Cytomics and Cytomics Technologies in Cardiovascular disease

Attila Tarnok PhD

Pediatric Cardiology, Cardiac Center, University of Leipzig, Germany. E-mail: tarnok@medizin.uni-leipzig.de

The molecular analysis of heterogeneous cellular systems (Cytomics) by cytometry in conjunction with pattern-oriented bioinformatic analysis of the multiparametric cytometric and other data provides a promising approach to individualized or personalized medical treatment or disease management. This procedure, termed **Predictive Medicine**, aims at the detection of changes in patient's disease state prior to the manifestation of deterioration or improvement of the current status. Patient-specific, disease-course predictions with >95% or >99% accuracy during therapy would be highly valuable for everyday medicine. If these predictors were available, disease aggravation or progression, frequently accompanied by irreversible tissue damage or therapeutic side effects, could then potentially be avoided by early preventive therapy. Predictive medicine is best implemented by cell oriented measurements e.g. by flow or image cytometry. Cell oriented gene or protein arrays as well as bead arrays for the capture of solute molecules form serum, plasma, urine or liquor are equally of high value. Cardiovascular diseases are a prominent field for the clinical implementation of predictive medicine by Cytomics. The problems covered include multi organ failure, sepsis or non infectious posttraumatic shock in intensive care unit, or pretherapeutic identification of high risk patients for restenosis after stent implantation. Our group has demonstrated the applicability of Predictive Medicine by Cytomics in phase I studies in several different areas of cardiovascular diseases and interventions. Early individualized therapy may provide better survival chances for the individual patient at concomitant cost containment. Predictive medicine guided early reduction or stop of therapy may lower or abrogate potential therapeutic side effects. As a consequence, better patient care and new forms of inductive scientific hypothesis development based on the interpretation of predictive data patterns are at reach.