

Controlled analysis of preanalytical variables in clinical blood and CSF sample collection, processing and storage: Implications for clinical research

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In the last ten years several robust technologies have been developed for proteomics-based biomarker discovery. However, a difficult problem in biomarker research and the elucidation of robust markers is the limited availability of carefully collected and controlled, high-quality human biospecimens. For example, sample collection, processing, handling and storage protocols for the most common specimens for biomarker discovery, i.e. blood and cerebral spinal fluid (CSF), are based on accepted practices rather than careful testing. We examined variables intrinsic to each step in the process of obtaining and storing clinical samples, beginning with electronically monitored collection of samples in controlled studies. Various blood collection tubes, times left on the bench, incubation temperatures, freeze-thaw cycle and freezer storage effects were compared. Seated or recumbent CSF collection and fasted or fed conditions were compared. Sample analysis was performed by high resolution mass spectrometry, leading to the identification of specific proteins that are affected by the various parameters tested. A multiplexed multiple-reaction monitoring (MRM) assay has now been assembled in order to determine sample integrity and utility for use of stored samples in clinical research.

Biography

Roy leads Caprion's US operations in California. A protein chemist by training, she has worked extensively in biomarker discovery, proteomics and protein characterization. Her work on finding brain lymphoma markers, published in the Journal of Clinical Oncology, demonstrated verification of proteomics results by non-mass spectrometric methods, reestablishing confidence in mass spectrometry-based technologies for finding biomarkers. She holds over 30 publications and patents in the area. Recently Dr. Roy has rebuilt Caprion's US operations and enabled technologies that can measure hundreds of plasma proteins in 1 microliter of plasma. She continues to work in biomarker discovery, particularly in neurological diseases.

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