

Monitoring ADME Proteins in Extracellular Vesicles for Drug Therapeutics

Non-invasive extracellular vesicle assay that accelerates drug metabolism and safety testing.

Researchers at Purdue University have developed a new method for monitoring absorption, distribution, metabolism, and excretion (ADME) of new drug therapeutics by quickly and noninvasively measuring proteins from extracellular vesicles (EVs), a class of biological entities released by cells that includes microvesicles and exosomes and that is present in fluids such as urine or blood. Current ADME studies are invasive and slow as researchers collect tissue samples from patients in clinical drug trials and use centrifugation to extract cytochrome P450 (CYP) and UDP-glucuronosyltransferase enzymes responsible for metabolizing over 90% of drugs. Purdue researchers introduce a new biochemical assay to assess ADME properties of therapeutics by quantifying enzymes extracted from EVs. Using their previously described EVtrap method to isolate EVs, extracting proteins, and analyzing with mass spectrometry Purdue researchers identified multiple CYP family enzymes from cell culture media. They also quantified induction of the enzyme, CYP 3A4, in hepatocyte lysate in response to two drug treatments and quantified the same enzyme in human plasma.

Advantages:

- Able to Detect More Peptides and Proteins Than Current Technology
- Non-Invasive
- High Throughput

Potential Applications:

- Pharmaceutical Research
- Clinical Studies

Technology Validation:

Technology ID
2020-TAO-69103

Category

Biotechnology & Life
Sciences/Biomarker Discovery &
Diagnostics
Pharmaceuticals/Drug Discovery
& Development
Biotechnology & Life
Sciences/Analytical & Diagnostic
Instrumentation

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The abundance of peptides from the ADME protein, CYP3A4, was measured in extracellular vesicles extracted from hepatocyte lysates and from human plasma.

TRL: Biotechnology

Intellectual Property:

Provisional-Patent, 2020-06-01, United States

Utility Patent, 2021-06-01, United States

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