**Multiply Labs**
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## Multiply Labs

# Abstract for BADG Talk – September 2019

*Title:*

**Robotic manufacturing of personalized drug delivery systems**

*Abstract:*

In this talk we present a robotic manufacturing process to produce multi-compartment capsular drug delivery systems. This technology enables the rapid and efficient realization of small batches of fixed-dose combination products.

The robotic manufacturing system realizes capsules that contain several independent compartments. Each compartment contains a different formulation of one or more drugs. Each formulation is physically separated from the formulations in the other compartments. By varying the composition of the compartment walls or their thickness, the release profile of their content can be modified without affecting the rest of the capsule.

An example of the release process of a two-compartment capsular device with double pulsatile release is reviewed in detail. Furthermore, the performance of multi-compartment capsules realized by 3D printing is compared with analogous devices realized by injection molding. Both technologies emerge as viable manufacturing processes – the former emphasizing rapid iteration, and the latter enabling industrial scale.

Once the multi-compartment capsules have been formed, a proprietary robotic system deposits individual drug formulations into each compartment. This novel manufacturing approach is based on a set of automated dispensing modules working simultaneously, in parallel. The flexibility of the presented system enables the rapid production of small batches of fixed-dose combination products. In particular, drug dosages can be rapidly and accurately varied at the formulation deposition stage.

The talk concludes with an overview of the features of multi-compartment capsules manufactured via a highly automated production system. These products are ideally suited for the delivery of combination therapies where the required PK profiles for the drug ingredients vary widely, and where the physical separation of different formulations in different compartments is beneficial. Additionally, this system enables the realization of small batches of fixed-dose combination products, in cases where there is a need for variation in ingredient combination and dosage.