

Physical Avatars: using your Heart-on-a-Chip to treat your heart

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While drug development costs have been rising exponentially in the last decades, the number of effective treatments resulting from those developments is limited. In part, this is due to using non-human preclinical models. In addition, in complex diseases a drug often does not have the same effect in different patients, stressing the need for a more personalized approach.

Human stem cell derived models can offer a solution. By making *in vitro* models of specific (groups of) patients using their own biological material, the effect of a certain therapy can be predicted accurately. However, these models are currently limited in how they recapitulate physiological aspects of the human body such as flow and mechanical stress. In addition, integrated readouts of the status of the models are required to determine whether certain therapies have (toxic) effects. Here, Lab-on-Chip technologies such as biosensors, microfluidics and biomaterials are needed to make complex, human-specific Organs-on-Chips.