Cardiology Foundation and the American Heart Association recognized the value of Gal-3 testing and included it into the Guideline for the Management of Heart Failure, because it has been proven that Gal-3 could provide useful information for optimisation of HF patient care decisions. Namely, Gal-3, as a biomarker of myocardial fibrosis, is predictive of hospitalization and death and may provide incremental prognostic value over natriuretic peptide levels in patients with HF.
Gal-3 has also been proven as a useful diagnostic marker for the differentiation of benign and malignant thyroid nodules, whereas its value for the diagnosis/prognosis of other malignant and chronic diseases, *e.g.* diabetic nephropathy, is under intensive investigations.
Due to its important roles in different pathologies, Gal-3 has also been recognised as a potential therapeutic target. However, designing selective Gal-3 inhibitors is challenging because of the shared homology of the carbohydrate-recognition domains among not only galectins, but also other lectins. Yet, several Gal-3 agonists, either plan-based (GCS-100, GM-CT-01, GR-MD-02, modified citrus pectin) or synthetic (TD139) are in different phases of clinical trials as a potential drugs for different chronic diseases, *e.g.* NASH advanced fibrosis, chronic kidney disease, idiopathic pulmonary fibrosis, osteoarthritis, *etc*. as well as malignant diseases, *e.g.* chronic lymphocytic leukaemia, melanoma, colorectal cancer, metastatic melanoma, *etc*.
Our long-standing interest in Gal-3 has recently been directed on its involvement in the adaptation response of cardiovascular system (CVS) to recreational SCUBA diving, which represents a special form of physical activity, due to the body exposure to low temperature, hyperoxia and elevated pressure. Our studies of the effects of single dive and repeated dives on CVS, showed significant changes not only in Gal-3 plasma concentration, but also in the levels of other CVS biomarkers, such as hs-TnI, NT-proBNP, VEGF, endothelin-1 and myoglobin. Although transient, these changes suggest extensive activation of adaptation mechanisms, which in some aspects could possibly have a positive effect of SCUBA diving on CVS.

Serum non-coding RNA profiling as a promising diagnostic approach

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Serum non-coding RNAs (ncRNAs) have been identified as paracrine and endocrine messengers of different diseases. It has now been widely acknowledged that ncRNAs a new area in the field of biomarkers has emerged. ncRNAs are RNA molecules of different sizes that are transcribed as independent genes or as part of protein coding genes and are not translated, therefore they do not produce proteins. They have been classified according to their size and function and include micro RNAs (miRNAs), piwiRNAs (piRNAs), snoRNAs and long non coding RNAs (lncRNAs). These non coding RNAs are present in different cell compartments participating in multiple cell functions, but they have also been identified in biological fluids, also known as cell-free or circulating ncRNAs, where they can be detected in exosomes, bound on lipoproteins as well as free circulating molecules. The role of circulating ncRNAs is still under investigation but are believed to be paracrine or endocrine messengers to systematically deliver signals between cells and tissues. Extensive studies have implicated a family of ncRNAs, this of miRNAs in disease pathogenesis and their potential as diagnostic and prognostic biomarkers of diseases. Recent evidence have identified additional families of ncRNAs such as piRNAs or lncRNAs as potential diagnostic tools both in the serum and in tissues. Detecting ncRNAs in biological fluids has opened a new field in Clinical Chemistry utilizing them as biomarkers of diseases or prognostic markers for different pathological conditions. To date, individual ncRNAs or groups of ncRNAs are being used to facilitate disease diagnosis. Nevertheless, diversity between individuals and pathogenetic mechanisms limits their specificity for most conditions. As high throughput analyses are becoming wider used and more affordable, ncRNA profiling is emerging as a diagnostic and prognostic approach. Profiling utilizes next generation sequencing approaches and allows screening of all ncRNAs in biological fluids or cell extracts, thus providing a comprehensive view of the changes in any particular patient. Serum ncRNA profiling coupled with bioinformatics analyses that identify targets and functions associated with the target genes, provides evidence for a direct impact of the circulating ncRNAs on disease pathogenesis. A recent example published by our group has shown that ncRNA profiling identified miRNAs and piRNAs as biomarkers of male subfertility and associated those with hypogonadism. Additional examples in cancer patients have indicated that changes in serum ncRNA profiling reflects changes in cancer growth and may predict disease outcome. Thus, profiling of ncRNAs will provide a diagnostic tool that allows global understanding of changes occurring in diseases. Thus, ncRNA profiling coupled with proteomics analyses in patient samples is the foreseeable future in diagnostics.

Ethical issues in (pharmaco) genetics

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Apart from genetic testing for diagnostic purposes, application of genetics in human medicine encompasses genetic interventions and pharmacogenetical testing which are becoming more frequently utilized in clinical practice, as well as genetic studies employed in the process of research and drug development.
It's been widely known and accepted that application of a drug in equal dosing regimens for treatment of the same diagnosis in different patients, doesn't produce equal results regarding achievement of a therapeutic effect and/or occurrence of side effects. Investigating the genetic cause for interindividual variations in patients' drug response and toxicity, pharmacogenetics holds valuable prognostic and predictive value in tailoring the pharmacological treatment of various diseases accorcing to the principles of precision medicine.
But, just as any other medical testing, genetic analyses impose ethical risks which in this case are even more serious due to the following specific features of these tests and the obtained data: the "mutual" ownership of the genetic information by individuals from the same family, the lack of precise phenotype-genotype correlation and the influence of epigenetic and environmental factors on the phenotypic expression of genetic information, the balance between the right of an individual "to know" and the right "to not know" as well as the enormous potential for discrimination. The rapid advancement of high throughput technologies delivering a mass of detailed data on an individual's genome introduces a lot of advantages in scientific and clinical applications, but also threatens with a tremendous risk for misuse of these data in various settings.
The lecture discusses the fundamental ethical principles applicable to genetic analyses/studies including respect of the individual's autonomy and privacy and commitment to providing confidentiality, beneficence and justice. The informed consent as well as the levels of anonymization in genetic testing as measures to satisfy the above mentioned principles will be addressed. Special emphasis will be placed on the ethical issues regarding orphan and rescued drugs emerging in the pharmacogenetical testing within clinical studies in drug research and development.
Philosophers of science claim that science is morally neutral, it is actually the use and implementation of science that can have positive or negative impact. Hence, it is crucial to understand that achievement of our aim for humane application of (pharmaco)genetics can only be accomplished if technological and clinical advances in this field advance at a similar rate with the corresponding ethical considerations.

The relationship between adiposity parameters and hsC-reactive protein values in overweight and obese women

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Overweight/obesity has become an important health problem in developed countries and as a result of the rising epidemic of obesity, understanding body fat distribution and its clinical implications is critical to timely treatment. Adipose tissue is anatomically distributed in different proportions throughout the human body, but the percentage of adipose tissue is higher in women, the elderly and overweight individuals. Visceral adipose tissue is a hormonally active component of total body fat, which possesses unique biochemical characteristics that influence several normal and pathological processes in the human body. It has been distinctly linked to several pathological conditions including impaired glucose and lipid metabolism, insulin resistance, several malignancies, increased incidence of infections and non-infectious complications, and increased mortality