## Granted by Lithuanian Research Council

## "Relations among heart diseases, psycho-emotional and sleep disturbances; their impact on life quality". (contract No LIG-03/2012). The leader prof.habil.dr. G. Varoneckas (CV)

The aim of the research is to investigate the dynamic of relations among psycho-emotional, sleep disturbances and cardiovascular disorders as well as their impact on health-related quality of life and to prepare recommendations for correction of risk factors.

Repeated epidemiological study will be performed among Palanga citizens. The relations among prevalence of insomnia and depression, social, biological, health behaviour factors, coronary artery disease (CAD) and health-related quality of life will be investigated.

1602 persons were investigated during the first study, performed in 2003-2004. It is expected to investigate 1000 persons from the same contingent (65% of invited to participate persons) during repeated study after 10 years. The impact of cardiovascular risk factors will be evaluated and the mathematical model for prediction of cardiovascular risk factors will be developed.

Clinical research will be performed; the relations among psycho-emotional status, sleep quality and cardiovascular status in CAD patients will be assessed. It is expected that clinical data base will be formed of 2000 records of CAD patients. The relation among risk factors, tiredness, anxiety, depression, sleep quality and cardiovascular disease will be investigated.

The project results will serve as a scientific background for long lasting strategy formation for prevention and control of cardiovascular disorders. The strategy will lead to effectively decreased rates of morbidity and mortality due to cardiovascular disorders and external reasons.

## "Impact of mental disorders and metabolic syndrome on mortality in primary health care patients" (contract No.LIG-03/2011).Projekt manager habil dr. R.Bunevičius

Mental disorders such as depression are directly related to morbidity and mortality from various diseases, particularly from cardiovascular diseases. Metabolic syndrome as a combination of medical disorders that, when occurring together, increase. the incidence of cardiovascular diseases and early death rate. Various biological, behavioral factors link metabolic syndrome to mental disorders. Their interaction can affect the course of somatic diseases, mortality, including mortality from external causes. Project objective isto investigate the prevalence of mental disorders and their links to suicidal ideation, alcohol consumption, metabolic syndrome and mortality in the primary health care level. The survey is conducted in two phases. Patients who request to consult a family doctor will be evaluated in the first phase. In the second phase-population of subjects registered in primary health care centers will be evaluated prospectively. Medical records will be used from cross-sectional study database collected in 2004, in one of the region of Lithuania. Necessary information will be obtained from evaluation of medical records, and statistics.

Project results will help identify and assess the problems faced by family doctors diagnosing mental disorders, suicidal tendencies and risky alcohol consumption: provide new insights into links between mental disorders with insulin resistance, metabolic syndrome, cardiovascular events, and provide information about influence of somatic factors on mental disorders and manifestation of their complications. Obtained data will enable support of mental, somatic diseases prevention strategies, taking into account the lifestyle and biological factors; to develop their risk-assessment methodology.

## "Factors determining quality of life and outcomes in patients with ischemic heart disease".(contract No LIG-04/2011). The leader dr. N.Mickuvienė

Research priority in new cardiovascular diseases studies is related with research of complex inflammatory, hormonal and genetic markers to predict outcome for CHD. Recently, great attention is paid to inflammatory markers, and hormonal factors influence to cardiovascular functional status, quality of life of patients with ischemic heart disease outcomes. Therefore, it is important to comprehensively assess the hormonal and inflammatory markers in patients with ischemic heart disease for long-term impact on quality of life, disease course and outcome. The project will aim to establish long-term quality of life in breach of the factors - mental disorders, psychosocial factors and their links with hormones and inflammatory markers on purpose to exclude the most vulnerable groups. The stated objectives will be used to examine cross-sectional cohort study long-term clinical follow-up data. Will be investigated in patients with CHD long-term quality of life, mental disorders, psychosocial factors, inflammatory (interleukin-6 and high sensitivity CRP) and hormones (NT-pro-BNP, TSH, FT4, FT3, RT3) signs, the disease course and outcome. Tasks will be used to examine the cumulative clinical cohort of long-term monitoring data and blood serum.
This project will disentangle factors such as mental disorders (depression, anxiety and type D personality, fatigue) and psychosocial factors (social support, social events values), and inflammatory (high-sensitivity CRP, interleukin-6) and hormonal markers (hormone NT-pro-BNP, TSH, FT4, FT3, RT3)effecting long-term quality of life. The purpose of the project is to detect vulnerable groups of patients with CHD.

## Granted by European Commission Seventh FrameworkProgrammes

## Open Science Link: "Open Semantically-enabled, Social-aware Access to Scientific Data (CIP-ICT PSP-2012-6)", represented by habil.dr. Robertas Bunevičius (2013.02.01 - 2014.04)

Open Science Link will introduce and pilot a holistic approach to the publication, sharing, linking, review and evaluation of research results, based on the open access to scientific information. OpenScienceLink will pilot a range of novel services that could alleviate the lack of structured data journals and associated data models, the weaknesses of the review process, the poor linking of scientific information, as well as the limitations of current research evaluation metrics and indicators. Five pilot services will be integrated and piloted in particular: (a) Data journals development based on semantically-enabled research dynamics detection, (b) A novel open, semantically-assisted peer review process, (c) A

services for detection and analysis of research trends, (d) Services for Dynamic researchers' collaboration based on non-declared, semantically-inferred relationships, and (e) A set of scientific field-aware, productivity- and impact-oriented enhanced research evaluation services. These services will be developed over the OpenScienceLink platform, which will be based on the semantic and social networking capabilities of background FP7 projects, as well as of the popular GoPubMed search engine. The OpenScienceLink services will be piloted with the active participation of over 1200 researchers from the consortium organizations. OpenScienceLink has already established a group of external users/stakeholders that will contribute additional users/researchers in the scope of the validation process, while also engaging in the sustainable use of the services. OpenScienceLink will also study the business potential of open access paradigms, through investigating and pursuing multiple business models including author fees, hard copy sales, advertisements, sponsorship, as well as subscription based models. Furthermore, as part of its holistic approach, OpenScienceLink will devise and validate a legal framework for regulating and reusing open scientific data.

## 7 BP BIO ASQ: "A challenge on large-scale biomedical sematic indexing and question answering (ICT Call 8:FP7-ICT-2011-8)". Project underway since 2013.02.01, represented by habil.dr. Robertas Bunevičius.

*BP BIO ASQ initiates a series of challenges on biomedical semantic indexing and question answering (QA).*

*The challenge (aka competition or shared task) will assess:*

1. large-scale classification of biomedical documents onto ontology concepts (semantic indexing),
2. classification of biomedical questions onto relevant concepts,
3. retrieval of relevant document snippets, concepts and knowledge base triples, delivery of the retrieved information in a concise and user-understandable form.

## 7BP PONTE:"Efficient Patient Recruitment for Innovative Clinical Trials of Existing Drugs to other Indications", (Sut.Nr.247945). Project underway 2010-2013 m, represented by habil.dr. Robertas Bunevičius.

Efficient Patient Recruitment for Innovative Clinical Trials of Existing Drugs to other Indications Clinical trials are increasingly considered to be not only a means for evaluating the effectiveness of new medicine and pharmaceutical formulas but also for experimenting on existing drugs and their appliance to new diseases and disorders. Pharmaceutical companies tend to prefer launching modified versions of existing drugs, which generate generous profits while carrying little risk of rejection. Translation into clinical therapy has to overcome substantial barriers at the preclinical and clinical levels. Thus, bridging basic science to clinical practice comprises a new scientific challenge which can result in successful clinical applications with low financial cost. In the aforementioned context, the results yielding from clinical trials, which are testing the effectiveness of existing drugs and pharmaceutical formulas on diseases other than the ones they are currently treating, are closely dependent on the available data and the

patients. The efficacy of such trials requires the pursuit of a number of aspects that need to be addressed ranging from the aggregation of data from various heterogeneous distributed sources (such as electronic health records - EHRs) to the intelligent processing of this data based on the clinical trial-specific requirements for choosing the appropriate patients eligible for recruitment. Within this framework, PONTE aims at providing a platform following a Service Oriented Architecture (SOA) approach that will offer intelligent automatic identification of individuals eligible (concerning their safety and clinical trial efficacy) to participate in clinical trials, as these will be designed and planned through a flexible authoring tool, enabling semantic interoperability of clinical care information systems with clinical research information systems and drug and disease knowledge databases, as well as the appliance of advanced data mining techniques and enhanced learning algorithms.

## Global grant

*"Gene-Environment Interactions Connecting Low Triiodothyronine Syndrome and Outcomes of Cardiovascular Disease (GET-VASC)" (contract No.VP1-3.1-ŠMM-07-K-02-060).The leader habil. dr. J. Bražaitienė (2012-2014 habil dr. R.Bunevičius).*

Mortality rate in Lithuania is among highest in Europe and cardiovascular mortality covers about 56% of the general mortality. Survivors after MI or stroke often demonstrate symptoms of depression, fatigue, poor cognitive functioning worsening health related quality life. Finding modifiable factors and biomarkers that affect both mortality and quality of life after acute cardiovascular events is an important task understanding and improving outcomes in cardiovascular disease. Decrease in triiodothyronine ($T_3$) concentrations is observed in patients after acute MI and stroke have been linked to its adverse prognosis and to co-morbidities such as depression. Genetic alterations in various components of thyroid hormone signalling and environmental factors such as dietary selenium or iodine are associated with morbidity, mortality and well-being of patients. However, these interactions in patients after acute cardiovascular events have not been studied. Better understanding thyroid hormone signalling in brain-thyroid-heart interaction may open new markers and new targets managing MI and stroke as well as depression.

The aim of this research project is to establish whether polymorphism in thyroid axis related genes interacting with environmental factors affect thyroid hormone concentrations, survival and well-being of patients experiencing major cardiovascular events.

To reach these aims we plan to recruit patients after acute MI and patients after stroke and in cross-sectional and in follow-up design to evaluate if clinical, psychological, endocrine, environmental and genetic factors affects survival after major cardiovascular events and health related quality of life in survivors. This complex interdisciplinary study requires concert action of cardiologists, psychiatrists, geneticists, neurologists, environmentalists and endocrinologists. The multidisciplinary group of the experienced researchers covering all fields of interest will be established. Site of the study, Lithuanian University of Health Sciences and its Clinics, the largest medical centre in the country, will provide modern research and clinical facilities and will contribute to the success of the project.

We expect that the project will give important new knowledge in understanding mechanisms by which gene and environmental factors are associated with cardiovascular events, and by which it affects outcomes and well-being of patients. It will also provide pharmacogenetic foundation for new clinical trials evaluating endocrine, cardiovascular and dietary interventions in patients after acute MI or stroke.