Safer and cheaper: New research in ‘nanospears’ could transform gene therapies

UCLA scientists have developed a new method that utilizes microscopic splinter-like structures called “nanospears” for the targeted delivery of biomolecules such as genes straight to patient cells. These magnetically guided nanostructures could enable gene therapies that are safer, faster and more cost-effective.

The research was published in the journal ACS Nano by senior author Paul Weiss, UC Presidential Chair and distinguished professor of chemistry and biochemistry, materials science and engineering, and member of the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research at UCLA.

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Current gene therapy approaches rely on modified viruses, external electrical fields or harsh chemicals to penetrate cell membranes and deliver genes straight to patient cells. Each of these methods has its own shortcomings; they can be costly, inefficient or cause undesirable stress and toxicity to cells.

To overcome these barriers, Weiss and Dr. Steven Jonas, a clinical fellow in the UCLA Broad Stem Cell Research Center Training Program, led a research team that designed nanospears composed of silicon, nickel and gold. These nanospears are biodegradable, can be mass-produced inexpensively and efficiently, and, because of their infinitesimal size — their tips are about 5,000 times smaller than the diameter of a strand of human hair — they can deliver genetic information with minimal impact on cell viability and metabolism.

Read full, original post: Nanostructures created by UCLA scientists could make gene therapies safer, faster and more affordable