mathematical Model of Drug Treatment of Rheumatoid Arthritis. In: Jaiani G., Natroshvili D. (eds) <i>Mathematics, Informatics, and Their Applications in Natural Sciences and Engineering. AMINSE 2017. Springer Proceedings in Mathematics & Statistics</i>, vol 276. Springer, Cham 2019 2. L.G. de Pillis, A.E.Rudinskaya, C.L.Wiseman: A Validated Mathematical Model of Cell-Mediated Immune Response to Tumor Growth Cancer, <i>Cancer Research</i>, 65 (2005), 7950-7958. 3. M.A. Benchaib, A. Bouchnita, V. Volpert, A. Makhoute. Mathematical Modeling Reveals That the Administration of EGF Can Promote the Elimination of Lymph Node Metastases by PD-1/PD-L1 Blockade. <i>Frontiers in Bioengineering and Biotechnology</i>. 14;7:104. doi: 10.3389/fbioe, 2019 4. M. Samson, S. Audia, N. Janikashvili et al. Inhibition of Interleukin-6 Function Corrects Th17/Treg Cell Imbalance in Patients with Rheumatoid Arthritis, <i>Arthritis & Rheumatism</i>, Vol. 64, No. 8, August 2012, pp 2499–2503
24.	<p>Kocharyan S.</p> <p>•The Main Aspects of Scientific Research Projects Management by YSMU Grants Success Example</p> <p>Yerevan State Medical University, Republic of Armenia</p> <p>Research management is a global challenge for world universities given the certainty that high education institutions are ranked by their research performance. It is an increasingly demanding task to perform by research managers and administrators. On the one hand it requires wide spectrum of international activities and adherence to world developments, on the other hand there are strongly embedded local standards that are difficult to be disregarded.</p> <p>In recent years Yerevan State Medical University (YSMU) research management mechanisms have undergone significant changes in terms of working with the government, international funds, as well as the beneficiaries in the name of the University infrastructures: laboratories, faculties and chairs.</p>

Horizon2020, the largest EU research funding program has an exclusive role in the reformation of research management strategies. The work of the system of Horizon2020 National Contact Points and the consultancy provided to individual researchers and research administrators have been greatly impactful and have led the research management infrastructure to a more focused and efficient way of working with beneficiaries.

In the meanwhile, the research interests and, more importantly, the research focus area have become more targeted. The daily work and close cooperation with local beneficiaries and international partners have to a certain extent influenced the target of research interests making the research topics highly demanded from the point of view of international research funding requirements.

Following the global shift towards making research outputs more open and accessible, YSMU strives to apply the principles of open science and encourages dissemination and communication activities for the projects implemented within YSMU. The adoption of the culture of organizing series of international conferences, seminars, inviting visiting professorships and Nobel Laureates is a great motivation for young researchers to get involved in research. YSMU also encourages researchers to publish in international journals with impact factor to ensure more impactful research and a more visible research infrastructure.

All these processes lead us towards efficient collaborations and as a consequence a targeted long-term research goals are set which we hope to reach through the implementation of 4 internationally funded projects.

One of them is a Horizon2020 Twinning project “COBRAIN-Armenia Center for Translational Research on Chronic Neurodegenerative Disorders: A Neuroscience Initiative on Maintaining Healthy Brain Ageing”. This project aims to enhance the research and innovation capacity of the University through strengthening the field of brain research.

The seconded successful project is funded by the Competitive Innovation Fund of “Education Improvement” in cooperation with the WORLD BANK. It will support YSMU to establish a scientific-educational center for brain research.

Another 2 grants are obtained from ERASMUS + CBHE: MINERVA project aims to strengthen research management and open science capacities of HEIs in Moldova and Armenia. ARMDOCT project will reform doctoral education in YSMU and other HEIs of Armenia in line with needs of academia, industry and current EU practices.

These developments play a significant role in strengthening the research and education potential and raising the visibility of the University in the List of high-ranking world universities.

<p>25.</p>	<p>Karalashvili L.¹, Kakabadze Z.¹, Chakhunashvili K.¹, Kakabadze M.²</p> <p>•Developing Bioactive Hydrogel and Their Use in Chronic Wound Treatment</p> <p>¹Tbilisi State Medical University, ²Tbilisi State University likakaralashvili@gmail.com</p> <p>Introduction. The early and effective treatment of wounds is vital to ensure proper wound closure and healing with appropriate functional and cosmetic outcomes. Recently, various hydrogel biomaterials have been explored for many applications in regenerative medicine, including as delivery vehicles for drugs, proteins, and living cells [1. 2. 3]. This study presents new biologically active hydrogel development method, which is comprised of decellularized human amniotic membrane and freeze-dried bone marrow stem cells.</p> <p>Materials and Methods. To create hydrogel soluble human amniotic membrane was diluted with Hyaluronic Acid Hydrogel (HyStem®-HP Hydrogels). Experiment was executed of 30 Lewis inbred rats, which had radiation wound models (60 Gy).</p> <p>Results. After 20 days the damaged area was resected and a wound with size of 2x3 cm was created. The first group (n=15) was treated with our bioactive hydrogel. The second group was a control group (n=15). Conclusion. The studies showed that in the first group the wound regeneration and healing was much faster and this was mainly attributed to vascular neogenesis and high proliferation activity in the epidermis.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Murphy SV, Skardal A, Atala A. Evaluation of hydrogels for bio-printing applications. J Biomed Mater Res Part A 2013; 101:272–284. 2. Fraser JR, Laurent TC, Laurent UB. Hyaluronan: Its nature, distribution, functions and turnover. J Intern Med 1997; 242:27–33. 3. Toole BP. Hyaluronan in morphogenesis. Semin Cell Dev Biol 2001; 12:79–87.
<p>26.</p>	<p>Balanchivadze I.</p> <p>•The Role of Inclusive Education in Preschool Institution</p> <p>Akaki Tsereteli State University iagor.balanchivadze@atsu.edu.ge ibalanchin@gmail.com</p> <p>New standards for early childhood and preschool education contribute to the comprehensive and full development of children. Quality preschool education is the foundation upon which the next stage of education should be based. For the development</p>

	<p>of early childhood and preschool education and training institutions, it is necessary to timely identify the needs of children with special educational needs (SENs) and engage them in inclusive education. Timely development and implementation of individualized curriculum is facilitated by child development.</p> <p>We started incorporating children into inclusive education for a number of years and compared it to the control groups. We conducted a study aimed at identifying delays in preschool children development and developing methodological ways of overcoming them. To assess preschool children, we used a preschool assessment form, developed jointly by the Ministry of Education and Science and the National Curriculum and Assessment Center; We regularly monitored activities to engage children with special educational needs. Our team at SEN has introduced an Individualized Curriculum (IC) for children.</p> <p>We have developed pedagogical approaches that have led to the development of children with special educational needs. From our work, we have obtained the following results: For example, the cognitive field - the average success rate for children involved in inclusive education is 33% and for children in control kindergartens 18%. The average increase in speech development among children involved in inclusive education is 45%, and that of children in control kindergartens is 19%. As for literacy with children involved in inclusive education, the average increase is 33%. This is an average of 16% for children in control kindergartens, as well as in other areas.</p> <p>From the results we can conclude that the sooner an infant is diagnosed with developmental disabilities and their needs are identified, the greater their ability to develop their skills. A timely individualized curriculum helps develop the child, reduce problems later on, and prepare for school.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Berkey L., - Child Development, Tbilisi, 2010. 2. Dolidze Kh, Tsintsadze N., Kukhalashvili T., Jijavadze N., Balanchivadze I., Grigolia I., Abakelia N., - Nursery School Teacher Guide, Tbilisi 2015. 3. Tsintsadze N., Dolidze Kh, Mary Alicia Moran - Early Inclusive Education Tbilisi, 2019 <p>Pachkoria Tatia, Chincharauli Tinati, Lagidze Anna - "Inclusive Education", Tbilisi, 2011.</p>
27.	<p>Makaradze N., Shamilishvili I.</p> <p>■Importance of Student’s Load Regulation</p> <p>Batumi Shota Rustaveli State University, Faculty of Humanities</p> <p>The main challenge for any parent is to raise an educated, versatile child and to develop the skills necessary for transferring knowledge in practical life context. Due to a shortage of time or insufficient competence, most parents try to achieve these results through</p>

private schools. From their side, in order to justify parents' wishes and trust, private schools strive to increase school curriculum load maximally and, within the framework of educational standards or extra service, offer more and more subjects and services. As a result, most private schools have 7-8 hours of school day, which is the best solution for both busy parents and those with a focus on providing their children with versatile skills and see the solution in a private school. Moreover, the priority and competitiveness of private schools largely depends more on these issues rather than on the quality of teaching and learning. Though parents very often are well aware of the problem, they try to justify their choice, and consequently, the child, regardless of age, desire or ability, gets used to this overloaded school and parent-centered regime, which in turn affects both student motivation and the quality of learning. Besides, in addition to schoolwork, a student from any type of school has homework, that, in case of much amount, makes him/her incapable. Based on the results of the studies, it is necessary to control students', especially primary school students' study load at private schools. While establishing the study schedule the age characteristics of the students should be considered in collaboration with the relevant specialists, in order to find optimal ways and means of solving the problem.

28. Makaradze N.

•Safe School and Effective Disinfection

Tegeta Academy

School safety is one of the top priorities of Georgia. The Ministry of Education and Science of Georgia strives to increase safety in schools in several ways: dividing the teaching process in in different levels, establishing a school resource officer system, installing of surveillance cameras, etc.

According to the educational institutions' authorization standard, „the standard is met if the institution protects the safety and health of staff and students, for which there are:

- f. a) fire safety mechanisms and firefighting equipment;
- f. b) evacuation plan placed in a visible place;
- f. c) medical assistance mechanisms;
- f. d) mechanisms of guaranteeing school rules and regulations protection (Article 7, paragraph „f“, subparagraph „f. a“, „f. b“, „f. c“, f. d).

The existence of a standard and authorization procedure is a supportive factor for the school safety, but on the other hand, it is interesting whether at least one simulation exercise has been conducted in schools regarding fire or earthquakes; whether students, teachers and other school staff can read the evacuation plan which should be created according to the requirements; Who provides medical assistance to the school community

at school - a (professional) doctor who works on the extremely low salary, nurse, or school psychologist.

Unfortunately, nothing is mentioned about protecting and empowering hygiene standards in in the educational institution authorization standard when inadequate sanitary conditions have a negative impact on pupils' health, motivation to study, school attendance rates and learning outcomes.

Undoubtedly, school administration should provide suitable sanitary-hygienic conditions. However, this issue remains a pressing issue in both public and private schools (perhaps it is enough to remind that there is no hot water, soap, napkins, etc. in the toilets).

The National Center for Disease Control also provides with recommendations regarding the disinfection of the school facility to ensure sanitary and hygiene. For example: "In an epidemiologically unreliable time, disinfection process should be focused primarily on the items that have a critical role in transmitting the infection (often touchable surfaces, doors, door and window handles, table surfaces).

In order to prevent the spread of air-borne infections, child rooms / classrooms (at all breaks) should be frequently wet-cleaned from dust.

To prevent the spread of intestinal infections, proper disinfection of utensils, dining room surfaces, and sanitary-technical equipment is essential. "

Simply, there are questions:

- Are resource centers able to supply schools with disinfectant liquid?
- Who do public and private schools obtain disinfectants from and are they tested for effectiveness?
- Can all schools afford quality liquid?
- Do school cleaners manage daily disinfection?
- Is disinfection done correctly during the epidemic?
- and most important - who disinfects and who takes responsibility for its consequences, and etc.

Responses to disinfection results in the first place are likely to be required of those responsible for cleaning who have neither training nor retraining. It is interesting to know, without competence, how well the disinfectant is managed properly and how much the school doctor/nurse/psychologist's recommendations are sufficient.

According to the results of the study, we think that taking interest of this issue and introducing special training courses for school teachers will be a timely challenge for the institutions implementing vocational education programs and it will be the best way for schools.

29 Kobuladze N., Orjonikidze N., Edzgeradze L.
•University Services to Raise Awareness of Healthy Living at Schools

Akaki Tsereteli State University, Head of Continuing Education Center
nato.kobuladze@tsu.edu.ge

One of the important directions of the Ministry of Education, Science, Culture and Sport of Georgia is to promote healthy lifestyle in public schools.

The Healthy and Safe School Concept Strategy provides students with a healthy living. An important part of the strategy is to raise awareness among students and youth about healthy and safe living.

For this purpose, the Akaki Tsereteli State University Continuing Education Center provides various educational training courses for students, students, school teachers and medical professionals.

The Center has developed and implemented the following training courses:

1. Primary Medico-Sanitary Assistance to Children
2. Safe Reproductive Services, Safe Abortion (With the initiative and support of the Association Hera 21).
3. Developing a summer school for pupils and students.

Research Methodology: Theoretical and empirical research methods were used. Observation, comparison, analysis, synthesis, induction, deduction.

Results and Conclusions: In cooperation with the Faculty of Medicine and Continuing Education Center of the University, there are now seminars on measles and influenza virus in 10 public schools of Kutaisi. The seminars are organized by students and staff of the Faculty of Medicine to prevent the health of school children. These services are growing and available for Imereti public schools and other educational institutions.

The article will present statistics, achievements and challenges of implementing this service.

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Abdaladze L.¹, Akhvlediani M.², Adeishvili V.²

•About Health Conditions of Ozurgeti Theological Seminary Pupils of Guria -Samegrelo Eparchy in the Second Half of the 19th Century

¹Shota Meskhia Zugdidi State Teaching University

²Akaki Tsereteli State University

abdaladzelali@gmail.com

	<p>Introduction and Research Purpose: Our study presents the state of health of pupils at the Ozurgeti theological seminary of Guria-Samegrelo Diocese of the second half of the 19th century, according to archival documents (1: K.C.A. F.5 N 228, P.24;27) obtained from the Kutaisi Central Archive.</p> <p>The archive documents provide statistical information about the illness of the pupils of the Ozurgeti Theological Seminary of Guria-Samegrelo Diocese, the diseases prevalent in that era and the rules for their treatment.</p> <p>The result of the audit in the reporting year of the Ozurgeti Theological Seminary conducted by V. Vasiliev, a member of the Kutaisi Theological Seminary, is the report of the Kutaisi Theological Seminary to its Bishop Alexander, Bishop of Guria-Samegrelo.</p> <p>The report presents audit reports, recommendations, and conclusions discussed at the May 18 meeting by the Kutaisi Theological Seminary Board.</p> <p>Ozurgeti Theological Seminary Supervisor Report for 1898-99, together with educational programs, academic performance, financial and economic issues, provides detailed information on out-patients in Ozurgeti. It is noteworthy that Lazareti was not at the Ozurgeti school and medical assistance was provided to students at the Feldscher School, and in case of serious illness, the doctor was invited. The medicines were given to the students at the pharmacy with the money allocated by the clergy organizations of Ozurgeti Training District.</p> <p>Research Methodology: Theoretical and empirical research methods were used. Observation, comparison, analysis, synthesis, induction, deduction.</p> <p>Results: We think our research is of interest to researchers in the medical field who are interested in comparative morbidity studies, types of student illnesses, their incidence, and so on.</p> <p>Conclusions: Ozurgeti Theological Seminary is one of the interesting papers in the history of religious and pedagogical thought. The archive material about it not only informs us about the specifics of the school's work, but also gives us an opportunity to see other important epochal problems in a very interesting light. We think that the information presented by us is of interest to researchers in the history of medicine in Georgia as well.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Central Archives of Kutaisi. F5 # 228, P. 24 2. Central Archives of Kutaisi. F5. # 228, P. 27
31	<p>Kurdadze I.</p> <p>Teaching Environmental Issues at High School as One of the Most Important Directions of Healthy Life</p> <p>Samtskhe-Javakheti State University</p>

irmakurdade@gmail.com

Teaching environmental issues in high school is one of the priority directions today, which is confirmed by the strengthening of environmental education issues in Bachelor/ Master programs.

The goal of environmental education is to change the relationship between human and the environment, taking into account human values. That is why environmental education should be based on those philosophical guidelines that will help ensure a sustainable future for the country and focus not only on knowledge and skills, but also on environmental / sustainable approaches, values and actions; Must be holistic and interdisciplinary; It should be based on the principle of "lifelong learning"; Must promote tolerance for diversity in and out of the environment (Environmental Education for Sustainable Development. National Strategy and Action Plan of Georgia, Tbilisi, 2012)

It is noteworthy that the Ministry of Environment of Georgia, together with the Ministry of Education, Science, Culture and Sport, actively supports environmental education - National Action Plan (Ministry of Environment and Natural Resources of Georgia, 2010). As evidenced by the integration of environmental issues into the natural and social sciences envisaged by the National Curriculum.

Accordingly, Samtskhe-Javakheti State University Elementary School Teacher Training Program (300 credits) places great emphasis on Integrated Natural Sciences courses: Integrated Natural Sciences 2 (Elements of Geography and Astronomy), Natural Sciences Proper understanding and teaching of RSI 3 (Elements of Physics and Chemistry) in line with the "New School" model of successful reform in the country.

With these approaches, the courses in natural science present an interdisciplinary vision as a complex tool for bringing up and educating the healthy generation.

Targeted concepts in integrated courses in natural sciences are developed on the basis of indigenous representations in the context of various issues and topics. Interdisciplinary teaching strategies are a prerequisite for nurturing a healthy life in students.

The methodology used in the course is based on a practice component, where the practical study of the issues is carried out in a pedagogical practice - students observe environmental issues and develop professional skills in their pupils - their opportunities for healthy life-span and scope.

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1. New School Model, National Training Department of the Ministry of Education, Science, and Culture, Tbilisi, 2019
2. Ministry of Environment Protection and Natural Resources of Georgia, National Action Plan 2010.

	<p>3. “Environmental Education for Sustainable Development” - Approval of the National Strategy and Action Plan for 2012-2014, Government Decree No. 980, 24 May 2012.</p>
<p>32.</p>	<p>Maglakelidze Sh., Malazonia D., Malazonia T., Pkhaladze T.</p> <p>Interactions, Results, and Significance of Education and Health</p> <p>Ilia State University Shorena_maglakelidze@iliauni.edu.ge</p> <p>Introduction and Research Purpose. Education and health are two important characteristics of human capital and the necessary condition for its existence. Education feedback surveys show that high results of education bring social prestige and better health (Grossman, 2005). Because: 1. Education creates opportunities for health improvement (better job, high salaries, resources for good health. 2. Poor health puts risk to education. (application of psychotropic medicines, sleep disorders, psychic problems, asthma, bad vision, etc.) 3. Living conditions (starting from early age), may affect both education and health (social-economic factors, poverty, education of parents, activity, etc.).</p> <p>The studies demonstrate significant increase of the relation between education and health. Individuals with no high school education, have poorer health, than college graduates (<u>S. Jay Olshansky</u> <u>Toni Antonucci</u>, etc). The existing disproportion between these two groups reached from 23% to 36% in 1972 and 2004. (Goldman D, Smith JP. 2011).</p> <p>The purpose of our research is to demonstrate the status of the following in Georgia:</p> <ol style="list-style-type: none"> 1. Impact of education on health 2. How does the health affect education (feedback) 3. Influence of living conditions on health and education. <p>Research methodology. The research was conducted using the material received from insurance companies (according to our questionnaire) and various official statistical data.</p> <p>Results. The study demonstrated that in Georgia:</p> <ol style="list-style-type: none"> 1. High level of education, solid incomes enable the universities and different state, private and foreign companies to take care about the health of their employees and offer them the service of private insurance companies with high insurance premium. As of 2019, 15% of population is using the service of private insurance companies in Georgia. Their insurance package varies between 80-100%. 2. We can judge about negative influence of health on education based on child illness indicators, that may be hindering students’ full engagement in learning process (disorders in blood, immune system, psychic and behavioural disorders, disease of the nervous system, etc.)

	<p>3. Among contextual factors, influencing the education and health during the whole life, bad social -economic conditions can be distinguished, leading to widespread use of child labor. 4.2% of 5-17 age children are engaged in child labor, high education level in parents using the child labor is rarer, than in parents of non-working children.</p> <p>Conclusions. It can be concluded that, the level of education in Georgia is high (more than 26000 students graduate university), employment is very low (if not to include self-employees, income of the majority of which is not that high). The share of socially vulnerable people is also high. With low income it is difficult to think of good education, best medical insurance, and healthy life style.</p> <p>References</p> <ol style="list-style-type: none"> 1. Cutler D., and Lleras-Muney A. <i>Education and Health</i>. In: Anthony J. Culyer (ed.), <i>Encyclopedia of Health Economics</i>, Vol 1. San Diego: Elsevier; 2014. pp. 232-45. 2. Olshansky SJ, et al. Differences in life expectancy due to race and educational differences are widening, and many may not catch up. <i>Health Aff</i> 2012; 31:1803-13. 3. Goldman D, Smith JP. The increasing value of education to health. <i>Soc Sci Med</i> 2011; 72:1728-37. 4. საქართველოში ბავშვთა შრომის ეროვნული კვლევა, 2015 ანალიტიკური ანგარიში, თბილისი, 2016 წელი.
33.	<p>Gurgenidze M., Shervashidze G., Mamuladze N.</p> <p>•The Support to Pupils in Socio-emotional Formation at School Environment</p> <p>Batumi Shota Rustaveli State University; Faculty of exact science and education; Department of Pedagogical Sciences;</p> <p>Child’s organism reacts actively on any negative or positive factors that comes from external world. The frequent and strong influence of these factors change the child’s somatic physical psychic moral health and therefor it influences the idea and speed of child’s formation as a social person and development.</p> <p>It is necessary to say that bad influence on health has a lot and negative reasons that exist in the world and in social and studying environment. It is very important to think of and take care about creating emotionally stable environment and also the development of the skills to how to deal with emotions and formation of socio-emotional environment.</p> <p>Socio-emotional sphere defines the characteristics of child’s personal features and relationship with social members. Emotional development defines child’s skill to be able to realize and express emotions, understanding and reacting on others’ emotions. Social</p>

	<p>development defines the child’s skill to make relationship that is acceptable with the given environment.</p> <p>According the researches there are problems about dealing with emotions and conflict situations and not social habits. The reason lies in that there is lack of attention in development of child’s socio-emotional habits and skills and decreasing the stress factors. In order to make young people emotionally stable and forming him as a social person it is very important to act together with school principal, psychologist, teacher and doctor at the same time. They should find out the reasons of child’s unpleasant behaviour and should find some preventive ways to solve the problems together. According the researches the percentage of competence in these areas are lower than 70 percent of parents and 35 percent of teachers. The teachers and parents need to be acquired knowledge and awareness about given problems.</p> <p>At schools, still there is the problem creating positive school environment. For the young child’s emotional stability, it is very important to make the environment hygienically clean and safe, oriented on the pupils’ emotions and mood. All processes that happen in schools should be depended on the democratic values.</p> <p>The role of effective teaching, fair, love of the teacher, the cooperation of the teacher and the parent, teachers’ private examples, and healthy communication among pupils is unchangeable.</p> <p>They interaction between students and the teacher, between student and student during the brake time, is also very important. Therefor it is important to choose the duration of the brakes after lessons and creating appropriate environment.</p> <p>Children’s emotional sphere is affected badly by bullying at schools. School must provide the infrastructure to decrease the bullying factors.</p> <p>Moral development and awareness of discipline is one of the ways to decrease the reasons of emerging negative emotions during the studying process. It helps to develop to control emotions, steadiness and skills to give up in difficult situations. It is very important to develop the skills of self- esteem, self – estimation, self-control, self-expression, teaching adaptive social behaviour with the appropriate strategies. All these is the issue of the government to think about.</p> <p>Effectively organized studying process and healthy communications, form the right values, increases the quality of the academic performance and strengthens positive behaviours.</p>
34.	<p>Putkaradze N., Tavdgiridze M.</p> <p>•Inferior Education and Risk Factors Containing Life Threat</p> <p>Batumi Shota Rustaveli State University</p>

	<p>The Education Program of Georgia envisages providing equal opportunities for all children to receive an education. Schools must have the appropriate environment and conditions to support efficient education, and teachers must have teaching/learning competencies.</p> <p>The urgent issues of the 21st century are a healthy lifestyle and health-promoting factors. The development and civilization of the world have many difficulties, whether it be widespread diseases, natural disasters or various kinds of disasters. The number of infections, viruses, and illnesses is increasing day by day. These risk factors are closely linked to nature, the harm of which poses a serious threat to the environment and human health. It is imperative to meet the global problem, which requires efficient education.</p> <p>Modern schools teach human health, health care and first aid in a short, general course in biology, sociology, and nature, which is not enough. These topical issues should be taught separately at schools. The program should focus on the introduction of a healthy lifestyle and the providing of first aid in a force majeure manner, which will significantly increase the life expectancy of a person.</p> <p>Studies carried out by us at Batumi Republican Hospital and Batumi Health Center Medina Ltd show that 30 percent of patients with insufficient first aid was in poor health condition, some of the facts were even fatal. Such cases occur in people under 30 years of age, as for elder patients who are more or less aware of the relevant issues, make right decisions in case of malfunction, emergency or other force majeure situation. Thus, people, who have passed a short course of medical treatment at schools, make right decisions, and those who did not receive first aid education were not reacting correctly at the emergencies.</p> <p>The results of the study once again show the necessity of studying healthy lifestyle, health care and first aid issues at schools.</p> <p>References:</p> <ol style="list-style-type: none"> 1. National Curriculum; 2. "First Aid", http://vet.ge/wp-content/uploads/2015/08/studentis-saxelmzgvanelo-pirveladi-gadaudebeli-daxmareba.pdf Tbilisi, 2015; 3. Usnadze Dimitri, "Child Psychology", Tbilisi, 2005; 4. Janashia Natia, Imedadze Natela, Gorgodze Sophie, "Theories of Development and Teaching", Teacher Professional Development Center, Tbilisi, 2008.
35.	<p>Balasaniani M.</p> <p>•Mastering of Ecological Knowledge and Skills in the Process of Teaching Foreign Languages</p> <p>Samtskhe-Javakheti State University amadani1@rambler.ru</p>

Ecological problems acquired particular actuality in the beginning of the XXI century. There is a lack of pedagogical literature about ecological upbringing and the issues of methodology and methods are less studied. It is essential to acquire new priorities for ecological upbringing. It should not be studied only at the Biology class but also at history, geography and foreign language classes. Integrated teaching courses give us opportunity to get ecological education not by a traditional - subject platform, but joining all the platforms.

We consider that for the future generations, for providing ecological knowledge and for developing practical skills, it will be productive to use the classes of foreign languages. It is very beneficial and interesting to introduce ecological themes in the teaching of foreign languages, because the themes about the wild world is rich in its context. It includes all fields of curriculum - science, history, geography, mathematics and art.

To prove the importance of teaching ecological topics at the foreign language lessons, we quote the words of Gazden: "The language is studied not only because to study reading, writing or speaking, but also to get know the whole world, write and read about it. It is important to introduce "real life" and "nature" to students. We give crucial role to the teaching methods in the providing of ecological materials, particularly so called "business activities". They aim to solve the social problems in the reflection of real situations.

We use pictures; visuals in performing new materials, which somehow stimulate students in the teaching process. Visuals should be used in the case of involving students in the active process that should be realized on the basis of foreign languages. In the process of teaching, various activities assist us to form and develop communication skills on the basis of already taught materials. On the first stage "business activities" serve to grasp the content, develop cognitive thinking and moral and aesthetic upbringing, but on the high levels of teaching they serve to solve social problems, develop critical thinking which takes the shape of the problem-solving activity that is followed by question "why?" (Why yes and why no).

During activities students' age, interests and abilities should be taken into consideration. To work on the new methodology requires qualification, patience and energy from the teacher. The teacher plays the central role in it, but the students have to grasp the content independently and solve the problems on already studied material.

We suggest some business and problem-solving activities, which we have used. These activities facilitate not only the teaching process, but also, they develop right skills and opinions to the students about the wild world.

I. The activity "which species will you save?" Class is divided into two groups. The teacher distributes two pieces of papers with endangered species (plants or animals|). Pupils are required to choose the most important species to save.

II. What do you know about?

The teacher distributes the plants of different species (raspberries, almond, rose, sweet berries...). Children must speak about them and about profit.

III. Our school yard. The children are to look around the school yard and find out how many trees or flowers are there around the school yard, if the yard is tidy or dirty and speak about what they like and what they dislike in their school yard.

The following level of teaching - problem solving activities are more complicated.

I. "What is the cause of the air pollution?" (big cities, country life). The class is divided into two parts and the pictures of a big city and country life are distributed among them. Children discuss positive and negative sides of living there and the causes of air pollution in big cities and in country life. Then they are required to find out the right way getting rid of air pollution.

II. "Problems in our country". Class is divided into groups, each group has his own observer, from abroad. They jot down the problems familiar to the exact country and they should give us the ways of solving these problems.

We tried to suggest the main points in the teaching ecology, its importance and some activities, that facilitate to study the materials on ecology.

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