Assessing In Vivo Efficacy of Drug Therapeutics by Monitoring Proteins from Extracellular Vesicles

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- Biotechnology
- Pharmaceuticals

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- Biotechnology
- Cancer Research
- Drug Development
- Extracellular Vesicle
- Medicinal Chemistry
- Metabolomics
- Patient Care
- Peptides
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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 34A, 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:
The abundance of peptides from the ADME protein, CYP3A4, was measured in extracellular vesicles extracted from hepatocyte lysates and from human plasma.

People:

- Tao, Weiguo Andy (Project leader)
- Wu, Xiaofeng

Intellectual Property:

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