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Application of nanobiotechnology in oncoproteomics

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Nanoproteomics is a new proteomics technology that is an application of nanobiotechnology to proteomics. Nowadays, cancer-related nanoproteomics play a pivotal role by contributing to the development of oncoproteomics, such as cancer diagnosis, detecting cancer and its location in the body, cancer treatment, delivering anti-cancer drugs, and cancer prevention. Researches have shown that nanoproteomics has the potential to dramatically increase the effective and fast oncoproteome analysis by using nanoparticles. It can be subjected to nanoscale proteins that may exclusively be isolated from biopsies of tumors and then can be analyzed by different nanoproteomics methods. High-field asymmetric waveform ion mobility mass spectrometry (FAIMS) with electrospray and nanoelectrospray MS is an ion mobility technology that has been used in ion separation in determination of low abundance peptide ions from cancer samples. Nanoflow Liquid chromatography (nanoLC) combined with electrospray ionization mass spectrometers and tandem mass spectrometers is sensitive in identifying gel-separated cancer proteins and peptides. In addition to this, gel-free approaches in combination with nanoLC and LC have been advanced to perform faster and more comprehensive proteome analysis. Also LC-MS/MS (nanoflow liquid chromatography-mass spectrometry) analysis has been developed to expand the identification of low abundance peptide and increase reliable peptide sequencing information for targeted oncoproteomics. In conclusion, developing nanoproteomics technology using nanoparticles in the field of cancer is very important because studies show that it is able to detect low abundance proteins which would be highly difficult to obtain otherwise.

Biography

Sevgi Gezici is currently a research assistant and PhD student in Turkey. She received her Master's in Molecular Biology and Genetics. She has focused on proteomics that detect new potential cancer protein biomarkers in her PhD thesis. Now she is at Texas A&M University, working in the Laboratory for Biological Mass Spectrometry as an invited researcher. She has received scholarships for her MSc and PhD from TUBITAK, which is the best research center in Turkey.

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