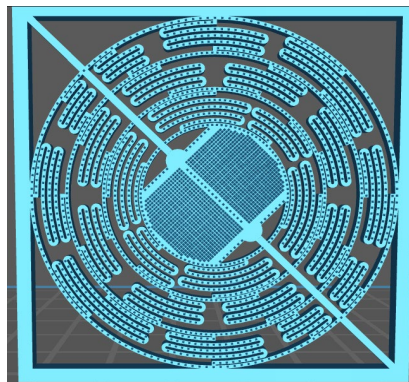


# Development of Concentration Gradient Microfluidic Needle Patch for Combinatorial Diabetic Therapy

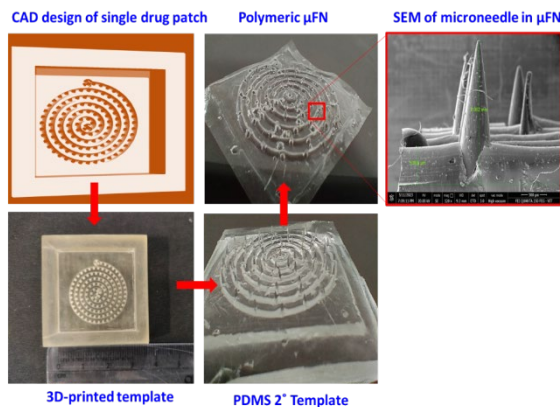
## Graphical Abstract



## Project Description

Delivering the combinatorial therapeutic drugs using current microneedle (MN) system is highly restricted with its geometry and drug encapsulation potential for enhancing the drug bioavailability in target sites. Currently, the Clinical management of many of the type II diabetes and all Type 1 diabetic patient requires continuous administration of insulin through invasive needles, pens and pumps, etc. However, these subcutaneous delivery methods show, persistent pain and require multiple injections for attaining clinical efficacy. Along this, a combinatorial treatment of insulin and the biguanide drug, metformin, improves the clinical outcome on glycemic control and reduced insulin requirements among diabetic patients, when compared with the free forms. But, there is no clinical product available in the market to deliver the combinatorial therapy as a single shot patch device with ease of drug administration. Based on this, we are interested to develop a novel microfluidic needle ( $\mu$ FN) based transdermal patch, which has the ability to deliver two or more drugs in a combinatorial fashion and can release drugs in a concentration gradient fashion through its embedded microneedles system. With complete mechanical flexibility, this implantable patch delivers localized concentration gradient delivery of drug/therapeutics of our choice and facilitates the personalized therapeutic intervention for diabetic management.

## Products/ Instruments/ Results/ Outreach Activities



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### Name of the Funding Agency

Department of Biotechnology (DBT)

### Name of the Scheme

Biomedical Devices (Phase 1)

### Sanctioned Amount (in Rupees)

Rs. 22,90,000

### Duration of the Project (years)

3

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