3D human and/or animal ex vivo precision cut tissue slices

Commonly used acronym: *PCTS*

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Organisation

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SCOPE OF THE METHOD

The Method relates to	Animal health, Human health
The Method is situated in	Basic Research, Translational - Applied Research
Type of method	In vitro - Ex vivo: 3D ex vivo
Specify the type of cells/tissues/organs	Intestinal tissue

DESCRIPTION

Method keywords

precision cut tissue slices

toxicology

drug screening

pathology

Metabolism

ex-vivo

organotypic model

lung disease

Scientific area keywords

cancer

infection

Method description

Ex-vivo tissue explants (precision cut tissue slices) prepared with the Krumdieck Tissue Slicer are living, three-dimensional tissue slices closely resemble the organ from which it is prepared, with all the cell types present in their original tissue-matrix configuration where physiological and organ functionality details are preserved. The cells are biologically active and are surrounded by their original microenvironment, where they communicate with each other and respond to cell-specific stimuli. This method has great potential in increasing and improving the translation of research to the clinic. These slices can be used in a wide range of applications from including studies of; 1) physiology of disease, 2) drug transport, toxicity and efficacy, 3) inflammatory processes, 4) functional changes, 5) disease models. We are able to perform high content screening of PCTS for drug screening and for fundamental research applications.

Lab equipment

- Krumdieck Tissue Slicer
- Laminar flow hood
- Microplate reader

PROS, CONS & FUTURE POTENTIAL

Advantages

1) resemble the *in-vivo* environment,

2) are reproducible,

3) are low cost and are consistent with the 3Rs principle proposed by Russel and Burch: they replace, reduce and refine animal testing, and finally

4) they permit the testing in complex human systems.

Challenges

- Different slicing strategies need to be employed from the slices prepared from different organs.
- Culture conditions have to be optimized according to the type and origin of the tissue.

Modifications

We are working on PCTS on chip technology to improve the culture conditions improving their perfusion and oxygenation conditions.

Future & Other applications

We are currently busy with optimizing freezing protocols for these tissue slices in order to create a biobank of animal and patient derive tissues to facilitate the availability of material for drug screening in the future.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

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