

TITLE

**Intradermal delivery
of fast acting
insulin for diabetes
management**

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Insulin delivery relies on needle injection, leading to less patient compliance. Transdermal delivery of insulin has been successfully demonstrated but dose accuracy and skin irritation are problematic in addition to the complex basal-bolus delivery profile required by insulin therapy. We present a novel intradermal delivery (delivered site at epidermis layer, < 150 μm) technology by combining skin pretreatment with short microneedles (<150 μm in length) and iontophoresis transdermal patch (enhanced transport via electrical field) that can provide a continuous basal dose and on-demand bolus dosing for mealtime insulin needs. The insulin used is rapid-acting human regular insulin. Synergistic enhancement achieved combining microneedles and iontophoresis makes it possible for the simultaneous percutaneous basal-bolus administration of human regular insulin. This work provides an encouraging support for the future clinical development of novel therapy strategy for diabetes and shows a conceptual advance in the field of intradermal administration of biologics without needle injection. This new intradermal delivery technology is likely to change the therapy regimen of patients suffering from insulin-dependent diabetes mellitus and provide a way to lower cost compared to insulin pumps while improve patient compliance.

Biography

With a PhD from The Molecular Materials Lab/CNRS, France, Dr. Xu's professional activity focuses on the development of micro-electro-mechanical systems, known as MEMS. MEMS technology is the integration of sensors, actuators, together with electronics. Before he devoted his full effort to Nanomed Devices, a drug delivery startup he co-founded, he was a founding faculty of world's first college exclusively dedicated to nanotechnology research and education: College of Nanoscale Science and Technology, University at Albany. He served as Senator in Faculty Senate and committee members of Curriculum Committee, Qualifying Exam Committee, Faculty and Professional Staff Search Committee.