

# Heat-induced Controlled Transdermal Drug Delivery for Diabetes Management

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Diabetes is defined as a chronic elevation of glycemia. Due to acute and chronic complications, the disease poses a major economic, social, and medical burden on society worldwide. Diabetes is characterized by insufficient insulin plasma level to meet the organism demand. In type 1 diabetes, absolute deficiency of insulin production results from massive auto-immune destruction of pancreatic beta cells. For this reason, the main therapy consists in delivering exogenous insulin. The treatment methods require numerous daily injections of insulin administered by subcutaneous needle injection, insulin pen and catheters connected to insulin pumps. These methods are, however, both painful and inconvenient as the invasive multiple injections of precisely calculated amounts of insulin present a significant deterioration of the life quality of the diabetic patients. The discomfort associated with this type of administration has led diabetic patients to neglect or even give up the therapy. There is, thus, an increasing demand for the design of new insulin administration systems and this has led to the investigations of oral, nasal, buccal, pulmonary, rectal, ocular and transdermal routes.

Transdermal delivery of insulin, a simple and painless method, represents a viable alternative for the controlled release of insulin over time together with high patient compliance. However, transdermal delivery is limited by the low permeability of the stratum corneum, the skin outermost layer, allowing only small (<500 Da) hydrophobic molecules to be delivered. In this presentation, I will discuss our original contribution on insulin transdermal delivery upon photothermal or electrothermal activation.

## References

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