Report on the EUGenMed final conference "European Roadmap for Implementation of Sex and Gender in biomedicine and health research".

Report Workshop 1.3: „Sex and Gender in basic research"

Vera Regitz-Zagrosek reported on the workshop in "Sex specific approaches (S&G) in basic research" that took place in February 2015 in Berlin. She thanked all workshop participants coming from several European countries with very different research focuses.

Fig 1: Workshop participants

The rationale for a basic research workshop in EUGenMed was to understand sex differences that may contribute to improvements in therapy and to analyse how sex can be studied in basic research. It was first discussed whether disease specific approaches should be chosen or whether there are common sex specific mechanisms that play a role in many diseases. It was agreed that some basal mechanisms drive sex specific developments in many diseases, e.g. sex differences in immune cell and fibroblast function, in energy metabolism, cellular calcium handling, in mechanism of cell death. Fibrosis affects organ remodelling in many diseases in a sex specific manner. Estrogen decreases collagen synthesis in female cells and increases it in male cells. This sex specific modulation of fibrosis has been documented in models for rheumatic diseases, for heart failure and in models for renal diseases. Sex specific modulation of fibrosis and other mechanisms contribute to sex differences in autoimmune diseases and inflammation, myocardial infarction, heart failure, diabetes, renal diseases, cancer and many other diseases. These basal mechanisms are controlled by genetic and epigenetic processes, by sex hormones and their receptors. The group discussed that X-chromosome analysis is still underrepresented in whole genome analysis, but inclusion of the X-chromosome may provide new insights into molecular diseases, into the pathogenesis of many diseases. X-chromosomal variants have been associated with the slow progression to AIDS in HIV-1-infected women. There are already some translational approaches that have been started. Susanna Hofmann works on diabetes and lipid levels and hopes to develop sex specific therapeutic approaches.

Therefore it is important to develop sex specific research as a disease independent discipline where underlying mechanisms can be studies. Models for sex specific basic research are complicated and costly and need to be developed in a disease independent approach. Examples are sex hormone receptor knock-outs or over-expressors or the four core genotypes model.

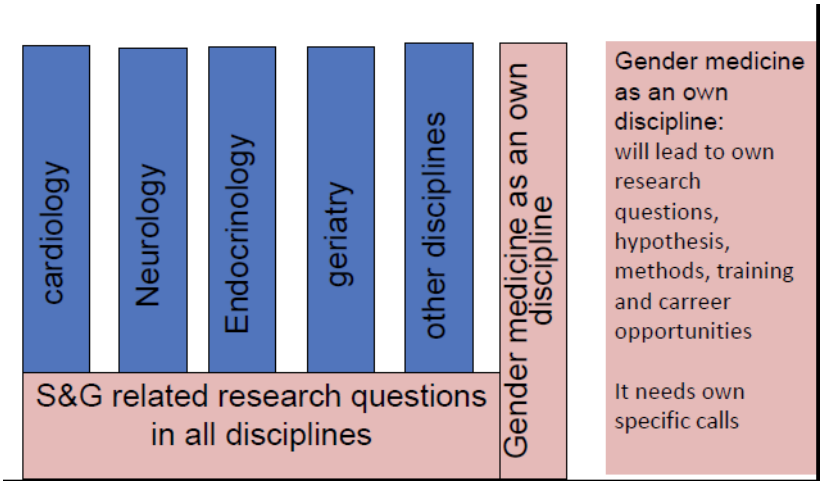

Fig 2: The organization of sex specific research across disciplines and as an own discipline

Conclusions:

The workshop concluded that sex differences must be studied in as many disease models as possible. It also pointed out that sex differences at cellular level are relevant for many diseases, that sex and sex hormones affect basic cellular physiology by some disease independent mechanisms. Therefore, it is also important to develop sex and gender differences in disease independent manner in an own discipline with own methods tools, research questions that offers training and career opportunities to young researchers and has its own specific research calls.