

# 3D printing of patient-specific pharmaceuticals as immediate-release formulations

## Background & Innovation

There are situations in which conventionally manufactured drugs do not offer a solution for the patient:

- medication for seriously ill patients is sometimes difficult to dose
- in **Pediatrics** there are often no age-appropriate medicines

With 3D-printed drugs we can solve these problems and realize individual dosages.

Such **patient-specific pharmaceuticals** will increase the **drug therapy safety**.

Since 3D printing enables the production of **very small batch sizes**, especially compared to conventional production, it offers a **high degree of flexibility**. Hence our innovation is ideal for the use in **research and development** as well as in **clinical trials**.

## Technical Description

Our pharmaceutical composition comprising an excipient composition is prepared by direct powder extrusion (DPE) of a pharmaceutical solid dosage form.

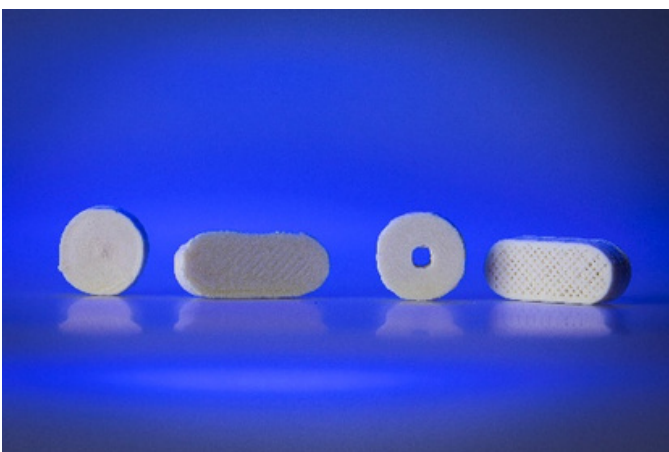
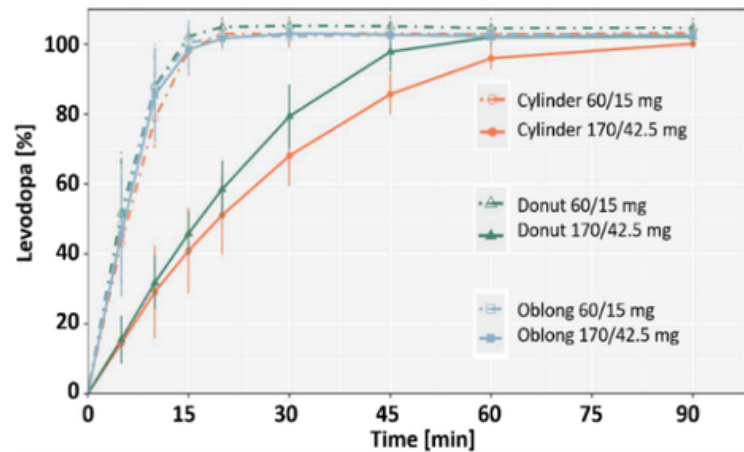


Figure 1: DPE printed tablets

**Fig.1** shows different tablet shapes: cylinders, donuts and oblongs, printed with different formulations. The main goal was an immediate release formulation with improved hardness values.

Small donuts and cylinders and oblongs release more than 80% of the drug in 10 and 15 min, respectively, large cylinders and donuts in 30 to 45 min, as can be seen in **Fig. 2**.



**Figure 2:** Release profiles of differently shaped tablets

The consistent printability without manual aids or adhesion enhancement as well as reduced brittleness were achieved by factorial optimization of the development process and the composition of the formulation. This is important for hospital use as tablets are handled manually without primary packaging during manufacture, packaging and administration to the patient.

## Competitive advantage

- Personalized, tailored drugs
- Better clinical outcomes
- Timely production
- Low cost and ease of use
- Diversity and simplicity to change dosage, release profile and design

Our technology presents an **innovative** and **convenient** approach for the **production of personalized tablets** with **great advantages in patient care** and **treatment costs**.

## FOCUS SECTORS

- Medtech
- Patient care in hospital
- Pediatrics
- Geriatrics
- Pharmaceutical Research and Development
- Phase I & Phase II Clinical Trials

## PROJECT KEY WORDS

- Personalized drugs
- 3D Printing
- Small Batch Production
- Tailored Dosage

## DEVELOPMENT STATUS

- POC
- Manufacture on a small scale
- Compounding

## PATENT PROCEDURE STATUS

- PCT application filed

## POTENTIAL FOR COOPERATION

- R&D Cooperation
- Transfer of rights



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