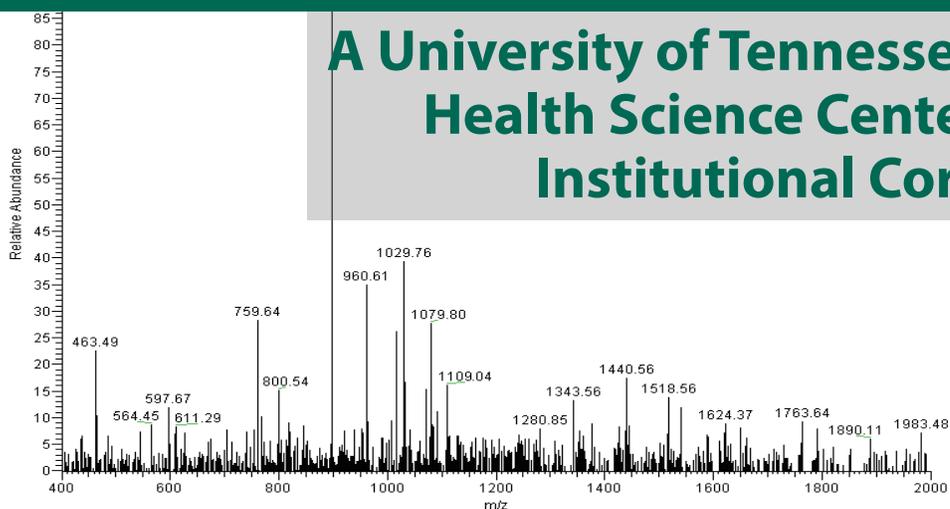


Proteomics and Metabolomics (PMC) Core



A University of Tennessee Health Science Center Institutional Core

The PMC Core's mission is to provide the UTHSC campuses with state-of-the-art mass spectral technology and support to facilitate molecular-level discoveries that transform and advance our understanding of biological systems to solve challenging, relevant scientific questions in the life sciences.

Introduction & Services

The Proteomics and Metabolomics Core (PMC) was established at the UTHSC in Memphis, TN in 2015. The Core was created to provide resources for the highest quality mass spectrometry (MS)-based analysis supporting research needs in the fields of proteomics, metabolic profiling and metabolomics. The Core provides consultations to optimize experiment design and to interpret generated data. Services include identification and absolute or differential quantification of metabolites, drugs, and other small molecules in body fluids, cell and tissue extracts, identification of individual proteins in simple and highly complex protein mixtures, identification and mapping of posttranslational and other modifications of proteins, differential protein expression analysis based on precursor ion quantification (SILAC, dimethyl labelling), reporter ion quantification (iTRAQ/TMT labelling), and precursor ion area detection (label-free analysis), analysis of protein-protein interactions, and determination of the molecular masses of analytes. The **Metabolic Phenotyping MS facility (MPMS)** within the PMC offers characterization of absolute and relative quantification of metabolites, such as those associated with glucose, lipid and protein metabolism, as well as specialized metabolite analyses.

Equipment and Software

The Core is equipped with a Thermo **Orbitrap Fusion Lumos mass spectrometer**-a tribrid mass spectrometer combining a Quadrupole, a Dual Linear Ion Trap, and Orbitrap mass analyzers able to perform CID, HCD, or ETD fragmentation, operate in parallel mode, and provide excellent resolution (500,000 FWHM @m/z 200), accuracy (1 ppm), sensitivity (quantification of 1 attomole at CV<15%), and high scan rate (20 Hz). The instrument operates in line with an ultra-HPLC system- Ultimate 3000RSLC Nano for nano-flow applications or Vanquish for micro-flow applications. The MPMS facility is equipped with an **Agilent 7000C GC/MS** instrument. The software tools for system operation/data acquisition and post-acquisition analysis of raw MS data include **Xcalibur/SII 4.1, Proteome Discoverer 2.2, PMI-Preview 2.14, PMI-Byonic 2.14, Compound Discoverer 2.1, Tracefinder 4.1, Lipidsearch 4.1**, and others.

Core Directors

David Kakhniashvili, PhD, is the director

of the PMC at UTHSC. He earned his MS in Chemistry at Tbilisi State University (Rep. Georgia) and Ph.D. in Biochemistry at the Institute of Protein Research of Russian Academy of Sciences. Dr. Kakhniashvili has multiple publications in the field of proteomics related to red blood cells and sickle cell disease. He joined the UTHSC team in 2015.

Michelle Puchowicz, PhD, is the director of the MPMS facility within the PMC. She brings expertise in small molecule targeted metabolomics and stable isotopomer analysis through mass spectrometry-based phenotyping techniques. These applications enable the identification of regulatory mechanisms that impact metabolism. Dr. Puchowicz earned a PhD in Nutritional Biochemistry from Case Western Reserve University and has over 17 years of collaborative expertise in the field of metabolism and whole body energetics. She joined the Division of Pediatric Obesity Program Team at UTHSC Memphis in summer of 2017.

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