CELL BIOLOGY

A gentle touch for cells

A new micromechanical device allows precise spatial and temporal control of cell-cell contact.

Tissue development depends on the interaction of different cell types. A good example is the development of the liver during which emerging hepatocytes need contact to cells from different tissues in the embryo; to investigate the nature of these interactions is experimentally challenging.

Sangeeta Bhatia from the Massachusetts Institute of Technology has a long history of pondering this problem. She says, "It is frustrating not to be able to ask the question whether cells need to touch or whether they just share short-range soluble factors."

Together with her postdoc Elliot Hui, she sought to devise a system in which the physical contact between different cell types can be spatially and temporally controlled. They designed a silicone comb, consisting of two parts with interlocking fingers that self-align when brought into close proximity, allowing cells to touch. The self-alignment mechanism allows easy manual handling to create a gap of a few micrometers, so that soluble signaling molecules can still pass between the cells (**Fig. 1**).

Bhatia and Hui performed the first proof-of-principle experiment with hepatocytes and fibroblasts. They showed that hepatocytes first need physical contact with the fibroblast to retain their function; subsequently they can survive on soluble factors.

For Bhatia, the independent handling of the combs is a big strength of the device; she says, "You have a co-culture system where you can manipulate and analyze the individual populations." For example, Bhatia performed gene expression profiling on the fibroblasts and is in the process of knocking down several candidate genes to then test the effect of these fibroblasts on hepatocyte function.

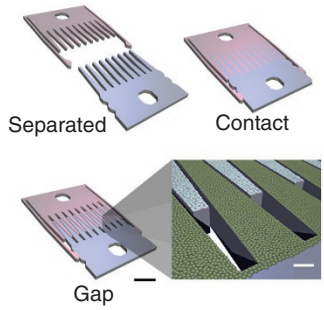

Figure 1 | Micromechanical device. The two combs allow cells to touch or exchange molecules via a small gap. Scale bars, 3 mm (250 µm in the inset). Reprinted with permission from the National Academy of Sciences.

To fully exploit the power of the device, she suggests exchanging the fibroblast for a different inducer cell population. One could try to recapitulate liver development by exposing hepatocytes to the different cell types they encounter during development.

Another interesting application is the study of tumor and stroma cells, to see whether maintenance of a malignant phenotype is dependent on contact with the stromal cells.

A device that allows precise cell positioning in two dimensions will get us some answers to these questions—the next step will be to take it to three dimensions.

Nicole Rusk

RESEARCH PAPERS

Hui, E.E. & Bhatia, S.N. Micromechanical control of cell-cell interaction. *Proc. Natl. Acad. Sci. USA* **104**, 5722–5726 (2007).

DATA ANALYSIS

NEED AN ERROR BAR REFRESHER?

In a cursory glance at a figure, we often overlook error bars in deference to the more 'significant' data that are shown. But is that information actually significant? Error bars hold the answer to that question—but do you understand them?

If you only vaguely remember your statistics class, a Feature in *The Journal of Cell Biology* is worth a look. In it, Cumming *et al.* review the information different error bars convey, and outline eight rules for using and interpreting them. *IK*

RESEARCH PAPERS

Cumming G. *et al.* Error bars in experimental biology. *J. Cell Biol.* **177**, 7–11 (2007).