3D organoids and organoid derived monolayers from patients with inflammatory bowel disease

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Organisation

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Country Belgium

Geographical Area Flemish Region

SCOPE OF THE METHOD

The Method relates to	Human health
The Method is situated in	Basic Research, Education and training, Translational - Applied Research
Type of method	In vitro - Ex vivo
Specify the type of cells/tissues/organs	Intestinal epithelial cells from human intestinal biopsies

DESCRIPTION

Method keywords

organoids

ECM

3D culture

Coculture model

Transwell

Scientific area keywords

inflammatory bowel disease

ulcerative colitis

crohn's disease

stem cells

epithelial cells

intestinal crypt

Method description

Intestinal organoids are cultured from intestinal biopsies obtained during routine endoscopy. The stem cell containing crypts are isolated and cultured in a 3D ECM (Matrigel) in the presence of the desired growth factors. The present stem cells will expand and give rise to all epithelial cells of the intestinal epithelium while maintaining location, disease and patient specific characteristics. 3D organoids can be used to evaluate several mechanism including responses to inflammatory stimuli, microbiota stimulation, analysis of epithelial (transport) mechanisms in the development/progress of IBD. In addition, 3D organoids can be dissociated and seeded into 2D transwells to allow access to the apical side of the cells for exposure towards different components.

Lab equipment

- Biosafety cabinet ;
- CO2 cell incubator ;
- Centrifuge Microscope.

Method status

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

Organoids and organoid derived monolayers maintain region, disease and patient-specific characteristics.

Challenges

- Only epithelial cells (no immune cells) present.
- Requires specialized training ECM and medium including growth factors is rather expensive.

Modifications

- Organoids can be cultured from multiple organs.
- Possibilities for co-culture with other cell-types are being explored.

Future & Other applications

Organoids have/are currently been/being developed from different organs and are widely applied for the analysis of different mechanisms (drug testing, barrier function, specific mutations,..).

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

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