



# A Novel Approach to Treatment of Hyperglycemia Using a Nano-Particle-Encapsulated Peptide

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## Technology description

### Problem solved by this Technology

The highly inconvenient insulin injections remain the most prevalent treatment for Diabetes. By 2020, the global insulin market is expected to top \$48 billion annually as insulin production costs are increasing and more insulin is being administered to diabetics due to developing insulin resistance. Therefore, there is an urgent need for novel therapies that target insulin resistance and are cheap for patients. Moreover, developing orally available drugs that increase glucose uptake or mimic insulin action remain an important goal for nearly all of the major pharmaceutical companies.

Dr. Maines and her research team at the University of Rochester have discovered an unprecedented approach to stimulate glucose uptake. Her team demonstrated that a nanoparticle encapsulated peptide (P2), which corresponds to a segment of human biliverdin reductase protein, can alter the Insulin signaling pathway and stimulate glucose uptake and metabolism. The researchers showed that P2 stimulates sustained glucose uptake in several cell types derived from liver, kidney, lung and muscle cells. More importantly, P2 delivered in nanoparticles was shown to effectively increase glucose uptake to peripheral tissues and reduce blood glucose levels in normal and even obese diabetic mice. Collectively, these findings point to a novel treatment approach to control hyperglycemia and P2 an important therapeutic candidate to treat diabetes.

### Publication

Peter E. M. Gibbs, Tihomir Miralem, Nicole Lerner-Marmarosh, and Mahin D. Maines, "Nanoparticle Delivered Human Biliverdin Reductase-Based Peptide Increases Glucose Uptake by Activating IRK/Akt/GSK3 Axis: The Peptide Is Effective in the Cell and Wild-Type and Diabetic Ob/Ob Mice," *Journal of Diabetes Research*, vol. 2016, Article ID 4712053, 15 pages, 2016. doi:10.1155/2016/4712053.

## Application area

This technology entails a novel nanoparticle based peptide treatment approach for diabetes. The peptide-based treatment has shown good preclinical efficacy, would be cheaper to synthesize, and most importantly can be orally delivered compared to the injection-based insulin administration.

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