YEREVAN STATE MEDICAL UNIVERSITY AFTER MKHITAR HERATSI

HORIZON 2020

Current Health Research Activities aimed at Upcoming Collaborations in the frames of Horizon 2020

IncoNet
Eastern Partnership

ARMENIA
2016

REVIEW ON YEREVAN STATE MEDICAL UNIVERSITY AFTER MKHITAR HERATSI

The roots of medical sciences date back to unknown times throughout the glorious history of Armenia and its nation. Higher medical schools in Armenia existed since untold times where medical sciences were taught together with the Philosophy and Natural Sciences.

Hence, the Armenian nation, having medical institutions and schools in Middle Ages, would think of establishing new ones if not renovating those remaining. Such opportunity was granted to Armenians during the period of the first Armenian Republic. After the disastrous and devastating calamities at the beginning of the 20th century there was urgency for qualified medical specialists and physicians as well as paramedical staff in Armenia.

The number of students having graduated from the University can safely be characterized as more than 31 thousand so far. Currently, there are about 5.500 students enrolled in the studies at seven faculties of Yerevan State Medical University after Mkhitar Heratsi; 1140 of them coming from different countries of the world. There are over 100 academic departments in the university structure, where academic and scientific activities are conducted – these workings are as well conducted in leading clinical facilities and research centers in Yerevan.

Currently, over 162 doctors of sciences and 481 PhD degree holders constitute the university faculty of 1100 professors. 264 members of the university faculty hold scientific degrees, seven academicians of RA National Academy of Sciences conduct scientific and academic workings in the University. 80 professors of medicine, 171 associate professors and 6 senior research officers are enrolled in the university teaching, scientific and clinical activities.

On 11-16 April 2016 Yerevan State Medical University hosted five Nobel Laureates under one roof in the frames of a unique scientific event "Nobel days in Yerevan" which was aimed at discovering facts about the scientific achievements worth sharing the Nobel heritage.

Three days on a row they will deliver public and specialized lectures aimed at discoveries put forward by Nobel Laureates, as well as their scientific achievements and exclusive successes. It is an unprecedented opportunity to see and hear what has changed the world and what has become worth sharing the Nobel heritage.

This event was a distinguished one ever organized in Armenia. It was the first opportunity for the experienced and young scientists, as well as for students of the region, to interact and get to know outstanding personalities who have been awarded the highest prize for scientific achievements. http://www.nobeldays.am/

On the subsequent pages we present priority scientific directions of the university, which can serve as a basis for our future cooperation within Horizon 2020.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *CARDIOLOGY*

1. Research Title:

MEGACARYOCYTES AND ACUTE MYOCARDIAL INFARCTION: PATHOGENETIC STUDY OF THROMBOGENESIS IN ACUTE CORONARY THROMBOSIS

2. Supervisor (Name, Surname, Position):

Hamayak Sisakian, MD, PhD, Professor
Chairman of Department of Urgent Cardiology

3. Background:

Acute myocardial infarction resulting in occlusion of coronary artery causes ST segment elevation myocardial infarction (STEMI). Plaque rupture enriched by lipids promotes thromboaggregation which limits the coronary artery circulation. Early fibrin formation stimulates platelet aggregation and blood coagulation, which is resulting in formation of red thrombus riched with erythrocytes and inflammatory cells. The morphologic evaluation of coronary thrombi cellular composition is an important step in understanding pathophysiology of unstable plaque and occlusive thrombus formations. Several cellular mechanisms play a key role in progression of local inflammation, platelets activation and thrombus formation. Percutaneous coronary intervention (PCI) is the main treatment strategy in patients with STEMI.
Our previous study demonstrated the presence of platelet and erythrocytes riched thrombi. But whether the platelets are activated and morphologically and physiologically ideally or not remained to be determined.
Totally 67 thrombi were collected which immediately washed with saline and fixed in formaline. The paraffin embedded material was serially sectioned, cut and mounted on glass slides at > 6 levels. The sections were stained with hematoxylin eosin for light microscopy. Fibrins definition was made by Picro-Malory s method. For definition of cellular components and activated thrombocytes peroxidase and antiperoxidase (PAP) immunohistochemical method was used with monoclonal antibodies to CD 4, CD 8, CD15, CD 63, CD105 with diaminobenzydin visualization (Spring Bioscience). The CD63 is a marker of platelet activation that is transported to surface after activation, which also modulates platelet spreading on immobilized fibrinogen.
Revealed CD 63 antibody activity in thrombi provide evidence that in the formation of thrombi activated platelets and megacaryocytes may play key role in the provoking mechanisms.

4. Keywords: *acute myocardial infarction, coronary thrombosis, megacaryocytes, thrombopoesis, activated platelets, CD63*

5. Research Aims & Objectives:

We suppose that megacaryocytes may be found in lungs and systemic circulation prior to and during clinical manifestation of acute myocardial infarction and contribute to the coronary thrombosis as key mechanism.
We aim to study the possible role of activated and reticulated platelets/CD63 and megacaryocytes in the formation of coronary thrombi in ST elevation myocardial infarction patients.

6. Materials and Methods:

CD 63 and megacaryocytes presence in the venous and systemic circulation bloods will be determined by blood immunohistochemistry analysis in patients with STEMI and controls with chronic coronary artery disease.
CD 63 and megacaryocytes distribution, concentration and morphology will be determined in pulmonary tissue in a series of hospital necropsies and relating the findings to respiratory and coronary thrombosis.

7. Expected Results:

Possible association of pulmonary megacaryocytes with coronary thrombosis in STEMI may show common coexistence of pulmonary and cardiovascular mechanisms of development of coronary thrombosis and megacaryocytes role in these processes. Possible association is that number of pulmoinary megacaryocytes may be increased as well as megacaryocytes fragmentation activated which in hypoxia may produce thrombogenesis. Identification of venous –pulmonary- circulatory megacaryocytes, CD63 distribution peculiarities may permit to find new mechanisms of activated platelets /megacaryocytes role in the pathogenesis of acute myocardial infarction.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *FORENSIC MEDICINE*

1. Research Title:

THE ROLE OF INSULIN-LIKE GROWTH FACTOR-1 IN THE DEVELOPMENT OF SUDDEN CARDIAC DEATH

2. Supervisor (Name, Surname, Position):

Mher Bisharyan, MD, PhD
Head of the Scientific-Practical Center of Forensic Medicine, Ministry of Health, RA

3. Team Background:

The research team is experienced in the medico-legal field. They have identified the most informative and appropriate biochemical and histological methods of study for the exact diagnosis of sudden cardiac death, the need of the same methods to obtain material from cadaver /Bisharyan M.S. et al. «The use of luminescence microscopy for diagnosis of sudden cardiac death due to ischemic heart disease in the forensic practice», The New Armenian Medical Journal: Yerevan, 2015, N 1, p. 83-89.
At the same time, IAG's content was determined in the pericardial fluid and blood serum. Proved that the amount of IGF in the blood serum of people who died from sudden cardiac death is significantly low compared to levels observed in the case of non-cardiac death /Bisharyan M.S. et al. Medico-legal diagnosis of sudden cardiac death due to ischemic heart disease with complex use of histological and biochemical methods of investigation. “Medical expertise and law” 2015. - 2. p. 29-32.
The results of investigations were published and presented in different conferences.

4. Keywords: *sudden cardiac death, insulin-like growth factor, histological, luminescent, immunohistochemistry, biochemistry*

5. Research Aims & Objectives:

We suggest performing a complex investigation of sudden cardiac death by using histological, morphometrical, toxicological and biochemical methods of examination.

6. Materials and Methods:

Early and late cardiac marker levels are considered to be detected in the blood serum from different topographical parts of body (blood from left ventricle cavity and femoral vein lumen) and in the pericardial fluid. Simultaneously insulin-like growth factor-1 level will be investigated in the abovementioned fluids by using enzyme-linked immunosorbent assay.
The terms of histological methods of samples taken from heart in addition to rutine investigation methods also include luminescent microscopy to reveal early ischemic changes in the heart and immunohistochemical examination on purpose to identify insulin-like growth factor-1 receptors in the heart.

7. Expected Results:

The comparison of the results of histological, biochemical and toxicological studies of human specimens during sudden cardiac death with the results of investigation of Insulin-like growth factor and binding proteins local and total amount, their receptors presence and localization could play a significant role in each particular case to clarify the unsolved issues of pathogenesis of sudden cardiac death, with further possibilities of prevention and treatment of the heart diseases.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *PHARMACOLOGY*

1. Research Title:

PHARMACOLOGICAL CORRECTION OF CEREBRAL ISCHEMIC DISORDERS IN RATS EXPERIMENTAL MODELS

2. Supervisor (Name, Surname, Position):

Marine Balasanyan, MD, PhD, Professor
Head of Department of Pharmacology

3. Background:

Development of new neuroprotectors for pharmacological correction of cerebral ischemic disorders one of the most important medical problems as stroke - most common life-threatening neurological disease, ranks as the third leading cause of death and first leading cause of serious long-term disability in the economically developed countries. One of the important risk factors of brain ischemic disorders is the movement restriction and physical inactivity. In previous studies (Hakobyan et al 1990-2012) it was demonstrated that experimental hypokinesia leads to morphological, pathobiochemical and functional changes typical for chronic ischemisation of brain tissue. Thus, experimental investigation of new compounds with ability to improve impairment of cerebral circulation under the condition of movement restriction and prevent ischemic brain disorders could be basic for development of new neuroprotectors.

4. Keywords: *MCAO, movement restriction, focal ischemia mesedin, PRP-1, pyridine nucleosides, Armenian flora plant origin substances*

5. Research Aims & Objectives:

For investigation of neuroprotective properties of some synthetic, endogenous and plant origin compounds in experimental models of local cerebral ischemia and under the condition of chronic ischemisation of brain tissue it will be studied effects of new benzodioxane derivative – mesedin, endogenous proline-rich peptide-1, uridine and cytisine nucleosides as well as extracts from Armenian flora plants on local cerebral blood flow, infarct size, neurobehavioral consequences of cerebral ischemia, motor coordination, memory and cognitive functions of rats.

6. Materials and Methods:

- ✓ modeling of local ischemia by Middle Cerebral Artery Occlusion in rats
- ✓ modeling of chronic ischemic disorders by rats movement restriction with several durations
- ✓ measurement of cerebral blood flow by Laser-Doppler flowmetry,
- ✓ assessment of neurobehavioral consequences of brain ischemia by Open Field and Elevated Plus Maze tests.
- ✓ evaluation of motor coordination disturbances by Rotarod test
- ✓ assessment of memory loss in passive avoidance conditioning
- ✓ infarct size evaluation by TTC staining
- ✓ characterization of cerebral microcirculation bed by Chilingaryan.

7. Expected Results:

Promotes investigations could:

- ✓ open perspectives for synthesis of benzodioxanes derivatives as a potential source for new neuroprotectors,
- ✓ obtain the role of endogenous proline-rich peptide-1 in defense mechanisms of brain protection from ischemic factors,
- ✓ suggest nucleoside-containing compounds and plant extracts as a safe substances for prophylaxis of cerebral circulation disturbances caused by physical activity limitation.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF
HYGIENE AND ECOLOGY

1. Research Title:

MEDICAL AND ECOLOGICAL PROBLEMS OF ENVIRONMENTAL NATURAL FACTORS ON TERRITORY OF RA FOR THE LAST 35 YEARS

2. Supervisor (Name, Surname, Position):

Armenuhi Kotanyan, MD, PhD
Associate Professor of Department of Hygiene and Ecology

3. Team:

Larisa Avetisyan, Sofya Mkrtchyan, Naira Khachikyan, Aram Hayrapetyan

4. Keywords: *climate, weather changes, maximum temperature threshold, chemical composition of drinking water, health status*

5. Research Aims & Objectives:

The aim of the following study is the hygienic evaluation of influence of natural environmental factors on health of population in Armenia in order to determine the major medical and ecological problems having been investigated through modern research methods for the last 35 years.

- ✓ To investigate climatic factors and define climatic zones based on influence on human health.
- ✓ To give hygienic evaluation of sharp changes of weather conditions, heat waves and their influence on human morbidity and mortality rate.
- ✓ To investigate chemical composition of drinking water and its possible impact on health of population.
- ✓ To investigate types of soils in RA and their biogeochemical peculiarities.
- ✓ To investigate prevalence of meteopathic reactions and factors, contributing their development.
- ✓ To work out preventive measures, directed at maintenance and promotion the population health.

6. Materials and Methods:

- ✓ statistical reports of: a) ministry of health, b) meteorological service, c) water resources administration center,
- ✓ questionnaires.

Method of hygienic investigation of environmental objects, surveys and screening-methods, statistical methods of data analyze.

7. Expected Results:

- ✓ Assessment of possible influence of:
  a) climatic and bioclimatic factors on the morbidity and mortality rates,
  b) heat waves on health status and death rates.
- ✓ Prediction of the average monthly mortality of population, conditioned by temperature factor.
- ✓ Prevalence of meteopathic reactions at different groups of population.
- ✓ Possible impact of chemical composition of drinking water on health of population.
- ✓ Prevalence of some diseases in population because of insufficiency of some microelements in the soil.
- ✓ Preventive measures, directed at maintenance and promotion the population health.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *HYGIENE AND ECOLOGY*

1. Research Title:

MAIN PROBLEMS OF STUDENTS' HEALTH STATUS, STUDYING AT DIFFERENT EDUCATIONAL ESTABLISHMENTS AND WAYS OF THEIR SOLUTION

2. Supervisor (Name, Surname, Position):

Larisa Avetisyan, MD, PhD, Professor
Head of Department of Hygiene and Ecology

3. Team:

Sofya Mkrtchyan, Susanna Kocharova, Naira Khachikyan, Amalya Simonyan, Armen Mkrtchyan, Armine Aslanyan

4. Keywords: *students' health status, students' psychological status, factual nutrition, educational establishment*

5. Research Aims & Objectives:

The aim is to work out a complex of measures, directed to the health maintenance and improvement, based on investigations, revelation and assessment of case-effect relations between social-hygienic status, factual nutrition and health status of the students, studying at different educational establishments of RA.

- ✓ To investigate: social-hygienic status of students, factual nutrition of students, psychological status of students, physical development of students, morbidity and health status of students.
- ✓ To reveal main problems of students' health status, studying at different educational establishments.
- ✓ To work out preventive measures, directed at students' health maintenance.

6. Materials and Methods:

To performance of this investigation it is required to choose different groups students from different educational establishments for conduction of surveys and medical check-ups.
Method of hygienic investigation of educational establishments, surveys and screening-methods, methods of physical development and health status assessment, methods of assessment of psychological status, statistical methods of data analyze.

7. Expected Results:

- ✓ social-hygienic characteristics of students,
- ✓ hygienic characteristics of factual nutrition of students,
- ✓ psychological status of students,
- ✓ physical development of students
- ✓ standards of physical development at different age-gender groups,
- ✓ health status of students,
- ✓ preventive measures, directed at students' health maintenance.

YEREVAN STATE MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *BRAIN RESEARCH*

1. Research Title:

THE INVOLVEMENT OF BONE MARROW DERIVED MONOCYTES IN CLEARING OF AMYLOID AGGREGATES FORMED IN ALZHEIMER'S DISEASE

2. Supervisor (Name, Surname, Position):

Konstantin Yenkoyan, MD, PhD, Professor
Vice-Rector for Science and Research

3. Background:

The most neurodegenerative states and Alzheimer's disease (AD) in particular are accompanied by neuroinflammation, which induced by brain microglia cells. In the damaged brain, on the one hand, microglia can orchestrate neurorestorative processes that are beneficial for neuronal recovery. On the other hand, microglia cells can also become disregulated and can produce high levels of pro-inflammatory and cytotoxic mediators that hamper neuronal repair and contribute to neuronal dysfunction and cell death. Apart from resident microglia, in the brain there are monocyte-derived macrophages, which under pathophysiological conditions, such as AD, autistic spectrum disorders (ASD), stroke, are mobilized from the bone marrow to the blood circulation and infiltrate into the damaged brain. However, aged resident microglia are less efficient than their circulating sister immune cells in eliminating Aβ deposits, which are very important features of AD, from the brain parenchyma, thus underlining the importance to further investigate the functions of these innate immune cells in AD.

Diseases of the central nervous system with an inflammatory component are characterized by the migration of bone marrow-derived monocytes into the brain where they differentiate into microglia, the "tissue macrophages" of the nervous system, bearing a therapeutic potential for certain diseases by transplantation of bone marrow-derived hematopoietic stem and progenitor cells.

4. Keywords: *Alzheimer's disease, microglia, bone-marrow derived monocytes*

5. Research Aims & Objectives:

The ***aim*** of current study is to find out the involvement of bone marrow derived monocytes in process of clearing of amyloid aggregates formed in Alzheimer's disease.

To achieve this goal we have to investigate the process of generation and further migration of monocytes into the different regions of brain in Aβ-induced neurodegeneration (experimental model of AD).

For this purpose the ***following tasks*** have to be solved:

- modeling of neurodegeneration *in vivo*,
- *in vitro* culturing of bone marrow cells,
- *in vitro* stimulation of myeloid progenitors to proliferate and differentiate into the cells of the macrophage/monocyte lineage,
- *in vitro* collection and labeling of monocyte colonies, with their further *in vivo* reinfusion into the amyloid treated rats,
- detection of bone marrow derived macrophages in AD target brain regions (hippocampus, frontal cortex, basal forebrain).

6. Materials and Methods:

- male albino adult rates, housed four per cage at 12:12 h light/dark cycle (08.00–20.00 h) and fed ad libitum,
- non-transgenic models of AD by chronic intracerebroventricular injection of commercially available Aβ1-42 fragments into rat brain during 4 weeks using ALZET osmotic pumps,
- bone marrow isolation from rats' femur and cultivation in granulocyte/macrophage colony-stimulating factor media,
- isolation and collection of monocytes' colonies from bone marrow culture and labeling them with BrdU,
- reinfusion of labeled monocytes in amyloid injected rats,
- immunohystochemical detection of labeled monocytes in different brain regions using $CD45^+/CD11b^+/Ly6G^-/CD115^+$ markers.

7. Expected Results:

- results of the study will figure out new insights on the involvement of bone marrow derived monocytes in process of neurodegeneration with focus on their generation and migration,
- study will give an opportunity for possible use of blood monocytes/macrophages for diagnosis and prognosis, as well as potential therapy and monitoring of neurodegenerative diseases such as AD,
- this project will serve a good background for international collaboration and may lead to future successful funding.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *BRAIN RESEARCH*

1. Research Title:

GLIA MEDIATED IMMUNE IMPAIRMENT AND BEHAVIORAL CHANGES AT EXPERIMENTAL MODELS OF AUTISM

2. Supervisor (Name, Surname, Position):

Konstantin Yenkoyan, MD, PhD, Professor
Vice-Rector for Science and Research

3. Background:

Autism spectrum disorders (ASD) are common heterogeneous neurodevelopmental disorders with typical triad of symptoms: impaired social interaction, language and communication abnormalities, and stereotypical behavior. Despite extensive research the etiology and pathogenesis of ASD remains unclear. The most "brain disease" are accompanied by neuroinflammation, which induced by brain glia cells. In the damaged brain glia cells play a dual role: can orchestrate neurorestorative processes that are beneficial for neuronal recovery or can also become disregulated and can produce high levels of pro-inflammatory and cytotoxic mediators that hamper neuronal repair and contribute to neuronal dysfunction and cell death.

Several reports link the presence of immunological dysfunction with autism, and some studies suggest that up to 60% of patients with ASD have various types of systemic immune dysfunction, as part of either cellular or humoral immune responses. Pathomorphological evidence of immunological reactions within the CNS, such as lymphocyte infiltration and microglial nodules was earlier reported. Several reports using different methods and small patient populations have shown increases in pro-inflammatory cytokines in peripheral blood samples in ASD. No widely accepted autism model exists up to date. It is important to emphasize that all the existing models are not models of autism but models for autism. Each of the existing models may help to reveal some of the crucial mechanisms involved in pathogenesis of autism. Anyway, the validity of the most of the models yet needs to be verified.

4. Keywords: *Autism, glia, CSF, modeling*

5. Research Aims & Objectives:

The aim of current study is to choose a model with the highest level validity and translational power, and test the hypothesis of glia-mediated immune impairment in autism.

For this purpose in different experimental models of autism the following tasks have to be solved:

a. testing the models by means of a battery of social interaction, communication and repetitive behavior tests:

- compare results of behavior phenotyping of the chosen models,
- choose a model with the closest behavioral results.

b. testing the hypothesis of glia-mediated immune impairment in the chosen model:

- immunohistochemical detection of GFAP, CD11b/c and Cnp1-positive cells in different brain structures,
- determination of IL-6, Il-3, MCP-1, TNF-a, TGFb1 and Sox10 in CSF,
- determination of mRNA for IL-6, Il-3, MCP-1, TNF-a, TGFb1 and Sox10 in CSF.

6. Materials and Methods:

- male albino adult rates, housed four per cage at 12:12 h light/dark cycle and fed ad libitum,
- modeling of autism: "lesion models": the specific brain zones, which are involved in development of autistic symptomatic are damaged mechanically or by the toxic agents (e.g. excitatory amino acids). From the variety of "lesion models" proposed some of them are of particular attention:
  - ✓ "early cerebellar lesion" model: midline lesion of the cerebellum is performed in young 10-day-old rats,
  - ✓ "early amygdala lesion model": lesions of the amygdala on day 7 of life,
  - ✓ "early medial prefrontal cortex lesion" model: neonatal excitotoxic lesions of the medial prefrontal cortex,
- "valproate" model: pregnant rats are administered valproic acid during fetal neural tube development on embryonic day 12.5,
- "propionic acid" model: by intraventricular infusion of propionic acid,
- battery of behavioral tasks,
- immunohistochemical detection of GFAP, CD11b/c and Cnp1 in different brain regions,
- ELISA and Western-Blot determination of IL-6, IL-3, MCP-1, TNF-a, TGFb1 and Sox10 in CSF,
- RT-PCR determination of mRNA for IL-6, Il-3, MCP-1, TNF-a, TGFb1 and Sox10 in CSF.

7. Expected Results:

- the comparative characteristics of studied models of autism will be obtained;
- results of the study will figure out new insights on the role of glia in pathogenesis of autism;
- project will serve a good platform for international collaboration and may lead to future successful funding.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *CHEMOTHERAPY*

1. Research Title:

CHEMOTHERAPY INDUCED THROMBOCYTOPENIA AND PLATELET TRANSFUSIONS IN PEDIATRIC ONCOLOGY

2. Supervisor (Name, Surname, Position):

Samvel Danielyan, MD, PhD, Professor
Chairman of the Department of Oncology, Chief of the Clinic of Chemotherapy

3. Team Background:

Our team consists of 11 oncologists and hematologists (pediatric and adults), 2 oncology fellows, 7 nurses. For the statistical part, data management and other issues we cooperate with other departments within the institution, as well as with other institutions locally and abroad.

4. Keywords: *chemotherapy, thrombocytopenia, platelet transfusion, pediatric oncology*

5. Research Aims & Objectives:

Despite decades of experience with prophylactic platelet transfusions, there are still insufficient data to provide clinicians with evidence-based guidelines specific to pediatric oncology. Current guidelines for the treatment approaches of chemotherapy induced thrombocytopenia are based on expert opinions and clinical trials and studies performed in adult patients. There is insufficient information in the published literature to determine the optimal prophylactic platelet transfusion strategy in this group of patients with respect to threshold or dose.

Primary Objectives:
To estimate the proportion of patients experiencing (1) thrombocytopenia and (2) associated bleeding in pediatric patients with solid tumors and hematologic malignancies receiving chemotherapy.

Exploratory Objectives:

(1) To estimate the relative risk (RR) of thrombocytopenia in different:
   a. Chemotherapeutic agents
   b. Age groups (or for continuous age)
   c. Types of cancer

(2) To estimate the frequency and dosage of platelet transfusions, transfusion associated complications, and incidence and severity of bleeding after the transfusion.

6. Materials and Methods:

This is a retrospective study, for children with different types of solid tumors and hematologic malignancies who received chemotherapy at the Clinic of Chemotherapy of Muratsan Hospital Complex of Yerevan State Medical University. The study population consists from pediatric patients (≤18 years) who received chemotherapy for any kind of solid tumor or hematologic malignancies.

Statistical Considerations:
Descriptive statistics will be used to summarize the demographic and clinical characteristics in the study population. All statistical analyses will be performed using SAS version 9.4 (Cary, NC).

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *PEDIATRICS*

1. Research Title:

EPIDEMIOLOGY AND CLINICAL MANIFESTATIONS OF NOSOCOMIAL INFECTIONS AMONG PEDIATRIC PATIENTS HOSPITALIZED FOR ACUTE RESPIRATORY DISEASE IN ARMENIA

2. Supervisor (Name, Surname, Position):

Sergey Sargysan, MD, PhD
Associate Professor at Department of Pediatrics
Head of Institute of Child and Adolescent Health
Principal Pediatric Advisor to Ministry of Health of Armenia

3. Background:

Since mid 90s mortality caused by acute respiratory infections (ARI) and pneumonia decreased more than twice, particularly due to activities of the National program, run by the supervisor / principal investigator of the project (within the program, the series of studies on epidemiology, risk factors of ARI in children in Armenia have been held).
However, death rates caused by ARI and pneumonia, caused are still higher than in the West; in line with other reasons (nutritional problems, late referrals), nosocomial infections (NI) play a role in that. The frequency of hospitalizations among young children is appx twice higher than in the Western countries and even has tendency to arise over last years. Combination of excessive hospitalizations and NI lead not only to worsening health indicators, but also to extra financial losses, which is crucial for Armenia as a country with low-middle income.

4. Keywords: *acute respiratory infections, epidemiology, vaccination*

5. Research Aims & Objectives:

Overall aim is to determine epidemiology and peculiarities of NI among pediatric patients with ARI in Armenia. Objectives: (1) determine the incidence of cases of NI among patients of target group; (2) establish the etiologic agents and risk factors; (3) determine clinical peculiarities and outcomes of infections; (4) establish overall clinical and economic consequences of intrahospital infections (5) optional - determine resistance of bacterial agents (6).

6. Materials and Methods:

Materials: the study will be held in sampled pediatrics units of hospitals of different levels (community, regional, referral national), including general pediatric wards and intensive care units (a) a system of registration of cases of NI will be established in focus hospitals (b) special case forms will be filled out by the staff / researchers (c) relevant specials (blood, mucus) will be taken for etiologic diagnosis by known methods; etiology will be determined by rapid chromatographic and PCR methods. (d) risk factors for infection will be determined by relevant epidemiologic methods, including case-control (e) clinical characteristic and outcomes will be studied by descriptive methods.

7. Expected Results:

The study will let to develop proper recommendations for reducing the incidence of NI in pediatric patients in Armenia and by this to make input in reducing child mortality and morbidity.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *RURAL AND ENVIRONMENTAL HEALTH*

1. Series of related research topics:

"The impact of pesticides on cancer morbidity and reproductive health of rural population, and development of risk reduction strategy"; "Agrochemical's impact on the environment and population health and development of prevention measures in Armenia"; "Health status of newborns as criteria for environmental pollution assessment"; "Study of POPs impact on the health of inhabitants and their infants in rural area and Yerevan"; "Assessment of mutagenic background of the environment in connection with contamination by organochlorine compounds and relevant issues of population health".

2. Supervisor (Name, Surname, Position):

Artashes Tadevosyan, MD, PhD, Professor
Department of Public Health and Healthcare

3. Team Background:

Artashes Tadevosyan MD, Professor; Natalya Tadevosyan, MD, PhD; Aram Hayrapetyan MD; Stephen Reynolds, PhD; Bavakan Khachatryan, MS; Susanna Muradyan, MS; Hasmik Guloyan, MS.

Outcomes of these research projects are one defended Doctoral thesis, one Doctoral thesis and one PhD are about to finalize, one MPH Master thesis has been done.

Research results were used during development of several official documents by relevant concerned authorities, such as:

"National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in RA"
"Concept on safety of chemicals use in agriculture in Armenia"

4. Keywords: *environment, pollution, pesticides, POPs, morbidity/cancer morbidity, birth defects, rural population health, infant's health.*

5. Research Aims & Objectives:

The aim of this study is development of strategies to reduce morbidity/cancer morbidity and improve reproductive health based on known associations of specific outcomes with type and assortment of pesticides, work practice, etc.

The specific objectives are:

- to study the rates and structure of morbidity/cancer morbidity among the rural population
- to study the rates and structure of congenital abnormalities among the rural population
- to study the rates and structure of reproductive health disorders i.e. infertility, miscarriages
- to evaluate the level of pesticide impacts by using of selected indirect indicators: the duration of work with pesticides, the application practice, etc.
- to evaluate pesticide concentrations in biological tissues: fat tissues, breast milk, biopsy and autopsy substances
- monitoring of residues of organochlorine pesticides in environmental objects (soil, surface water, sediments/sludge), foodstuff of plant origin
- to evaluate the level of contamination of the environment by pesticides using genetic tests
- to quantitatively evaluate the negative impact of different pesticides
- to develop complex of preventive measures

6. Materials and Methods:

Following research methods were used: clinical-epidemiological, social survey, environmental components genetic testing, biosubstrats'chemical analysis, GIS, and biostatistics. The burden of potentially carcinogenic and mutagenic compounds on the environment and human organism will be assessed.

7. Expected Results:

The results will allow ensuring safety of pesticides' applications, to reduce the cancer morbidity of rural population and improve reproductive health.

One Master of Public Health student defended her Master thesis; another PhD thesis is in process.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *MEDICAL COMMUNICATION*

1. Research Title:

PROVIDING HEALTHY GENE POOL THROUGH KNOWLEDGE

2. Supervisor (Name, Surname, Position):

Seyran Kocharyan PhD, Professor
Head of Science Division

3. Background:

The key challenge of research is to prepare today's adolescents to cooperate with European adolescents in equal conditions. It is indisputable that European society wants to be surrounded with educated and healthy partners. Caucasian adolescents are the future partners of European youth. They are also the carriers of knowledge. So the reduction in the amount of sexual infections, the use of drugs, alcohol and tobacco in our region will reduce their use in the world arena. The project is prospective in the sense that we are planning to work directly with children of different communities of our region. Due to the knowledge acquired during our events, most adolescents will understand harmful consequences of alcohol, tobacco and drugs use and will avoid their use.

4. **Keywords:** *adolescent, healthy gene pool, sexual infections, use of drugs, alcohol and tobacco, provision of knowledge*

5. Research Aims & Objectives:

The objective is to inform adolescents about health issues. The Caucasus region is the “meridian” of the Asian and European civilizations. Around this “meridian” Asian conservatism and European free mind evolve. The tool is the provision of the knowledge by parents, teachers and physicians which should promote the majority of adolescents with significant change of mentality. The ultimate goal is to have informed youth, insured with a healthy gene pool.

6. Materials and Methods:

Our solution to the above mentioned problems is the provision of knowledge. This process will be carried out by experienced teachers and physicians who will receive the appropriate knowledge by studying the global experience at the first stage of the project. Educational activity will also be carried out with parents who will be able to provide a new approach towards the issue of children's sexual upbringing due to received knowledge.
The anonymous questionnaires will be distributed to children, which have been prepared by the pediatricians, psychologists, physicians, sexologists and pedagogues. The content of questions should find out adolescents' knowledge on the above mentioned issues, in the result of which seminars, round tables, bilateral talks and discussions will be organized. These activities aim to educate adolescents and keep them away from the influence of sexual infections, tobacco, alcohol and drugs. The questionnaires will also be distributed to parents, pedagogues and physicians. Questionnaires being distributed to parents aim to find out if the parents have private talks with their children on similar subjects or not. The questionnaires of pedagogues will also be of the same content.

7. Expected Results:

One of the outcomes of the project is the formation of the consciousness of healthy generation through the knowledge provided by the project. The mind is the most powerful weapon. Inserting proper knowledge on healthy lifestyle and providing of sexual health in minds of young generation, their parents and pedagogues we prepare healthy and intelligent future citizens of Europe. In order to measure the outcomes of the project we need questionnaires of four types: for children, pedagogues, parents and physicians. This activity will be implemented in two stages: at the beginning of the project and at the end of it.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *NEUROLOGY*

1. Research Title:

PAIN AND QUALITY OF LIFE IN PATIENTS WITH NEURODEGENERATIVE DISEASES (PARKINSON, ALZHEIMER AND ALS)

2. Supervisor (Name, Surname, Position):

Professor Hovhannes M. Manvelyan, MD, PhD
Chairman of Neurology Department

3. Team Background:

Team consists of experienced neurologists with sufficient knowledge in clinical investigation and bench science, participated to international multidisciplinary clinical study of pain. Team has several successful researches in both Neurodegenerative Diseases and pain nature, including investigation in simultaneous Vitamin D deficiency in those patients.

***4.* Keywords:** *Neurodegenerative Diseases, Pain, Quality of Life*

5. Research Aims & Objectives:

Neurodegenerative Diseases themselves are very expensive pathologies in clinical practice, and Pain and Quality of Life in those exacerbating their being. There is growing evidence on deficit of chemical substances or vitamins in those patients, playing essential role in worsening of the Pain syndrome and decreasing of the Quality of Life.
We are performing investigation in patients with Neurodegenerative Diseases to reveal possible reversible deficit, and one of promising is Vitamin D deficiency. Supplementation with vitamin D allows reducing the pain intensity and improving the quality of the life, as well physical activity.
Further research will let decrease the burden of Neurodegenerative Diseases and improve the medical deficit.

6. Materials and Methods:

300 patients with Neurodegenerative Diseases are investigated to reveal possible deficit of Vitamin D, B12, thyroid gland dysfunction, blood composition changes (including homocysteine), and additionally investigated in pain measurements, motor and cognitive deficit.
Objective measurements in Quality of Life, Beck Depression Inventory, Pain Intensity Measurements are performed.

7. Expected Results:

Further correction in revealed deficit and supplementation with vitamins improves the condition and reduces the pain, which leads to expressive improvement of the Quality of Life. Taking in account extremely high both social and medical burden of patients with Neurodegenerative Diseases it will help to reduce the problem and improve the Quality of Life.

YEREVAN STAT MEDICAL UNIVERSITY AFTER MKHITAR HERATSI, ARMENIA

CURRENT RESEARCH ACTIVITIES IN THE FIELD OF *DENTISTRY*

1. **Research Title:**

INTERDISCIPLINARY DIAGNOSIS AND TREATMENT OF PATIENTS WITH TMD

2. **Supervisor (Name, Surname, Position):**

Hrant Ter-Poghosyan, MD, PhD, Professor
Head of Pediatric Dentistry and Orthodontics Department

3. **Team:**

Sergo Hovhannisyan, Eleonora Ghazaryan, Margarita Gevorgyan, Ludmila Tatintsyan

4. **Keywords:** *TMD, Interdisciplinary diagnosis, Interdisciplinary treatment, functional disorders*

5. **Research Aims & Objectives:**

The aim of the research is diagnostics and multidisciplinary treatment of TMD.
The Objectives are:

1. To study the correlation interrelationship between some dental diseases and TMD
2. Using the principles of Neuromuscular dentistry find out more effective diagnostic criteria for the patients with TMD
3. Find out technical tools and multidisciplinary protocols for the occlusial disorders in restorative dentistry and Orthodontics
4. Find out the interrelationship between sleep apnea and TMD

6. **Materials and Methods:**

Materials: Patients who came to the University dental clinics with and without TMD
Methods:

- ✓ To study diagnostics models using adjustable articulators
- ✓ Axiographia
- ✓ MPI diagnostics (SIM)
- ✓ Examination using K7 evaluation system (Myotronic USA)

7. **Expected Results:**

1. To create a group of interdisciplinary specialists (endocrinologist, neurologist, ENT specialist, physiotherapist, psychologist, psychotherapist)
2. Find out new protocols for the treatment of TM
3. Create new technical tools for the multidisciplinary rehabilitation of occlusion for the patient with TMD
4. Show the important role of dentists in the early diagnosis of sleep apnea

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