What's next for gene therapy? Plastic

September 13 2006

Gene therapy depends upon foreign DNA, even viruses, to deliver genes, therapeutic proteins, or medicine to cells within the body. Many scientists are looking for better chaperones across the cell membrane. Virginia Tech researchers think polymer molecules can be created to do the job.

The research will be presented at the 232nd national meeting of the American Chemical Society in San Francisco September 10-14, 2006.

"We are applying our fundamental knowledge in polymer science to gene transfer agents," said Tim Long, professor of chemistry in the College of Science at Virginia Tech. "We are trying to understand how the structure of the chaperone impacts the efficiency of its ability to transfer DNA across the cell membrane."

Entire texts have been devoted to the subject, Long said. "But the researchers are usually biologists. Polymer scientists can bring a unique perspective that I think will lead to new advances."

Long's graduate student, John M. Layman of Richmond, Va., will share information regarding star-shaped, or highly-branched, molecules, which are extremely effective at transfection. Long's group has demonstrated that the topology of these particular polymers can be changed. "We can control the molecular shape and number of functional end groups," said Long. "We think that topology is important because it can influence the strength of the interaction with DNA and permit efficient release of the DNA for protein synthesis."

"The paper defines a new paradigm for research," said Long. Layman, whose bachelor of science degree is from Virginia Commonwealth University in chemical engineering, "typifies the way we are going to educate students in the future," Long said. "He is an engineer working in chemistry on gene therapy. He collaborates with researchers in the Virginia Tech-Wake Forest School of Biomedical Engineering and Oak Ridge National Laboratory.

Source: Virginia Tech