# 1st International Scientific Conference "Civilization Diseases – Causes, Treatment and Prevention"

## Book of abstracts

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Editors:
Janina Kołodziej-Fedirko
Kamil Maciąg

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## Table of content:

### Plenary Speakers

The role of Advanced Practice Nurse in the multiprofessional team in Operating Theatre ..... 11

Therapeutic Nano-structured Nutraceuticals for Human Health and Wellness: Prospects and Perspectives ..... 13

### Participants

Activities of daily living and the level of intellectual disability ..... 17

Chronic stress – neuroinflammation – microbiota: importance in the pathogenesis of depression ..... 18

Companion diagnostics (CDx) – potential to reveal a specific, efficacious therapy for a breast cancer ..... 19

COVID-19 pandemic and its impact on allergic diseases in children ..... 20

Current utility of islet autoantibodies in predicting and diagnosing Type 1 Diabetes (T1D) ..... 21

Overcome the invisible – new treatment opportunities for triple negative breast cancer ..... 22

Pancreatic cancer risk assessment in patients with newly-diagnosed diabetes ..... 24

The impact of tight versus less tight glycemic control on the course of type 1 diabetes in children ..... 25

Index of Authors ..... 27

# Plenary Speakers

# The role of Advanced Practice Nurse in the multiprofessional team in Operating Theatre

***Prof. dr. Natalja Fatkulina**, Institute of Health Sciences, Faculty of Medicine, Vilnius University, Lithuania*

Successful integration of Advanced Practice Nurse (APN) into the health care team could improve the usage of resources and improve health care service delivery. APN in Lithuania is a new specialty that is only beginning its integration in the health care system.

*The aim* of the study was to analyze the needs of integration of advanced practice intensive care nurses (APICN) into the multidisciplinary team.

*Methods*. To determine the purpose of the study quantitative and qualitative study methods were used. Anonymous type of questionnaire method was conducted. The questionnaire consisted of 52 questions with one question being an open question, the latter was analyzed using a qualitative method. The questionnaire was developed by authors in correlation with Lithuanian legal act Medical Norm 160:2017. In the study volunteered 29 anesthesiology (n = 29) and reanimatology doctors (ARD), 3 residents, and 68 anesthesiologist-nurses and intensive care nurses (n = 68). Total sample N = 100. Data was collected in January – February, 2021. Statistical analysis of data was done.

*Results*. The main roles APN could undertake equivalently to anesthesiology and reanimatology doctors were: patient extubation – 47,4 percent, operate hemofiltration device – 31,9 percent, perform anesthesia according to already made plan – 34,0 percent, operate artificial pulmonary circulation device – 38,8 percent, however important to note these people were working at resuscitation intensive care unit. Research on the socio-emotional readiness of team members highlighted aspects that may hinder the development of the role of APICN: poor redistribution of roles, lack of communication, discussion with APN (35 percent), lack of knowledge about APN (27 percent), nursing maturity for new role lack, novelty of the specialty, lack of trust and negative attitude of the respondents. Despite the potential difficulties identified, most respondents said they would like to work in a team with APN (76 percent), choose the right definition of APN (88 percent) and thought that APN could work in both operation wards and ICU (78 percent) and all healthcare settings (39 percent).

*Conclusions*. The main findings of the study showed that the roles of the members of the acute care team are differentiated, however APN is poorly

expressed. Regarding the emotional-social readiness of team members to collaborate with APN, a lack of nurse initiative to expand their competencies was observed, but it can be seen that both ARD and APN expressed a willingness to collaborate and work together in a team. Assessing the opportunities for collaboration in terms of ARD and ICN, it was observed that the APN respondents see them as a team leader, as a facilitator who can redistribute workloads among the team members, and as a colleague to work with as an equal team member.

# Therapeutic Nano-structured Nutraceuticals for Human Health and Wellness: Prospects and Perspectives

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Nutraceutical compounds are of great interest in consumer health owing to their high nutritional significance, safety and therapeutic properties. There are several nutraceuticals with superior applications used in the treatment of various diseases and disorders; hence, they need a specific vehicle to reach the targeted site for treatment. In addition, nutraceuticals play a major role against curative disorders related to oxidative stress including allergy, Alzheimer's, cancer, cardiovascular, eye, diabetes, inflammatory, immune, obesity and Parkinson's diseases. However, the potential benefits of nutraceuticals have not been utilized completely due to some difficulties such as low bioavailability, poor solubility, less stability, poor adsorption and low permeability. To overcome these issues nanotechnology can be a solution because of its ability to manipulate biologically active molecules in a way to create nano-structured ($10^{-9}$ nm) constituents. Thus, nano-structured formulations as a potential vehicle for encapsulating and delivering the nutraceuticals to enhance the human biological system. Besides, a high surface to mass ratio of nano-structured form facilitates its application in the area of medicine, food, pharmaceutical, cosmetics, and agriculture. Therefore, consumer demand and growing research interest prerequisites the utilization of nutraceuticals such as essential fatty acids, vitamins, minerals, polyphenols, probiotics, dietary fibers, etc. to preserve human health and wellness are unavoidable. The nanoparticulate nutraceutical/or drug molecules could act as an efficient delivery system due to their improved stability, inhibition of degradation or interplay with other substances, safeguard sensory properties, maintain their bioactivity while passing through the gastrointestinal (GIT) system and increase the bioaccessibility and bioavailability. The nanostructure can be classified according to their method of supplementation i.e. solid delivery and liquid delivery system; these are nanoencapsulation, nanoparticles, nanoemulsion, nanoliposome, nanohydrogels, solid-lipid nanoparticles, nanocrystals, etc. In order to design and formulate nutritive or medicinal food products, the nutraceuticals are fortified in a nanostructured form.

# Participants

# Activities of daily living and the level of intellectual disability

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*Introduction:* Intellectual disability is often associated with an inability to satisfy physiological and emotional needs. People with intellectual disabilities have difficulty functioning in society and the level of intellectual disability is related to the patient's quality of life, which includes activities of daily living. Intellectual disability is a disorder in which the high level of meeting the needs of everyday life reflects the level of quality of life.

*Aim:* The aim of this study was to attempt to estimate the relationship between the ability to meet basic physiological needs and the level of intellectual disability.

*Methodology and materials:* 96 people were included in the study, 58% of them were women and 42% men with different degrees of intellectual disability. The study used the Katz scale used to assess basic activities of daily living and the abbreviated Hodkinson AMST mental performance questionnaire. All the subjects in the study were under institutional care. They resided in social welfare homes in Poland in the Silesian Province.

*Results:* As many as 40% of the study group were people with severe and 38% with moderate intellectual disability. People with severe intellectual disability show a high level of fulfillment of daily needs. Only 22% of those in institutional care are intellectually normal.

*Conclusions:* People in institutional care are characterised by a decline in intellectual performance. A high level of satisfaction of basic needs of everyday life does not mean a high level of mental fitness at the same time. Both gender and age are not determinants of a high level of mental fitness.

# Chronic stress – neuroinflammation – microbiota: importance in the pathogenesis of depression

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Depression is a serious disease that, according to the definition of the World Health Organization (WHO), is manifested by sadness, loss of interests and pleasure, guilt, low self-esteem, sleep and appetite disorders, fatigue and decreased concentration. Serious depression and anxiety are high-stress conditions that cannot be easily remedied and are associated with years of life with a disability. The lifetime prevalence of depression in the United States is 21% for women and 11% –13% for men. Psychosocial stressors, including acute trauma or sub-chronic stressors as well as early exposure to childhood trauma increase the risk of developing symptoms of low mood and clinical depression, influencing neuroimmune processes. There is evidence that different types of psychosocial stressors increase the levels of pro-inflammatory cytokines, including IL-1 and IL-6, in the systemic system and in the CNS. For example, immobilization stress or chronic mild stress of any other cause cause a significant increase in the levels of IL-1 (mRNA) in the plasma and brain. It is now known that neuroinflammatory mechanisms are important in the pathogenesis of depression, which is associated with a low-grade chronic inflammatory response and activation of cellular immunity, as well as activation of the compensatory anti-inflammatory system. New reports show that the intestinal microbiota may play a role in modulating the body's response to stress and in regulating the neurinflammatory response in the CNS. Modulates the activity of the hypothalamus-pituitary-adrenal (HPA) axis and the course of immunological processes, including those related to with neuroinflammation. It has been proven that microbiota can influence the occurrence of anxiety reactions or anheony. Research is ongoing to better understand the cause-effect relationships of stress – neuroinflammation – microbiota – depression, which may contribute to the development of new methods of preventing or treating stress-related disorders, including depression.

# Companion diagnostics (CDx) – potential to reveal a specific, efficacious therapy for a breast cancer

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Precision medicine is a practice related to the individualization of diagnosis and treatment so that the right dose of the right drug can be used at the right time in a given patient. This allows you to shorten diagnosis time, avoid side effects, increase treatment efficacy, improve clinical outcomes and reduce healthcare costs. Companion diagnostics (CDx) concerns research aimed at identifying and testing optimal biomarkers useful in diagnostics and qualifying a patient for a specific treatment method. Identification of biomarkers is also important in the context of developing new targets and/or new therapies. CDx was tested for oncology applications. Among these, the most targeted drug development efforts include breast cancer (BC), which is the most commonly diagnosed cancer in women (approximately 2.1 million new cases annually; 1/4 of all cancers in women). Over the past 10 years, the incidence of breast cancer in women has increased by more than 20%. Comprehensive breast cancer control covers prevention, early detection, diagnosis, treatment, rehabilitation and palliative care. Much progress has been made in the diagnosis and treatment of BC. However, it remains a multifaceted disease that exhibits heterogeneity within the same tumor or different neoplasms, and a variable course of the disease. Expanding knowledge through genetic, proteomic and metabolomic research on the molecular processes that make up the etiology of cancer allowed for the identification of specific tumor features and the development of targeted therapies against tumors with specific molecular features. Efficient diagnostics or the possibility of predicting the patient's response to treatment is an important goal of modern PM. The concept of co-development of drugs and diagnostics or companion diagnostics (CDx) has emerged, which is now the new horizon of cancer care.

# COVID-19 pandemic and its impact on allergic diseases in children

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Allergies are conditions caused by hypersensitivity of the immune system to typically harmless substances in the environment. An estimated 20% of the world's population has allergic disease, and the prevalence of IgE-mediated allergies in children ranges from 3% to 7.5%; higher rates occur in younger children. The aim of this study is to present data on the relationship between COVID-19 pandemic conditions on the occurrence, development and treatment of allergies in children.

In the period of pandemic COVID-19, children with allergies showed a lower incidence of exacerbations, reduced hospitalizations and decreased use of allergy and antihistamine medications. This can be explained by the implementation of a number of infection prevention methods, such as: 1. wearing masks, frequent hand washing and maintaining social distance; 2. reducing the duration of children's exposure to allergens; 3. improving air quality, reducing pollen counts and exposure to air pollutants; 4. greater parental attention to standardizing children's treatment and diet. These factors have been found to have a protective role in reducing children's exposure to allergens and mitigating allergic reactions.

Allergy patients usually exhibit eosinophilia as a protective mechanism against infections. Nevertheless, anti-IL-5 biologic drugs deplete eosinophils and could theoretically promote viral infections. Coronavirus, however, is rarely associated with asthma exacerbations. It appears that allergic diseases may be a protective factor for COVID-19 infection. The presence of allergies has been shown to be inversely correlated with the expression of angiotensin-converting enzyme type 2 (ACE2), which allows SARS-Cov-2 to enter cells. This is likely related to the highly expressed thymic repertoire and activated innate and adaptive immunity. Also decrease in specific IgE levels associated with increased allergic reactions during the COVID-19 pandemic was observed.

# Current utility of islet autoantibodies in predicting and diagnosing Type 1 Diabetes (T1D)

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In the pathogenesis of type 1 diabetes (T1D), the causative process is the immunological destruction of pancreatic β cells by autoreactive cytotoxic lymphocytes and macrophages. These changes are reflected in the blood of patients as the presence of autoantibodies directed against β-cell antigens.

The following antibodies are measured: against unidentified cytoplasmic β-cells (ICA), against glutamic acid decarboxylase (GADA), against tyrosine phosphatase (IA-2), against endogenous insulin (IAA) and against zinc Transporter 8 (ZnT8).

The IAA test must be performed prior to initiating insulin therapy. Injections of this hormone, both of human and animal origin, can stimulate the formation of antibodies against it. As in the case of ICA, GADA and IA-2A, a positive IAA result in a patient not taking insulin preparations confirms the presence of type 1 diabetes. Complete destruction of pancreatic beta cells stops the production of autoantibodies. It is therefore believed that the determination of antibodies associated with type 1 diabetes is of major importance in the early stages of the disease.

The newest in the diagnosis of T1D are ZnT8, which are an ideal supplement to the current diagnosis. About 25-30% of patients who do not have GADA, IA2A and ICA antibodies have ZnT8 antibodies. Moreover, in some clinical cases of T1D with negative specific antibodies, the isolated positive presence of ICA is observed, which indicates other, hitherto unknown antigens.

Along with routine antibody measurements, the optimization of sampling and test development to be reliable and cost-effective continues. This summary describes the present utility and future prospects for T1D prediction and diagnosis using the measurement of autoantibodies.

# Overcome the invisible – new treatment opportunities for triple negative breast cancer

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Breast cancer is considered a disease of civilization. It is diagnosed in approximately 1.7 million women each year, and more than 500,000 people die. Among the diagnosed neoplasms, 15-20% are TNBC (triple negative breast cancer) characterized by weak expression of estrogen and progesterone receptors and overexpression of the human epidermal growth factor 2 receptor. TNBC is a very heterogeneous group cancers. TNBCs are considered aggressive as they are usually diagnosed at higher stages, often appear in younger patients, and develop faster than some other breast cancers. Moreover, when these tumors do not respond to chemotherapy in the early stages, they have a great tendency to spread to other parts of the body. The aim of the study is to present data on the modern application of immunotherapy in the treatment of patients with triple negative breast cancer. The topics of effectiveness and the mechanism of action were discussed. The latest scientific reports have been taken into account.

Inhibition of ICI (immune checkpoint) is a new and effective method of treatment in several types of solid tumors. Unfortunately, for TNBC, the use of monotherapy targeting PD-1, PD-L1 or CTLA-4 showed little effect. Still many types of immunotherapy are questionable as to their effectiveness. However, in 2019 The Food and Drug Administration (FDA) has approved the use of atezolizumab in combination with the protein – paclitaxel in the treatment of adult patients with inoperable, locally advanced TNBC. Results from a multicentre randomized trial of 902 patients showed a higher median PFS (progressive-free survival) in patients receiving atezolizumab with paclitaxel. The PFS was 7.4 months in patients receiving atezolizumab plus paclitaxel protein-bound and 4.8 months in patients receiving placebo plus paclitaxel protein. ORR (objective response rate) was 53% and 33%, respectively.

Unfortunately, in the 2022, a case report was reported describing the adverse reaction of sarcoidosis caused by atezolizumab in a patient with metastatic breast cancer. It turns out, therefore, that while immunotherapy is a hope for TNBC patients, it is not free from undesirable side effects.

The work is of a review character. A review of the scientific literature was made using the PubMed NCBI database and other sources and materials related to the topic of the work.

# Pancreatic cancer risk assessment in patients with newly-diagnosed diabetes

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Pancreatic cancer is one of the most lethal types of neoplasm. Due to its poor clinical manifestation at early stages as well as its aggressive course, diagnosis usually comes at an advanced, unresectable stage with a dismal survival prognosis. However, if found at a localized stage, the relative 5-year survival rate is significantly higher. Thus, there is a great need to create a clinically useful and financially profitable screening model to diagnose pancreatic cancer at an early stage. Screening the whole population is not economically feasible, but it should be restricted to a more specific high-risk group. One of the most important risk factors for pancreatic cancer is diabetes mellitus. However, the relationship between diabetes and pancreatic cancer is more complex, for diabetes is a well-known risk factor for pancreatic cancer but its early clinical manifestation too. New-onset diabetes, defined as diabetes of up to 2-year history, is of the utmost importance in the context of pancreatic cancer. In this case, diabetes comes from the destructive action of cancer on pancreatic islets and their endocrine function. Such diabetes could be resolved after the resection of a pancreatic tumor. The high incidence of diabetes worldwide still makes it cost-ineffective to screen all patients with newly-diagnosed diabetes. There are, however, some clinical and biochemical factors discussed in the literature that allow narrowing the high-risk cohort even more, such as age at diabetes diagnosis, weight loss, glycated hemoglobin level, blood glucose level, rapid worsening of existing diabetes, kind of anti-diabetic medications used or proton pump inhibitors intake. Combined they may form prediction models helpful to assess the risk of pancreatic cancer. The purpose of this presentation is to characterize the high-risk factors of pancreatic cancer in patients with new-onset diabetes and to present the risk assessment models proposed in the literature to date.

# The impact of tight versus less tight glycemic control on the course of type 1 diabetes in children

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*Introduction:* Type 1 diabetes mellitus (T1D) is an autoimmune disease whose treatment is based on insulin therapy aimed at bringing round the patient's metabolic balance. Recent studies show that maintaining normal blood glucose levels is not sufficient to reduce the incidence of chronic T1D complications. Biochemical disturbances accompanying hyperglycemia in the asymptomatic period may induce the formation/activation of various biologically active substances (e.g. proteins and peptides regulating carbohydrate metabolism), which may influence the treatment process. Therefore, the aim of our study is to assess the effect of strict adherence to normoglycemia on blood levels of: amylin, catestatin, chromogranin A (ChgA), nerve growth factor (NGF), platelet activating factor (PAF), proamylin, and uromodulin.

*Material and Methods:* The study included 156 patients with T1D aged 6-18 (mean age: 12 ±4) who are patients of the Department of Endocrinology and Diabetology of The Children's Memorial Health Institute. The control group (n = 30) consisted of age-matched children (mean age: 9 ±4), with no metabolic disorders and no diagnosis of T1D. Concentration of selected biologically active peptides were assessed using commercial ELISA tests. The tight glycemic control group was defined as having a glycated hemoglobin concentration of ⩽ 7.5%.

*Results:* Concentration levels of all parameters assessed in the study group differed statistically significantly from those obtained in the control group statistically significantly ($p < 0.05$). In case of NGF, ChgA, uromodulin and PAF, concentration levels differed between patients with a disease duration > 3 years and newly diagnosed patients (11.2 ±4.22 pg/ml, 57.6 ±18.5 ng/ml, 164.3 ±175 ng/ml, 0.41 ±0.64 ng/ml vs. 20.2 ±86.0 pg/ml, 74.2 ±15.6 ng/ml, 304.0 ±126.5 ng/ml, 0.21 ±0.08 ng/ml, respectively). In the group of children

whose disease has lasted more than 3 years, peptide levels did not differ statistically ($p > 0.05$) between patients, regardless of whether or not they adhered to the strict glycemic regime.

*Discussion:* Blood concentration of the tested proteins and bioactive peptides modulating the insulin action or influencing carbohydrate metabolism did not change depending on the glycemic control. There is no relationship between the risk of developing and/or severity of diabetic complications and the concentration of the studied markers in children with T1D, regardless of whether they achieve the goal of normoglycemia or not.

# Index of Authors

Basek A. ..... 24
Borawska W. ..... 22
Dworak M. ..... 19
Fatkulina N. ..... 11
Galach P. ..... 18
Gromadzka G. ..... 19, 20, 22
Jakubiak G.K. ..... 24
Jałonicka E. ..... 22
Jochemczak M. ..... 17
Karthik P. ..... 13
Lechowska A. ..... 17
Misiak M. ..... 18, 19
Nowak A. ..... 17
Ochocińska A. ..... 21, 25
Patla K. ..... 21
Sobczak Z. ..... 17
Świderska J. ..... 25
Walendziak W. ..... 20
Wolszczak A. ..... 18
Wysocka-Mincewicz M. ..... 25
Zegarska P. ..... 20

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