

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

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## Organisation

**Name of the organisation** Katholieke Universiteit Leuven (KUL)

**Department** Department of Chronic Diseases and Metabolism

### Specific Research Group or Service

Translational Research in GastroIntestinal Disorders (TARGID) - IBD Group

**Country** Belgium

**Geographical Area** Flemish Region

## SCOPE OF THE METHOD

<b>The Method relates to</b>	Human health
<b>The Method is situated in</b>	Basic Research, Education and training, Translational - Applied Research
<b>Type of method</b>	In vitro - Ex vivo

<b>Specify the type of cells/tissues/organs</b>	Intestinal epithelial cells from human intestinal biopsies
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## 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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Noben M, Verstockt B, de Bruyn M, et al. Epithelial organoid cultures from patients with ulcerative colitis and Crohn's disease: a truly long-term model to study the molecular basis for inflammatory bowel disease?. *Gut*. 2017;66(12):2193?2195. doi:10.1136/gutjnl-2016-313667

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