CRACK IT Solutions

3D cell-based assays and platform for more predictive modelling of complex human physiology

KIYATEC is seeking active collaborators from the pharmaceutical or biotechnology sector for co-development of novel 3D cell-based assays and models.

What could your solution be used for?

Liver toxicity: Hepatocyte culture in one chamber benefits from controlled and directed interactions with a second cell type in an adjacent chamber separated by a porous membrane. The 3D microenvironment creates more robust CYP450 and other enzyme activity, while the interaction with the second cell type enables predictive ability that can surpass existing tests' sensitivity.

Cancer efficacy: Cancer of various types, including both primary cells and cell lines, cultured in one chamber benefits from controlled and directed interactions with a stromal cell type in an adjacent chamber again separated by a porous membrane. Cancer-stromal interactions have been identified to play a key role in cancer progression, and the 3DKUBE™ system is ideal for incorporating direct cell-cell interactions (via mixed culture in a single chamber) and by soluble factor interactions (via two chamber segregated co-culture).

In addition to these two examples, the 3DKUBE™ will be especially suitable for other 3D co-cultures modelling biological complexity using multiple cell or tissue types.

Need for collaboration

We have expertise in designing, conducting, analysing and interpreting reproducible short-to-long term 3D cell-based experiments incorporating perfusion flow. An ideal partner would have a need to develop a more predictive *in vitro* model for a particular physiologic system, cell and tissue specific expertise to input during the design of the experiments, provide compounds for testing within the model, and potentially the ability to provide funding or in-kind support to supplement our existing internal resource allocation.

3Rs impact assessment

3D cell-based assays have been demonstrated to have higher correlation to human physiology than some *in vivo* models. Their potential for replacement and reduction of animal models could be manifested in several ways:

- Reduction/replacement of animal use for prediction of toxicity in humans: a wide variety of human toxicities (cardio-, hepato-, immuno-, nephro-, neuro-, etc.) can be modelled using human cells and tissues within the 3DKUBE™.
- Reduction/replacement of animal use for prediction of toxicity in animals: a wide variety of animal cells and tissues can be cultured within the 3DKUBE™ to model animal physiology, and could compete with *in vivo* toxicity assessment.
- Reduction/replacement of animal use for disease modelling/efficacy testing: a particular disease state combining specific human cell or tissue combinations can be modelled more accurately in a 3DKUBE™ perfused culture environment than in an animal or in static, 2D culture. These cultures can be conveniently imaged and analysed histologically or via biochemical analysis.

To find out more or to connect with the technology developer contact crackitenquiries@nc3rs.org.uk

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