

CONTROLLED-RELEASE TECHNOLOGY



ADVANCES INDIVIDUALIZED DRUG THERAPY

Auburn University researchers Mark Byrne and Jacek Wower have developed a way to control the release of drugs into the body and, as a result, reduce the frequency of doses and side effects from multiple medications. Along with doctoral student Siddarth Venkatesh, they used tiny RNA molecules called aptamers to control the release of drugs. For each patient, the drug delivery can be set to occur at various rates or under certain conditions, including exposure to an enzyme or reaching a specific temperature. Unlike past studies, this technology is capable of delivering doses of multiple drugs at different rates or a single drug at controllable and extended rates from one medical device.

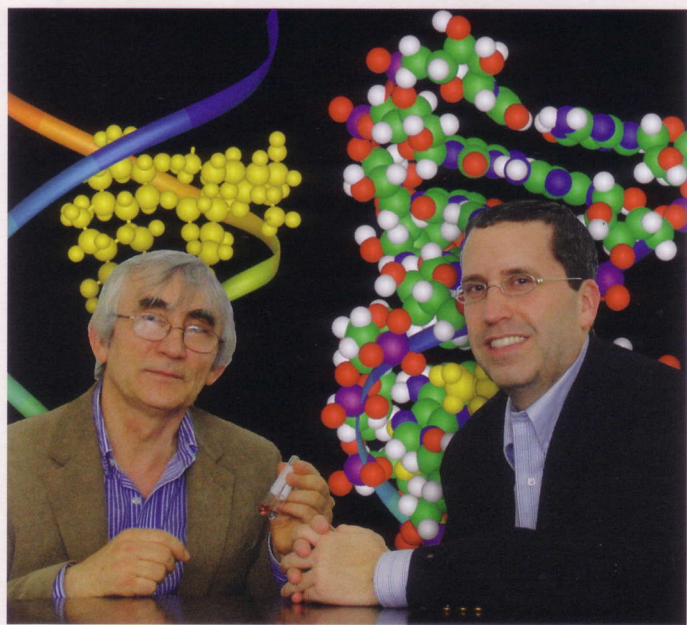
“There is a need to create tailor-made treatments because one person may respond differently to a medication than another,” said Wower. “Medicine of the future will take into account a unique genetic blueprint of every patient, increased risks for certain illnesses, and how patients respond to disease and therapy.”

The research team, which now includes doctoral student Padma Sundaram, is studying formulations based on both implantable gel systems and injectable gold nanoparticles. The gold nanoparticles could prove to be an important step for providing multiple-drug releasing carriers capable of delivering the right amount of medication at the right time, and to a targeted location.

“Nucleic acids work well for controlled drug delivery because they can easily be programmed to bind therapeutics, metals, other nucleic acids, and proteins,” said Byrne. “Based on the patient’s needs, the strength of the binding can cause drugs to release at varying rates and amounts over a certain time and can be controlled in a variety of ways.”

Wower, a professor in Auburn’s Department of Animal Sciences, is a biochemist who studies the structure and function of RNA molecules, conducting research in biochemistry, molecular biology, and bioinformatics. Byrne, whose expertise is biomedical engineering, biomaterials, biomedical devices, and drug delivery, is the Sanders Associate Professor of Chemical Engineering at Auburn. Venkatesh completed his doctoral degree in chemical engineering at Auburn and is now a researcher at Rockefeller University in New York.

—Sally Credille



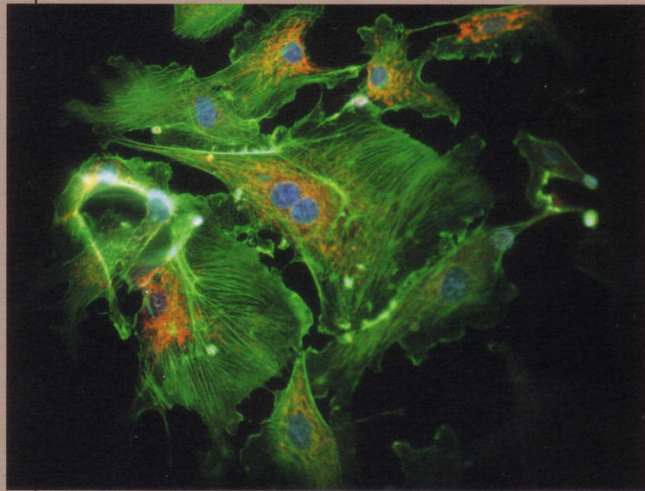
← Left to right: Jacek Wower and Mark Byrne



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