

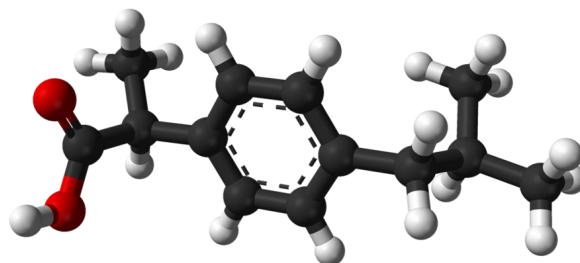


Small Molecule Analysis in Biomedical Research

Context— The identification and quantification of trace level, small bioactive molecules in complex matrices, including food, air, water, soil and biological fluids (blood, urine, saliva, hair, etc.) present formidable analytical challenges to basic laboratory and biomedical scientists and researchers. Small molecules have low molecular weights (<2,000 Daltons) and include lipids, monosaccharides, biological messengers, other natural products and metabolites, as well as drugs and environmental xenobiotics. They are distinct from macromolecules such as proteins. Although many of these small compounds provide health-enhancing effects or diagnostic benefits, they can also have large-scale negative impacts on humans and the environment.

Resources and Instrumentation— CESE has extensive analytical expertise and advanced instrumentation in the quantification of small bioactive molecules in a variety of matrices including plant and animal tissues, bacterial extracts, and therapeutics. Instrumentation includes:

- Sciex X500R Ultra High Performance Liquid Chromatograph/Time-of-Flight High Resolution Mass Spectrometer (UHPLC/QTOF)
- Ultra performance liquid chromatograph/tandem mass spectrometer (UPLC/MS/MS).
- UPLC with evaporative light scattering, fluorescence, and photo diode array detectors.
- Biotek Synergy HT Microplate Reader
- Genevac centrifugal evaporator



Research Capabilities— CESE has considerable capacity to support a diversity of small molecule research projects related to metabolomics, pharmaceuticals, nutrition, and food safety by providing a quantitative assessment of a wide array of small organic molecules ranging from lipids and neurotransmitters to vitamins and antibiotics.

Examples of projects that CESE can support include:

- Analysis of lipids in human and mouse tissues.
- Quantification of antibiotics in tissue
- Analysis of testosterone and dihydrotestosterone from biological fluids.
- Determination of concentrations of vitamins in human plasma and tissue.
- Quantification of cortisol as a stress biomarker in human hair and saliva.
- Identification and quantification of naturally occurring enterotoxic compounds linked to disease in the intestinal microbiota of humans and other animals.
- Trace analysis of leachable compounds from plastics in food, including bisphenol a and phthalates.