

# Entering the Blood Brain Barrier



**Shikha Nangia**

Assistant Professor, Biomedical and Chemical Engineering

Extreme Shrinkage of  
Cerebral Cortex

Severely  
Enlarged  
Ventricles

## CURRENT RESEARCH

### An engineering marvel for the future of therapeutics

The blood-brain barrier (BBB) serves the critical role of allowing only certain types of molecules to enter the brain from the blood stream. This important capability protects the brain from exposure to undesirable chemical compounds. However, it also prevents certain drugs from entering the brain to treat disorders or diseases like the Alzheimer's disease. Dr. Shikha Nangia, Assistant Professor of Biomedical and Chemical Engineering at Syracuse University, develops multiscale modeling techniques to understand the limited permeability of the BBB. Since the segment of the US population older than 65 is expected to increase by 50% by 2030, and the cost of care to treat patients with these kinds of brain diseases is billions of dollars per year, finding new ways to help address the BBB would provide significant benefits to patients and the nation. Thus, Dr. Nangia's research will combine existing theories in a new way to understand how this movement is controlled across the BBB, and will use an extensive computational tool-kit to engineer favorable pathways to transcend around it.

It is through the unique delivery of novel computational approaches that Dr. Nangia and her team are helping to elucidate the molecular interaction at the biological interfaces. Thus, rather than an experimental approach that requires researchers to guess and test, Dr. Nangia uses sophisticated mathematics and computers to develop models to study the transport of chemical therapeutics across the BBB. In this way, her research is likely to shed light on the molecular basis of what is causing the BBB, a mystery that has been studied for many years. Furthermore, by understanding the BBB, Dr. Nangia is highly motivated to find therapeutic...

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## AFFILIATION



Syracuse University

## EDUCATION

- Ph.D., in Chemistry, 2006 , University of Minnesota

## AWARDS

- NSF CAREER award, 2015
- Faculty Excellence Award, College of Engineering and Computer Science, Syracuse University, 2015
- Nominated for 2015 Judith Sienfeld Award Distinguished Fellow Award
- Nominated for 2015 Blavatnik Awards for Young Scientists
- Fellowship, Council of Science and Industrial Research (CSIR), India

## RESEARCH AREAS

Life Science, Chemistry, Computational Sciences / Mathematics, Nanotechnology

## FUNDING REQUEST

Your contributions will support the continued research of Dr. Shikha Nangia, of Syracuse University, as she studies the limited permeability of the blood-brain-barrier. Donations will fund the personnel required to speed up the rate of discovery and foster a creative learning environment. To fully support these individuals and their research infrastructure, \$100K/year is required. Be a part of uncovering the mechanisms that protect our brain but also inhibit important medications from relieving debilitating disease; fund Dr. Nangia.