

One Step Closer to Effective Needle-Free Injections

Researchers Design Novel Pulsed Microjet System To Deliver Protein Drugs Into the Skin Without the Pain or Bruising of Other Methods

Santa Barbara, California ? March 6, 2007 -- A team of UCSB researchers, in collaboration with colleagues from UC Berkeley and StrataGent Life Sciences, of Los Gatos, California, has designed a novel pulsed microjet system engineered to deliver protein drugs into the skin without the pain or bruising that deeper penetration injection systems cause. The research was published online today in the Proceedings of the National Academy of Sciences.

The effort to create needle-free drug delivery systems is driven by a combination of factors, including needle phobia, pain and discomfort, infections, and accidental needle sticks to healthcare providers. Currently, about 12 billion needle injections are performed every year for the delivery of vaccines and protein therapeutics such as insulin, growth hormone and erythropoietin, a red blood cell booster. Needle-free delivery of vaccines has recently been identified as one of the significant emerging challenges in global health.

The researchers felt that the pain and bruising caused by previously-developed jet injectors was caused by the deep penetration of jets into the skin, creating negative reactions of nerves and capillaries. The pulsed microjets engineered by the researchers combine high velocity (more than 100 meters per second) with very small jet diameters (between 50 and 100 micrometers), delivering only 2 to 15 nanoliters of liquid drug at a time. The research showed that the pulsed microjet system could be used to effectively deliver drugs for local and systemic applications without using needles.

?The microjet system delivers precise doses into superficial skin layers, thereby mitigating pain,? says Samir Mitragotri, a professor of chemical engineering at UCSB and a lead author of the paper. The system was designed as an alternative to the macro-scale systems that had been causing pain and bruising. ?We realized that we had to find a way to stop the jets from going deep into the skin,? says Mitragotri. ?Speeding the delivery, combined with using extremely small jet diameters and less liquid per pulsation, was shown to be more effective.?

About the College of Engineering:

The College of Engineering at UC Santa Barbara is a global leader in bioengineering, chemical and computational engineering, materials science, nanotechnology and physics. UCSB boasts five Nobel Laureates (four in sciences and engineering) and one winner of the prestigious international Millennium Technology Prize. Our students, professors and staff thrive in a uniquely-successful interdisciplinary and entrepreneurial culture. Our professors? research is among the most cited by their peers, evidence of the significance and relevance of their work.

Media Contacts:

Samir Mitragotri: samir@engineering.ucsb.edu, 805.893.7532

Tony Rairden: trairden@engineering.ucsb.edu, 805.893.4301

Released by Barbara Bronson Gray

Images



Media Contact

Tony Rairden

trairden@engineering.ucsb.edu

805.893.4301
