# Gel pen offers simple strategy for improving drug development

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One way to lower the cost of developing pharmaceutical drugs is by improving the predictive properties of preclinical screening. By making benchtop testing more realistic, ineffective drugs can fail faster and before they undergo expensive animal and human trials. To help tackle the issue, Alison McGuigan and her group at the University of Toronto in Canada have developed scaffold strips that can be loaded with cell populations and then rolled up to generate thick tumour sections for use in early-stage drug development.

Known as a Tissue Roll for Analysis of Cellular Environment Response, or TRACER for short, the 3-D design offers a much closer approximation to the microenvironment found in the body than conventional 2D petri dish models. For example, in a TRACER environment cells will be exposed to different oxygen levels depending on how deep they are within the roll. This is important as it paves the way for examining the efficacy of a potential cancer treatment in relation to the distance from major blood vessels. Testing a drug in a petri dish where the microenvironment is more uniform provides fewer clues to how a substance will perform in the body.

The TRACER model offers the advantage of being able to program-in the heterogeneity you want in your culture simply by controlling patterning of the biocomposite strip prior to assembly into the rolled TRACER structure," explained Bin Xu, who is working with McGuigan on devices to aid the deployment of the group's technique.

To make the patterning process more straightforward, the team - which also includes Darren Rodenhizer, Shakir Lakhani, Xiaoshu Zhang, John Soleas and Laurie Ailles - has come up with an affordable gel pen design. The device, which is described in detail in the latest issue of journal *Biofabrication*, offers a simple strategy to generate more complex multi-cell type tumour cultures in a way that does not require highly-specialized equipment.

In their work, the researchers use the pen to deposit a temporary gelatin barrier into the TRACER scaffold to define domain boundaries between cell populations. The gelatin can be melted away after cell seeding to allow interaction of cell populations from adjacent domains.

"A key priority in further refining our model is to benchmark these new 3-D systems against what is available currently, both in vitro and in vivo," said McGuigan. "Another goal is to incorporate more features of tumours such as vasculature and immune cells to allow the model to be used to ask a wider range of biological questions."

**More information:** Bin Xu et al. Patterning cellular compartments within TRACER cultures using sacrificial gelatin printing, *Biofabrication* (2016). DOI: 10.1088/1758-5090/8/3/035018

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