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Electrospray from an Affinity Capture Probe

A high-throughput mass spectrometry system uses specific mass tags and probes for automated, multiplexed identification and quantification of rare cells, such as circulating tumor cells, in whole blood.

A significant challenge in science is the detection and characterization of circulating tumor cells, which are present in people with solid tumors and are thought to be a route to metastasis. Recovery of viable cells can facilitate genotyping, and hence, allow characterization of drug susceptibility. Current techniques use a blood filtration system that holds white blood cells, as well as rare cells, and allows the rare cells to be recognized through microscopy after immunological reactions involving fluorescent stains. In such a process, the optical microscopy readout system is reliable, but difficult to automate.

Researchers at Purdue University have developed a mass spectrometry approach for identifying a rare target analyte in a complex sample such as circulating tumor cells in a blood sample. This is accomplished using mass tags and a mass spectrometry probe. The probe specifically captures the mass tag in the sample and is configured to ionize the sample so that the mass tag is ionized in an environment that causes the mass tag to be dissociated from the binding moiety on the surface of the probe. The ionized mass tag is analyzed in a mass spectrometer to determine if the target analyte has been captured from the sample. Systems and methods of this technology provide a mass spectrometry readout for identifying a rare target analyte in a complex sample that can be easily automated.

Advantages:

-Multiplexed recognition of different types of rare cells

-Identification and quantification of small numbers of rare cells in whole blood

-High throughput capabilities

Potential Applications:

-Mass Spectrometry

Technology ID

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Category

Biotechnology & Life Sciences/Biomarker Discovery & Diagnostics

Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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