SELDI ProteinChipTM technology: present applications and perspective for cancer and space biomedical research.

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SELDI (Surface Enhanced Laser Desorption Ionization) ProteinChipTM technology is a combination of a variety of active chromatographic and affinity surfaces with a laser based detector providing direct molecular mass readout. This combination permits extremely fast and effective analysis of complex biological mixes: bacterial lysates, cell extracts, conditioned media, blood serum, urine, tissue sections and etc. Moreover, one can quickly find conditions of purification of target protein(s) and study its properties. It permits, also, the analysis of different kinds of protein modifications, epitope mapping, protease mapping, protein-protein, protein -nucleic acid interaction analysis and C-terminal microsequencing. Only femtomoles of proteins are needed. Researchers never have to elute anything from the surface as everything is done on proteins retained and purified on a surface. Each protein chip permits the study of one marker under 8 to 24 different conditions or vice versa, to screen 8 to 24 patients under one experimental condition. Higher throughput screening is possible.

Data on tumor diagnostic markers, markers of drug efficacy, a combination of LCM (Laser Capture Microdissection) with SELDI, study of protein-protein interactions, analysis of protein glycosylation/deglycosylation, phosphorylation/dephosphorylation and epitope mapping will be presented. The perspective of SELDI applications for the studies of physiological variation and the possible value of this technology for the NASA space program will be discussed.