Sticky Nanoparticles Can Help Mend Broken Hearts
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Researchers at Clemson University have developed a promising, non-invasive way to fight heart disease by using nanoparticles coated with a sticky protein to deliver drugs to clogged or damaged arteries.

The researchers, led by Clemson bioengineering professor Naren Vyavahare, hope their breakthrough could someday supplement, or even replace, traditional heart disease treatments such as vascular stents, which hold blood vessels open and release drugs like paclitaxel.

"Healthy arteries have elastic fibers that provide elasticity. They are like rubber bands in the tissue that allow expansion and recoil during blood flow," Vyavahare explained.

"In most cardiovascular diseases, elastic fibers in arteries get damaged, creating hooks that can be used to target drugs."

The nanoparticles developed by the Clemson researchers latch onto these damaged arteries to deliver a drug to the site in slow-release manner. The nanoparticles can be engineered to deliver a variety of drugs, including paclitaxel, which inhibits cell division and helps prevent the growth of scar tissue that can clog arteries. The nanoparticles also have unique surfaces that allow prolonged circulation time, providing more opportunities for the particles to accumulate at the damage site, the researchers said.
Fighting Heart Disease With Sticky Nanoparticles - Health News - redOrbit

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"We developed nanoparticles that have antibodies on the surface that attach to diseased sites like Velcro," said Vyavahare.

"Interestingly, these newly created nanoparticles only accumulate at the damaged artery, not in the healthy arteries, enabling site-specific drug delivery."

Clemson graduate student Aditi Sinha, lead author on a paper about the work that will soon be published in the journal Nanomedicine: Nanotechnology, Biology and Medicine, noted that the particles could be administered intravenously to allow prolonged treatment.

"These nanoparticles can be delivered intravenously to target injured areas and can administer drugs over longer periods of time, thus avoiding repeated surgical interventions at the disease site," she said.

The researchers said their work is an encouraging step toward new treatments for cardiovascular and other diseases. The Clemson team is currently testing the nanoparticles to determine the most effective drug dosage for vascular tissue repair. However, the technology offers hope for a variety of other diseases as well, such as chronic obstructive pulmonary disease, Marfan syndrome and elastic fiber-related disorders such as aortic aneurysms.

Source: redOrbit Staff & Wire Reports - Your Universe Online

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