Proteomics - Technologies, Markets and Companies

Description: This report describes and evaluates the proteomic technologies that will play an important role in drug discovery, molecular diagnostics and practice of medicine in the post-genomic era - the first decade of the 21st century. Most commonly used technologies are 2D gel electrophoresis for protein separation and analysis of proteins by mass spectrometry. Microanalytical protein characterization with multidimensional liquid chromatography/mass spectrometry improves the throughput and reliability of peptide mapping. Matrix-Assisted Laser Desorption Mass Spectrometry (MALDI-MS) has become a widely used method for determination of biomolecules including peptides, proteins. Functional proteomics technologies include yeast two-hybrid system for studying protein-protein interactions. Establishing a proteomics platform in the industrial setting initially requires implementation of a series of robotic systems to allow a high-throughput approach for analysis and identification of differences observed on 2D electrophoresis gels. Protein chips are also proving to be useful. Proteomic technologies are now being integrated into the drug discovery process as complimentary to genomic approaches. Toxicoproteomics, i.e. the evaluation of protein expression for understanding of toxic events, is an important application of proteomics in preclinical drug safety. Use of bioinformatics is essential for analyzing the massive amount of data generated from both genomics and proteomics.

Proteomics is providing a better understanding of pathomechanisms of human diseases. Analysis of different levels of gene expression in healthy and diseased tissues by proteomic approaches is as important as the detection of mutations and polymorphisms at the genomic level and may be of more value in designing a rational therapy. Protein distribution/characterization in body tissues and fluids, in health as well as in disease, is the basis of the use of proteomic technologies for molecular diagnostics. Proteomics will play an important role in medicine of the future which will be personalized and will combine diagnostics with therapeutics. Important areas of application include cancer (oncoproteomics) and neurological disorders (neuroproteomics). The text is supplemented with 44 tables, 28 figures and over 500 selected references from the literature.

The number of companies involved in proteomics has increased remarkably during the past few years. More than 300 companies have been identified to be involved in proteomics and 223 of these are profiled in the report with 456 collaborations.

The markets for proteomic technologies are difficult to estimate as they are not distinct but overlap with those of genomics, gene expression, high throughput screening, drug discovery and molecular diagnostics. Markets for proteomic technologies are analyzed for the year 2015 and are projected to years 2020 and 2025. The largest expansion will be in bioinformatics and protein biochip technologies. Important areas of application are cancer and neurological disorders.

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