Advances in drug delivery are part of Northeastern's mission to identify solutions to global challenges like health, security, and sustainability.

Researchers at Northeastern are collaborating across disciplines to reimagine drug delivery. The combination of outside-the-box collaborations and innovative technologies to tackle health challenges results in what's just one example of the University's excellence in use-inspired research. Advances in drug delivery are part of Northeastern's mission to identify solutions to global challenges like health, security, and sustainability.

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Mansoor Amiji, distinguished professor and chair of the department of chemical engineering
Research focus: Amiji is leading interdisciplinary research into nanotechnology-based methods of drug delivery that could provide breakthroughs in treating diseases like cancer, inflammatory ailments, Alzheimer’s, Parkinson’s, and HIV/AIDS.
Recent grants: $13.5 million from the National Institutes of Health for the Center of Cancer Nanotechnology Excellence; $2.1 million from the National Science Foundation to train doctoral students in nanomedicine science and technology; $2.32 million over five years from the National Institute of Neurological Disorders and Stroke to examine a system of delivery that will allow drugs to cross the blood-brain barrier; $560,000 over two years from the National Institute of Neurological Disorders and Stroke to examine a system of delivery that will allow drugs to cross the blood-brain barrier; $500,000 over two years from the National Institute of Health to develop innovative technologies for isolating and cultivating stem cells for use in the replacement of damaged tissue; $484,788 from the National Science Foundation to help better understand the role of cell surface markers in microfluidic cell separation.

Graham Jones, chair of the department of chemistry and chemical biology, associate director of Northeastern’s Barnett Institute to develop more potent therapies for killing cancer cells that become resistant after initial chemotherapeutic treatment.
Research focus: Jones is investigating targeted ways to deliver antitumor drugs.
Recent grants: $1.8 million from the Department of Energy to look for more rapid ways to test drugs at the preclinical stage; $500,000 from the National Institutes of Health to develop a line of chemical agents that target certain tumors that are typically difficult to treat.

Shashi Murthy, associate professor and associate chair of chemical engineering
Research focus: Murthy is investigating based methods of drug delivery that could provide breakthroughs in treating diseases like cancer, inflammatory ailments, Alzheimer’s, Parkinson’s, and HIV/AIDS.
Recent grants: $1.9 million grant over three years from the National Institutes of Health for the Center of Cancer Nanotechnology Excellence; $2.1 million from the National Science Foundation to train doctoral students in nanomedicine science and technology; $2.32 million over five years from the National Institute of Neurological Disorders and Stroke to examine a system of delivery that will allow drugs to cross the blood-brain barrier; $560,000 over two years from the National Cancer Institute to develop more potent therapies for killing cancer cells that become resistant after initial chemotherapeutic treatment.

TWEEZERS FOR DRUG DELIVERY
Constantinos Mavroidis, professor of mechanical and industrial engineering, oversees Northeastern’s research in bio-nano robotics, which harnesses the power of peptides, DNA strands, and other naturally occurring “molecular machines.”

One of Mavroidis’s projects involves a V-shaped coiled protein dubbed the nano-tweezer which opens and closes like tweezer arms when pH levels are altered. Among other uses, it could potentially be used to open and close tiny channels in a drug-delivery device.

Mavroidis and other researchers, including associate chemistry professor David Budil, worked on methods for manipulating the tweezer-like protein. Mavroidis worked on development and design. Budil figured out how to measure the force with which the arms open and close by attaching a magnetic molecule to each arm.

For more information, contact Tim Leshan, vice president for government relations, 617.373.8528, t.leshan@neu.edu.

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