Questions

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What cell types are compatible with RASTRUM™?

We have tested a range of cell types, including tumour cells, stromal cells, neuronal cell types, hepatocytes and cardiomyocytes. For further information, please contact Sales & Support.

How does the applied pressure during the printing process affect the cells? Can I print sensitive cell types?

Our tests have shown no negative impacts on cell viability or function. This includes testing with sensitive primary cells types and stem cells. For further information, please contact Sales & Support.

How do you maintain printer sterility?

RASTRUM has inbuilt laminar flow with dual HEPA filtration, ensuring a sterile printing environment. Like a Biological Safety Cabinet, the internal stainless steel surfaces of the printer can be cleaned with 70% ethanol. Before and after every print, the fluidics are automatically cleaned and sterilised. Additionally, we provide a RASTRUM Sterilisation Kit that involves a more thorough deep clean of the fluidics and can be used routinely.

How does the user define the structure to be printed? Can I change printing parameters for my experiments?

We have developed a library of hydrogel formulations and 3D structures. The user can select a program that uses optimised printing parameters to build the 3D cell model using a hydrogel formulation matched to a cell type of interest.

What is the minimum number of cells required?

While cell density is dependent on the cell model, it is typical to resuspend $1x10_6$ cells in 200 µL of Activator solution ($5x10_6$ cells/mL). Optimal cell density in a 3D cell model should always be determined empirically.

Can RASTRUM™ construct 3D cell models containing multiple cell types?

Yes, the print head contains independently addressable nozzles capable of printing up to four different cell types within a single well and/or across the same plate.

How long does it take to print an entire 96-well plate?

Printing time depends on the complexity of the 3D structure. However, our simplest 3D cell models can be printed in 96 wells in ~5 minutes.

Can you control bioink/cell placement for more accurate downstream image acquisition?

Yes, printing your cells with RASTRUM has the added advantage of controlling the cell placement within the well and Z-plane, enabling consistent cell placement for downstream image analysis.

Can you retrieve cells from the printed hydrogel?

Yes, hydrogels can be dissolved in minutes using our RASTRUM Dissociation Solution, enabling retrieval of cells for downstream analysis.

Can you stain and image cells within the hydrogel?

Yes, most standard staining and imaging protocols are compatible within the 3D hydrogels. The gels themselves are completely transparent and compatible with brightfield/phase microscopy. The region of interest is typically kept close to the base of the well plate so that working distance is rarely an issue. Staining of the cells *in situ* is possible with both small molecule and antibody-based dyes, which readily permeate the gel. Standard fixation and permeabilisation protocols can be used. The gels do not autofluoresce and there are no issues with non-specific background fluorescence in these gel systems.

Can you fix and section the hydrogels?

Yes, the hydrogels can be snap-frozen and cryosectioned, or embedded and sectioned as per standard methods for tissue samples.