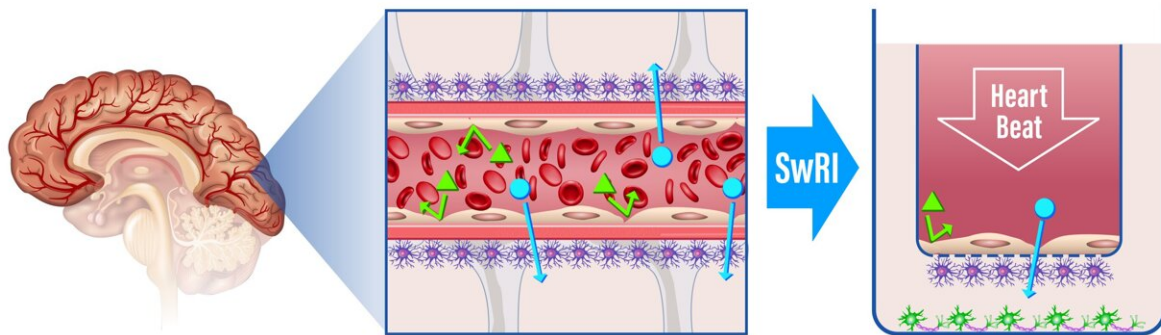


# A new screening method for measuring blood-brain barrier permeability

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SwRI developed a new screening method (on the right) that uses in vitro brain cells to identify potential drug formulations, depicted in blue and green, that can penetrate the brain's complex and highly selective blood-brain barrier with hydrodynamic forces to simulate movement or a heartbeat. Credit: Southwest Research Institute

Scientists at Southwest Research Institute have developed a new screening method to identify drug formulations that can penetrate the blood-brain barrier (BBB), to facilitate treatment of brain diseases and conditions.

"The BBB protects the brain and central nervous system from potentially harmful substances in the bloodstream, regulating the transport of essential nutrients and ions while maintaining the stability of the central

nervous system," said Research Engineer Nicholas McMahon, from SwRI's Bioengineering group.

"However, the very characteristics that make the BBB such an effective protector also pose significant challenges to the delivery of therapeutic agents to treat various neurological disorders."

SwRI has developed a technique to measure the permeation rates of molecules passing into the brain. By mimicking the interaction of pharmaceuticals with the BBB's dynamic, highly regulated processes, researchers can understand how to override the brain's natural defenses to support the development of targeted pharmaceutical treatments for neurological conditions and diseases.

"Our lab models offer an efficient, cost-effective and reproducible means of studying the molecular and cellular interactions at the BBB while avoiding the ethical and logistical issues associated with in vivo studies," said Principal Scientist Dr. Mike Rubal, the lead on the project.

The Institute leverages multidisciplinary pharmaceutical and bioengineering research and development to provide every phase of drug development from initial concept through clinical trials. SwRI scientists have used the new BBB techniques to screen multiple compounds for internal research and government projects. The team also developed specific liposomes; lab-created cell membranes designed to penetrate the BBB.

"A liposome is essentially a Trojan horse that can deliver drugs to the brain," said Darrel Johnston, director of SwRI's Pharmaceutical and Bioengineering Department. "Using our microencapsulation expertise, we can disguise a drug to get around the brain's robust protections."

The team hopes the new approach will advance potential treatments for a

variety of diseases and conditions.

"To treat diseases such as Alzheimer's requires penetrating the [blood-brain barrier](#)," said Rubal. "The Institute's BBB work will open the door to new treatments and pharmaceuticals we can develop at Southwest Research Institute."

SwRI will showcase the BBB analyses and other [innovative research](#) at booth No. 312 at the upcoming [Military Health Systems Research Symposium](#), August 26–29, in Kissimmee, Florida.

Provided by Southwest Research Institute

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