

Innovative Microphysiological Model Using HepatoXcell™ Primary Human Hepatocytes and Locsense Artemis

Brian Shapiro, PhD

Marketing Segment Manager, ATCC

Sujoy Lahiri, PhD

Lead Scientist, R&D, ATCC

Susan Roelofs, PhD

CEO and Founder, Locsense



ATCC®'s mission and future direction



Brian Shapiro, PhD

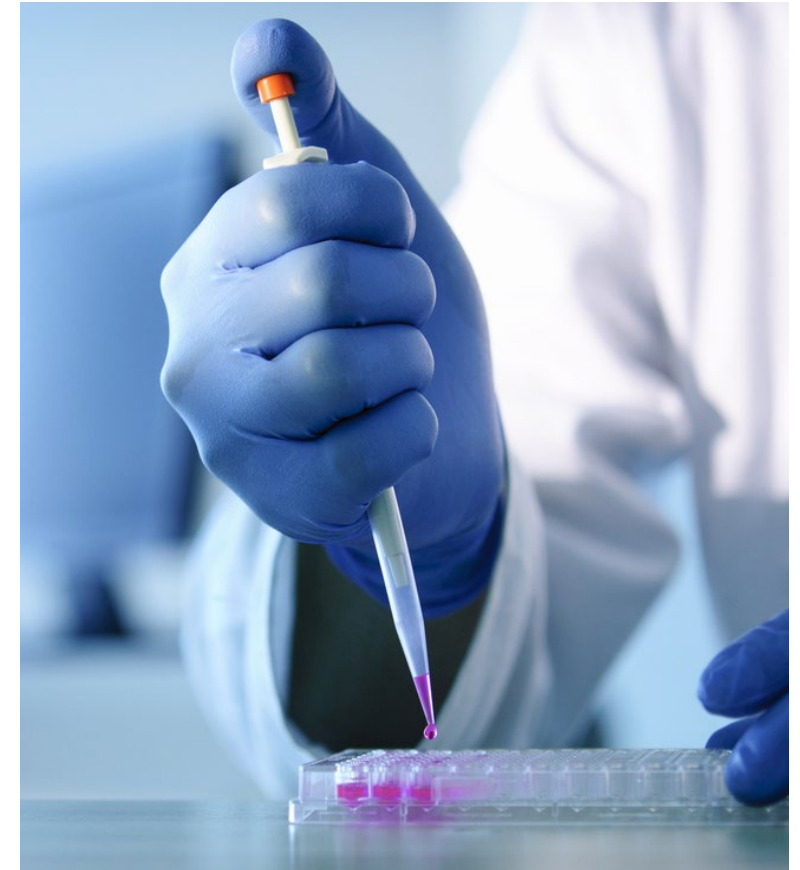
Marketing Segment Manager, Toxicology, ATCC

Dr. Brian Shapiro is a distinguished Marketing Segment Manager at ATCC, where he plays a pivotal role in bridging the gap between scientific innovation and the biomedical research community. With a robust background in oncology, toxicology, and metabolic diseases, Dr. Shapiro is dedicated to advancing research through the development and promotion of cutting-edge cell models and tools. Beyond his technical contributions, Dr. Shapiro is also the Executive Producer of ATCC's podcast, "Behind the Biology," where he communicates the latest scientific breakthroughs and insights to a broader audience.

Agenda



1. ATCC's mission and future direction
2. HepatoXcell™ – ATCC's new offering of primary human hepatocytes
3. Locsense Artemis
4. Constructing a gut-liver model
5. Conclusions



About ATCC®

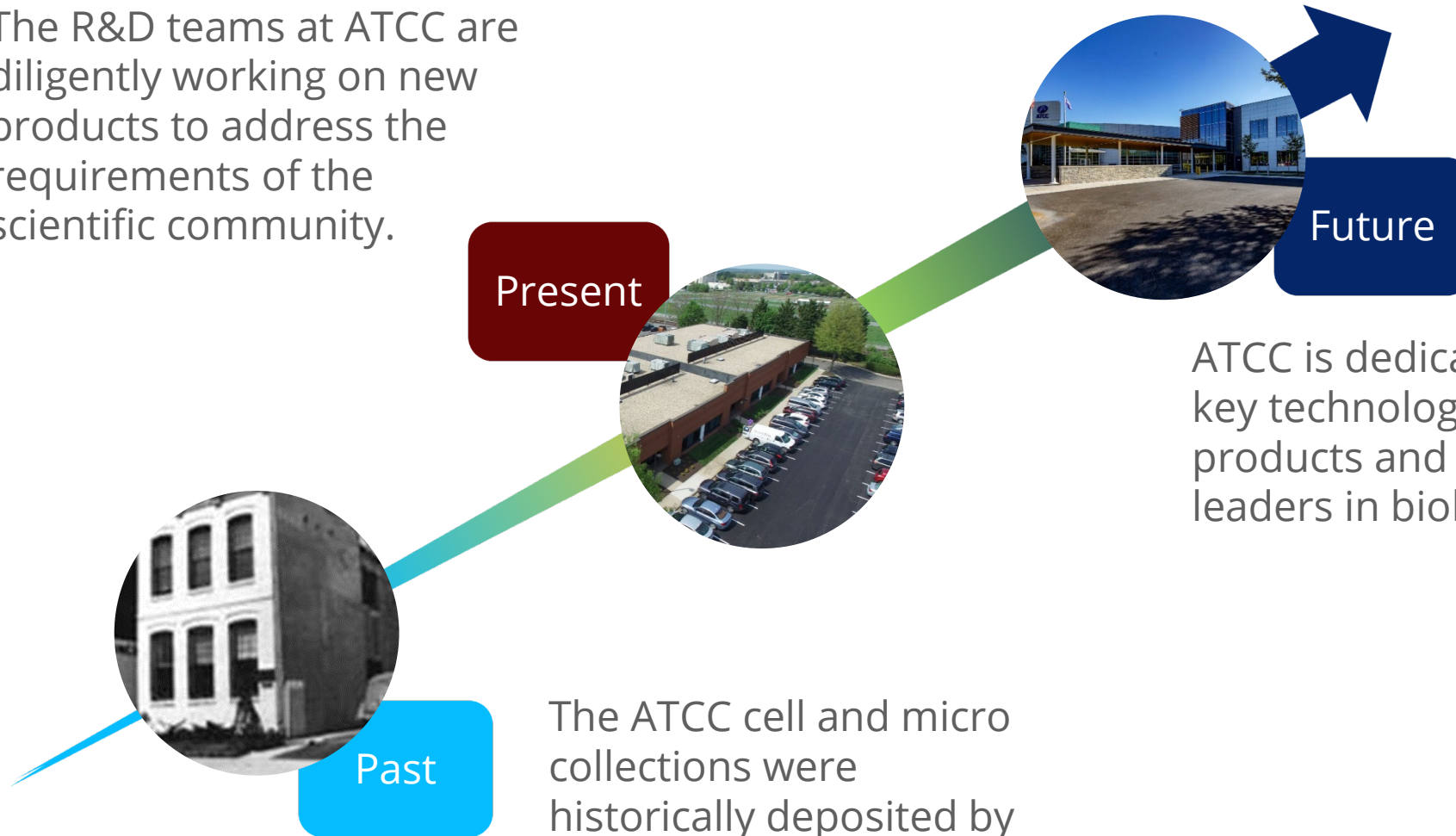
- Founded in 1925, ATCC is a non-profit organization with HQ in Manassas, VA, and an R&D and Services center in Gaithersburg, MD
- World's largest, most diverse biological materials and information resource for cell culture – the “gold standard”
- Innovative R&D company featuring gene editing, differentiated stem cells, advanced models
- Partner with government, industry, and academia
- Global supplier of authenticated cell lines and viral and microbial standards
- Sales and distribution in 150 countries, 20 international distributors
- Talented team of 700+ employees, over one-third with advanced degrees



Modernization of the ATCC® portfolio



The R&D teams at ATCC are diligently working on new products to address the requirements of the scientific community.



Present

Future

Past

The ATCC cell and micro collections were historically deposited by academic and other research scientists

ATCC is dedicating resources to key technologies to ensure its products and services remain leaders in biological research.

HepatoXcell™ Primary Human Hepatocytes



Sujoy Lahiri, PhD **Lead Scientist, ATCC**

Sujoy Lahiri, PhD, is an R&D scientist in ATCC. He leads the primary cell division, working on advanced cellular models using primary cells as well as expansion of ATCC's immortalized primary cell portfolio. Dr. Lahiri has extensive knowledge in the field of toxicology and drug metabolism. Previously, Dr. Lahiri worked at National Institutes of Health, where his work focused on lipid biochemistry. Dr. Lahiri received his PhD from the Weizmann Institute of Science, where he studied sphingolipid biochemistry and metabolism.

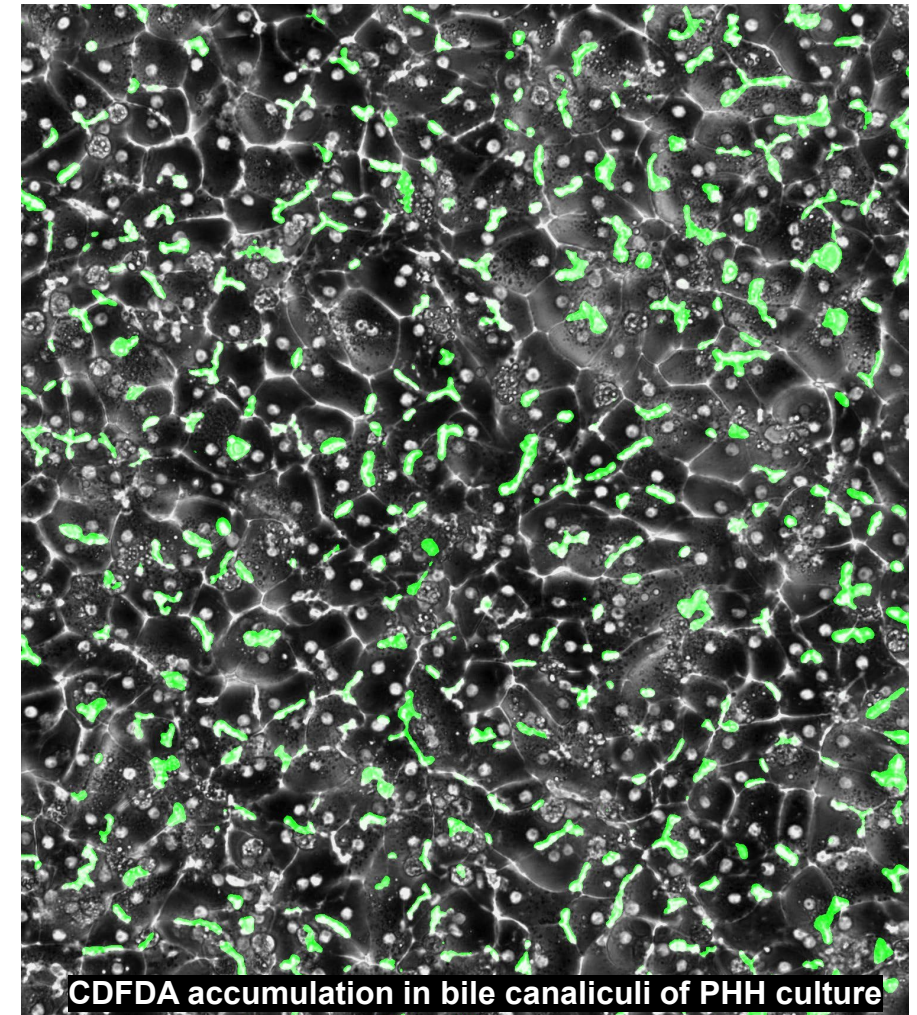


HepatoXcell™
by ATCC

Primary Human Hepatocytes

Challenges in ADME-Tox testing

- Limited models for in vitro ADME-Tox testing
 - Over dependence on primary human hepatocytes (PHH)
 - Limited success with immortalized hepatic cell lines or iPSC-derived hepatocytes
- Industry shortage of primary human hepatocytes for toxicological testing
 - Higher number of successful liver transplants
 - Difficult to acquire healthy liver tissue
- Choosing and ordering the right lot can be difficult
 - Access to donor information
 - Number of available vials per lot
- Characterization information of PHH offerings can be lacking
 - Lots not prequalified
 - Genomic data isn't available
- Prohibitive cost



HepatoXcell™ hepatocytes and media



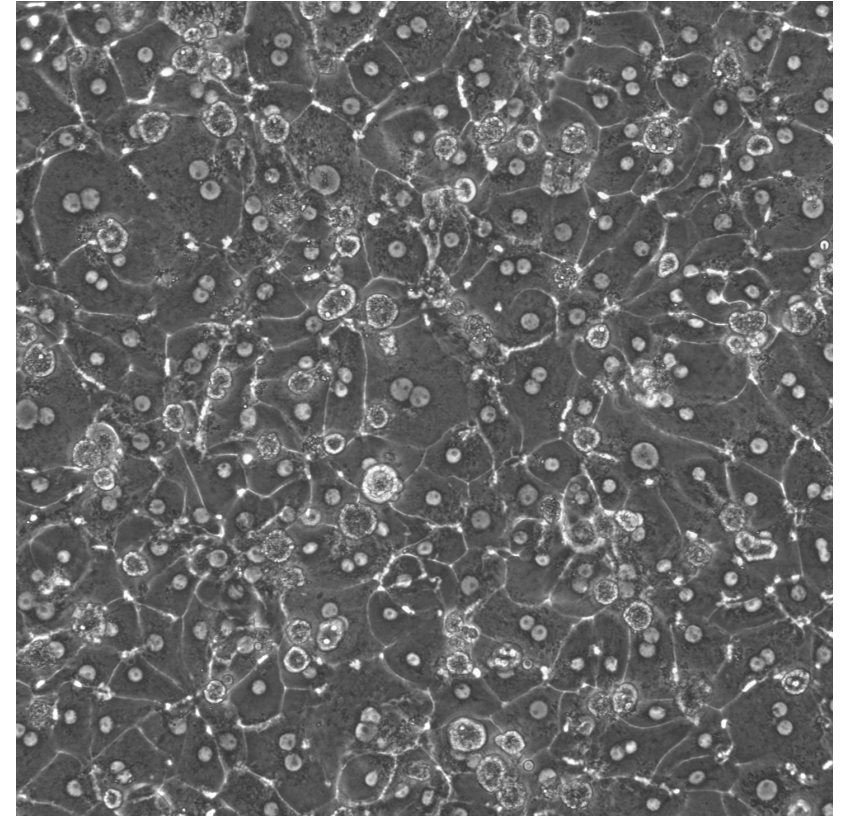
| Product Name | ATCC® No. | Notes | Amount |
|---------------------------------|--------------|-----------------|---|
| HepatoXcell™ Eco | PCS-450-012™ | Suspension | 1 vial, $\geq 4 \times 10^6$ cells/vial |
| HepatoXcell™ Plus | PCS-450-010™ | 3-Day Plateable | 1 vial, $\geq 4 \times 10^6$ cells/vial |
| HepatoXcell™ Pro | PCS-450-011™ | 7-Day Plateable | 1 vial, $\geq 4 \times 10^6$ cells/vial |
| HepatoXcell™ Thawing Medium | PCS-450-032™ | 1 bottle | 250 mL |
| HepatoXcell™ Maintenance Medium | PCS-450-034™ | 1 bottle | 500 mL |
| HepatoXcell™ Plating Medium | PCS-450-038™ | 1 bottle | 100 mL |

HepatoXcell™

ATCC's solution for your predictive drug development and toxicity testing



- HepatoXcell™ primary human hepatocytes come with ATCC's quality assurance
- Lot selection tool provides easy access to donor and lot information
- Lots are prequalified as per plate-ability or suspension viability
- CoA includes viability, metabolism, induction, and uptake data
- **Access to transcriptome and whole-exome data for individual lots**
- Competitive pricing



Hepatocyte lot selection web tool

Home > Cell Products > Primary Cells > PCS-450-012

SHARE

HepatoXcell™ Eco: Normal Human Hepatocytes

PCS-450-012™

HepatoXcell™

HepatoXcell™ Eco are Primary Human Hepatocytes Suspension Cells, derived from normal, healthy, human liver tissues.

| | |
|------------------|---|
| Product category | Human cells |
| Product type | Primary cell |
| Organism | <i>Homo sapiens</i> , human |
| Morphology | round and often in clusters while in suspension |
| Tissue | Liver |
| Applications | Toxicology Cancer research |

Buy Now

Price: \$850.00 ea

Discounts may be available for our fellow nonprofit organizations. [Login](#) to see your price.


Generally ships within 1-3 business days

SELECT SPECIFIC LOT(S)

Documentation

 Product sheet

 Certificate of analysis


 Safety data sheet

- Select a specific lot
- Add to your shopping cart

Select specific lot(s)

Please enter the quantity for the selected lot number and add to cart.

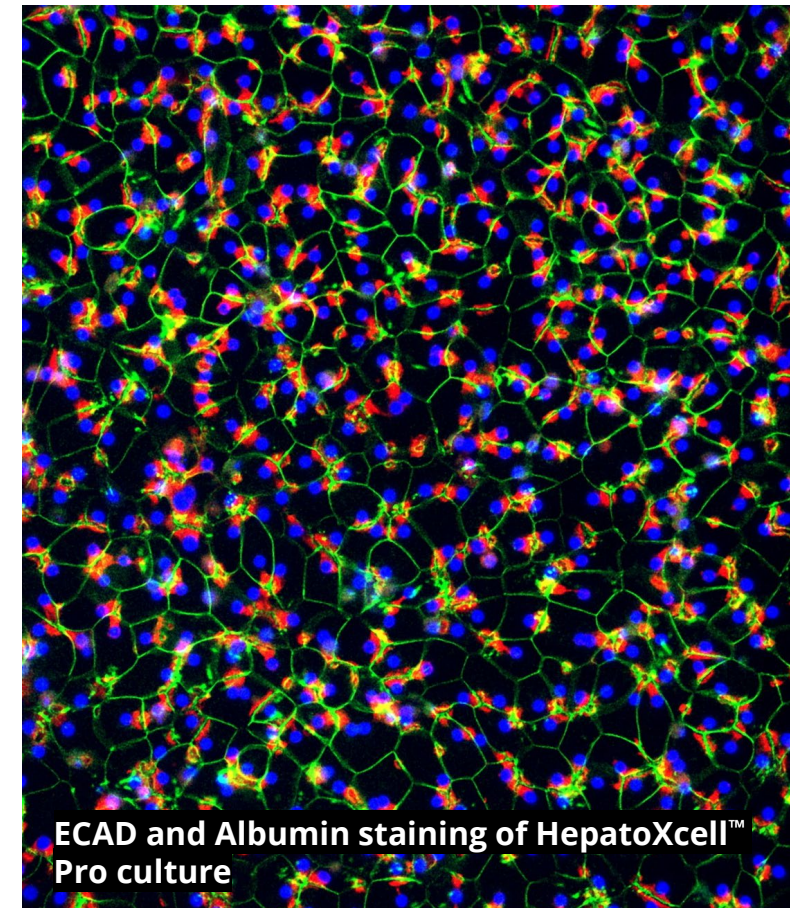
| Quantity | Lot Number | Inventory | Donor Age | Donor Sex | Donor Ethnicity | Donor BMI | CoA |
|----------------------|------------|-----------|-----------|-----------|-----------------|-----------|---------------------|
| <input type="text"/> | 0018 | 430 | 49 years | Female | Caucasian | 34.4 | CoA |
| <input type="text"/> | 009a | 445 | 45 years | Male | Caucasian | 29.1 | CoA |

 **ADD TO CART**

Why choose our primary human hepatocytes?



- High viability and functionality:
 - HepatoXcell™ exhibit excellent viability and retain key liver functions
 - This makes them ideal for drug metabolism, toxicity studies, and liver disease research.
- Comprehensive characterization:
 - Each batch undergoes rigorous testing to ensure consistency and reliability
 - Testing includes assessments of enzyme activity, protein expression, and metabolic function.
- Genetic diversity:
 - Sourced from multiple donors, reflecting the genetic variability found in the human population.
 - Allows for comprehensive studies on how different genetic backgrounds can influence liver function and drug response



ATCC® premium hepatocyte offering



Hepatocyte Premium Offering

HepatoXcell™ Pro: 7-day plateable hepatocytes



Application

Toxicology testing, ADME, drug development, disease research, advanced cellular modeling, co-culture, microphysiological system



Assays

Metabolism, hepatotoxicity, TEER, induction of CYP mRNA, transporter efflux, transporter uptake, metabolite formation, compound stability, inhibition, gene expression, clearance assay

ATCC[®] hepatocyte offering



Hepatocyte Plateable Offering

HepatoXcell™ Plus: 3-day plateable hepatocytes



Application

Toxicology testing, ADME, drug development



Assays

Metabolism, hepatotoxicity, transporter uptake, clearance assay



Suspension Hepatocyte Offering

HepatoXcell™ Eco: Suspension hepatocytes



Application

ADME, Drug development



Assays

Metabolism, hepatotoxicity, transporter uptake, clearance assay

ATCC® upcoming hepatic offerings



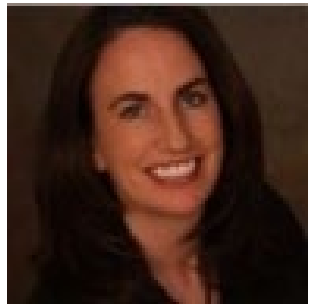
- Pooled primary human hepatocytes
- Spheroid/3-D qualified hepatocytes appropriate for MPS
- Non-parenchymal cells (NPC)
- Subcellular fractions – S9 microsomes and cytosol
- MPS application data using multiple platforms



Early access program - HepatoXcell™



- 3 vials of Hepatocytes at a 20% discount
- Hepatocyte Media at a 15% discount
- Free domestic shipping (no dewar charge)



Ask me for a quote!
Michelle Touloumes
Strategic Account Manager, ATCC
mtouloumes@atcc.org





Susan H. Roelofs, PhD **CEO and Founder, Locsense**

Dr. Susan Roelofs is the CEO and founder of Locsense B.V., a pioneering laboratory equipment company situated in Enschede, Netherlands. There, she is responsible for strategy and operations. Dr. Roelofs obtained her MSc degree in Applied Physics from the University of Twente with a specialization in Biophysical Engineering. She completed her PhD in Lab-on-Chip technology at the University of Twente in 2015.

Locsense focuses on the development of in-vitro sensing equipment. Currently Locsense' team consists of 10 persons. Since 2019, Locsense has successfully launched new products, including their flagship device, the Artemis Impedance spectrometer / TEER detector.

Artemis ST impedance spectrometer

01 Time lapse

Monitor the barrier function over time while cells are situated inside the incubator

02 Broad spectrum analysis

Frequency range from 10Hz – 100kHz.

03 Easily cleanable

Autoclavable parts in contact with cells

04 Incubator compatible

Smartlid including cells can be placed inside the incubator



Development
& production
in-house

Applications of barrier integrity monitoring

Quality

Cell culture growth, barrier formation

Disease modelling

Using gene editing, e.g., COPD or atopic dermatitis

Drug effectiveness

Compound testing



Treatment strategies

Concentration and duration therapeutics

Toxicology

Testing of chemicals, e.g., cosmetics

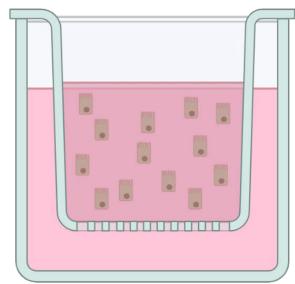
Developing of a highly representative in vitro gut-liver model using:

- Caco-2 (ATCC[®] HTB-37[™]) gut epithelial cells
- HepatoXcell[™] Pro (ATCC[®] PCS-450-011[™]) primary human hepatocytes

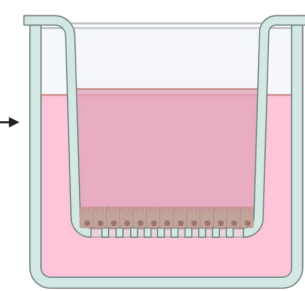
Plating of Caco-2 cells and HepatoXcell™

1. Cell plating

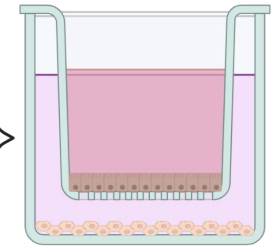
Plating of Caco-2 cells



21 days

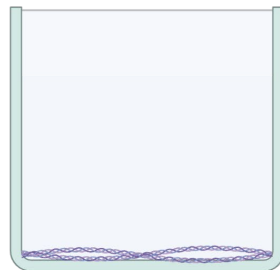


2. Co-culture

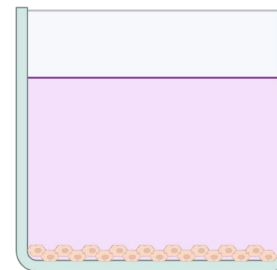


Plating of primary HepatoXcell

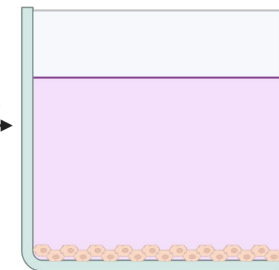
Overnight



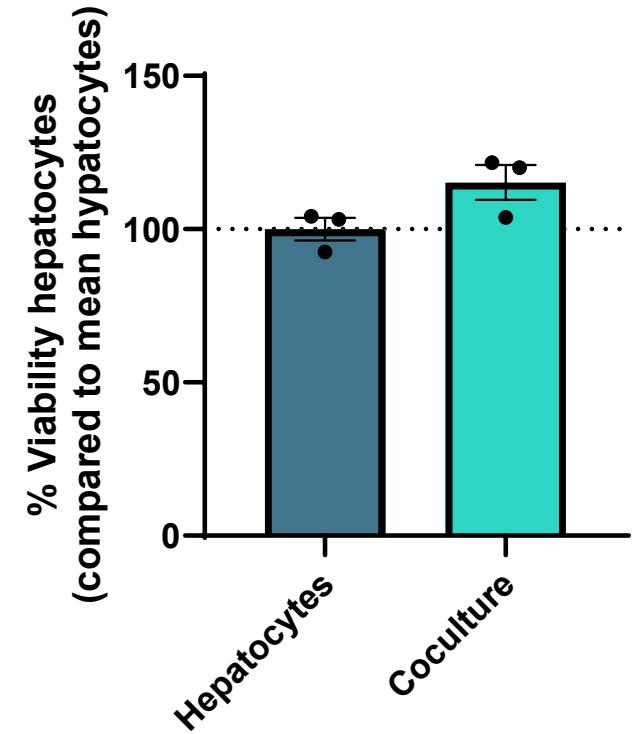
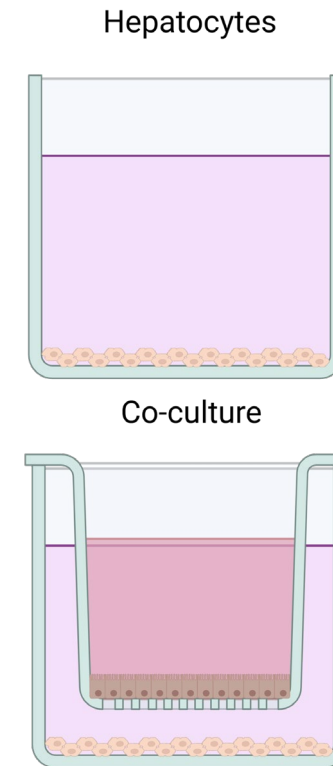
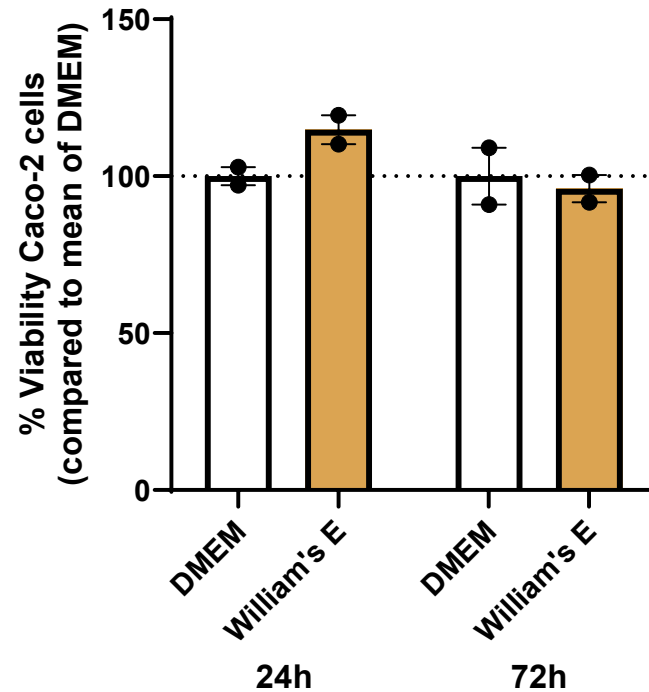
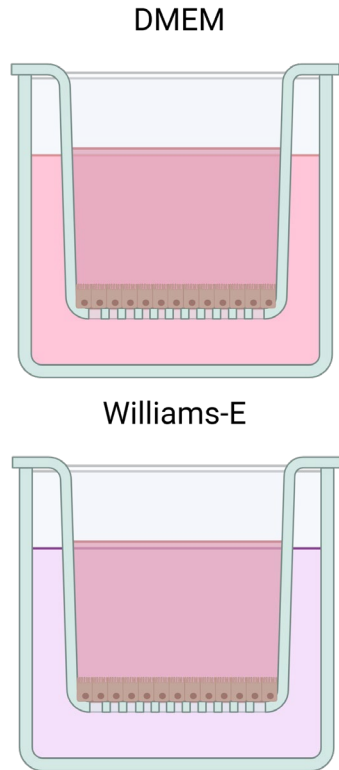
6 hours



1 day

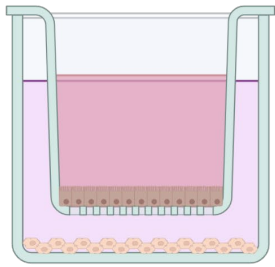


Viability of the co-culture

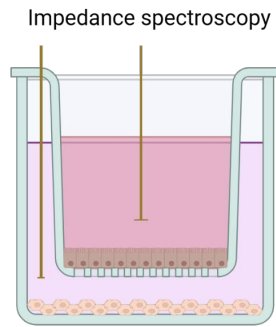


Analyzing the co-culture characteristics

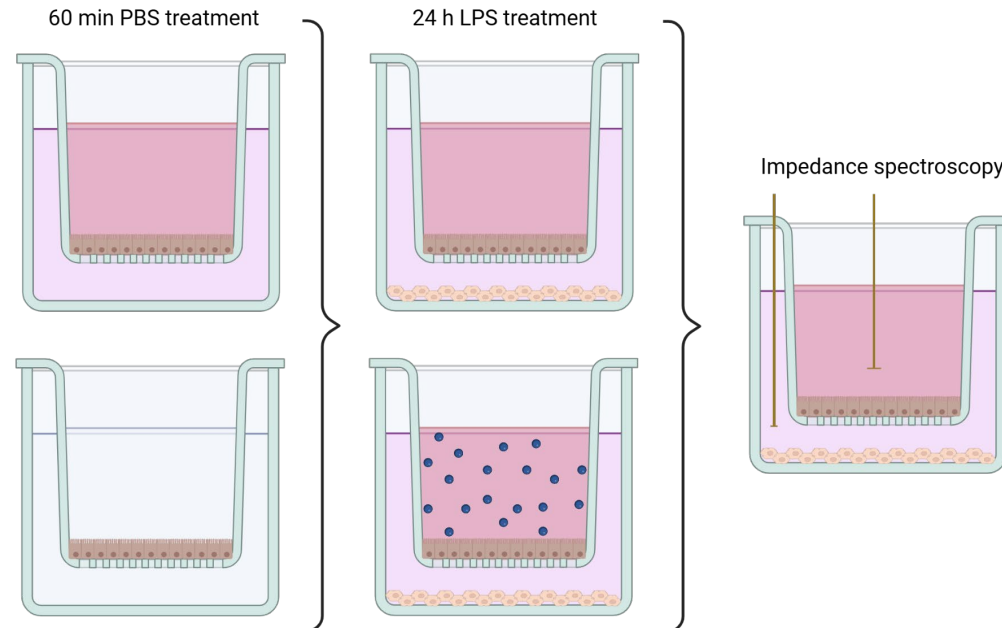
2. Co-culture



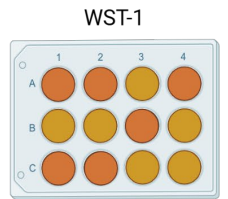
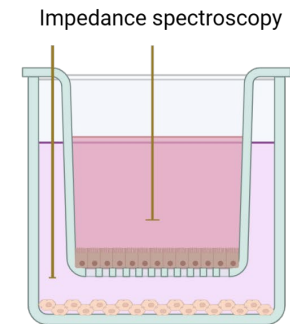
3. Barrier analysis



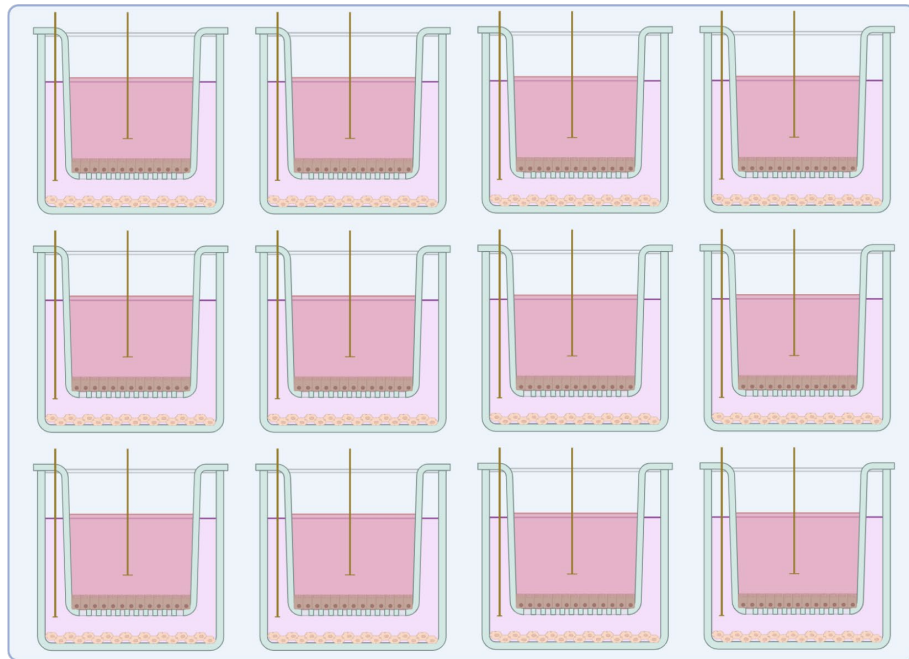
4. Induce stress on Caco-2 with PBS and/or LPS and barrier analysis



5. Barrier analysis and viability

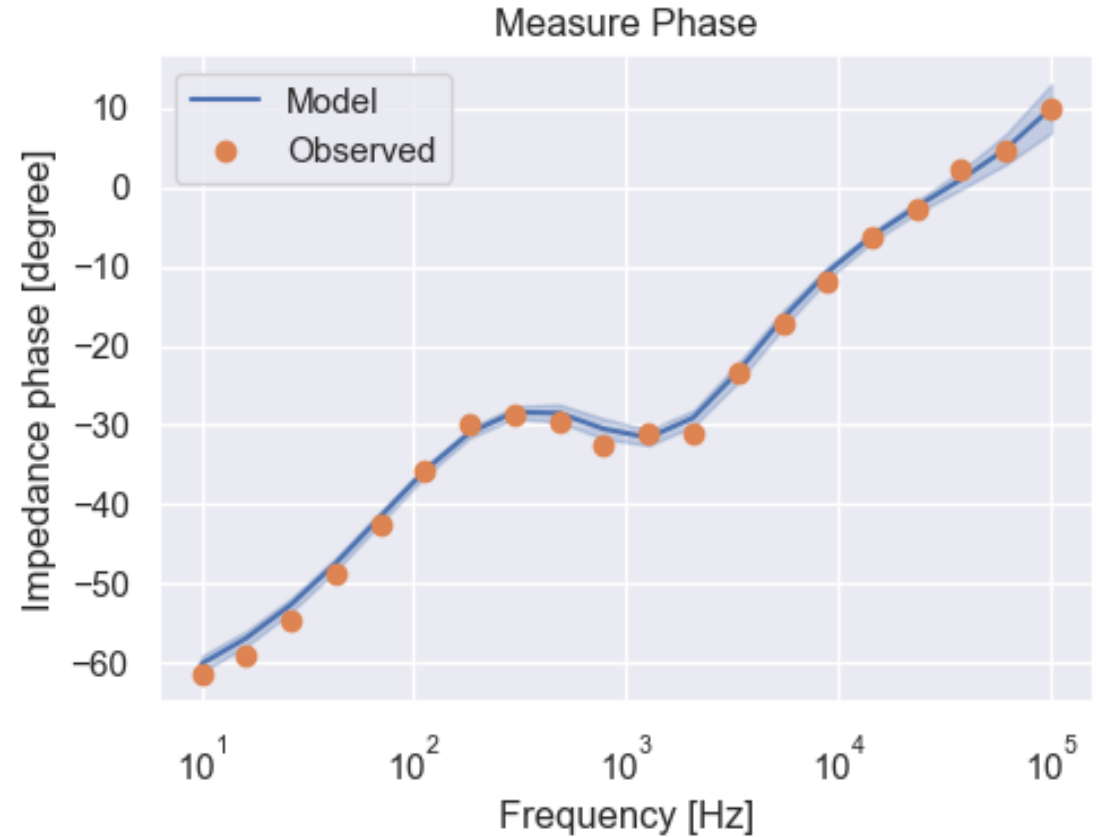
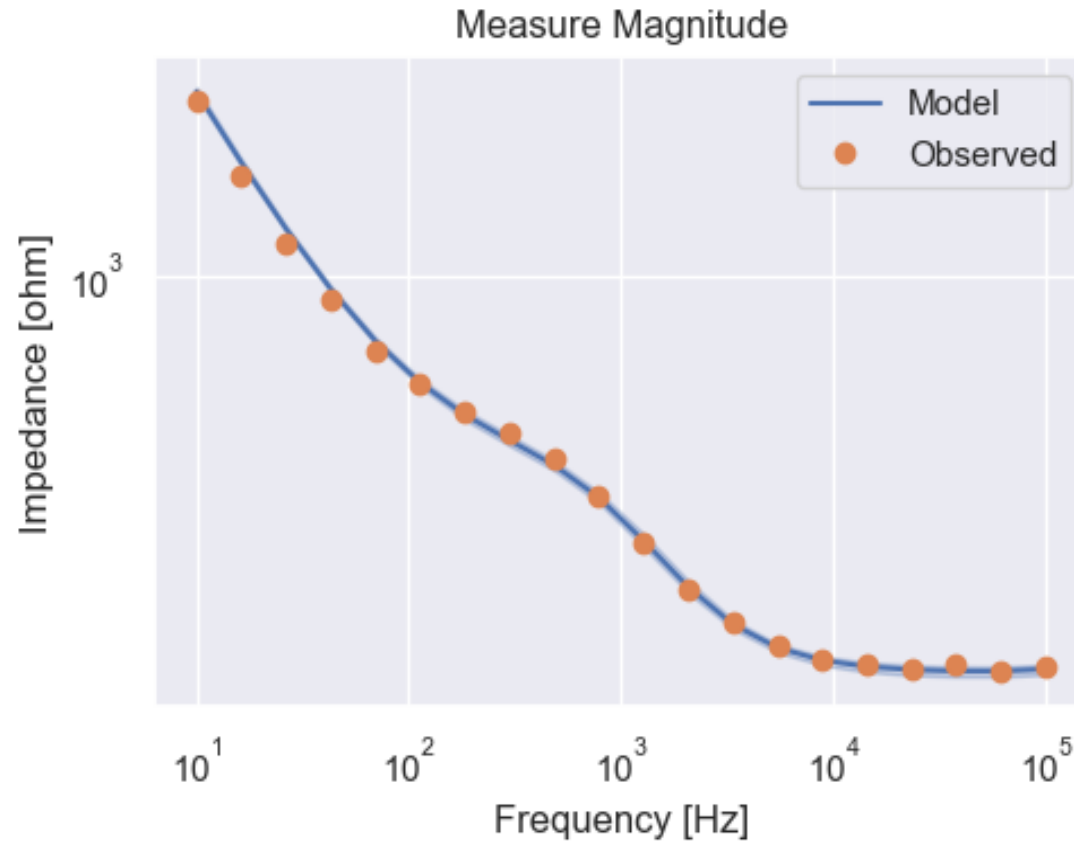


Locsense Artemis ST set-up

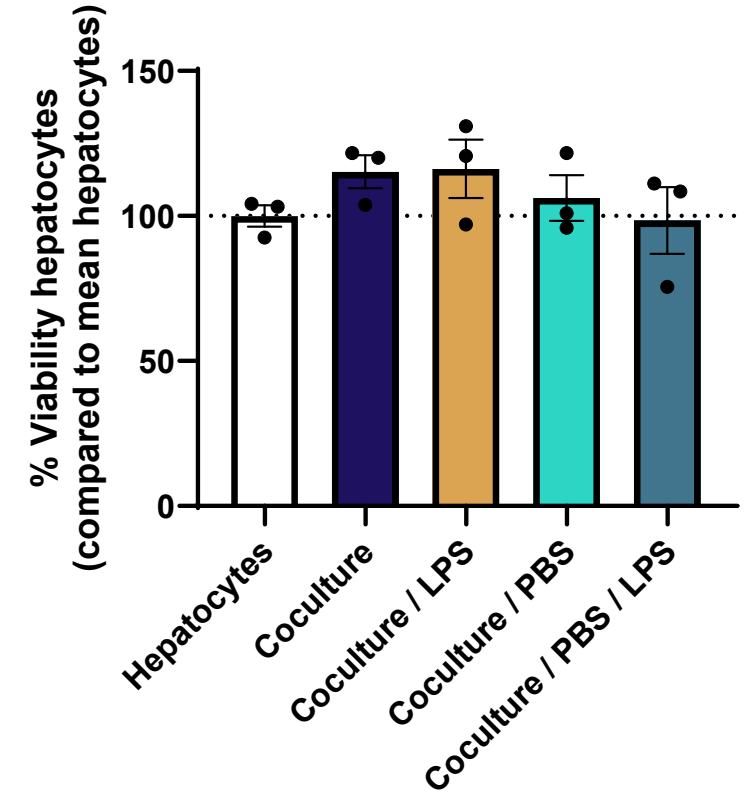
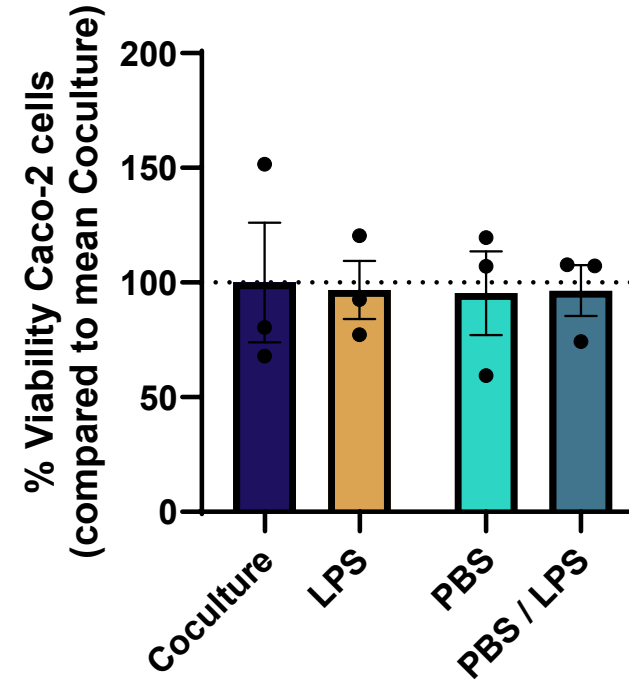
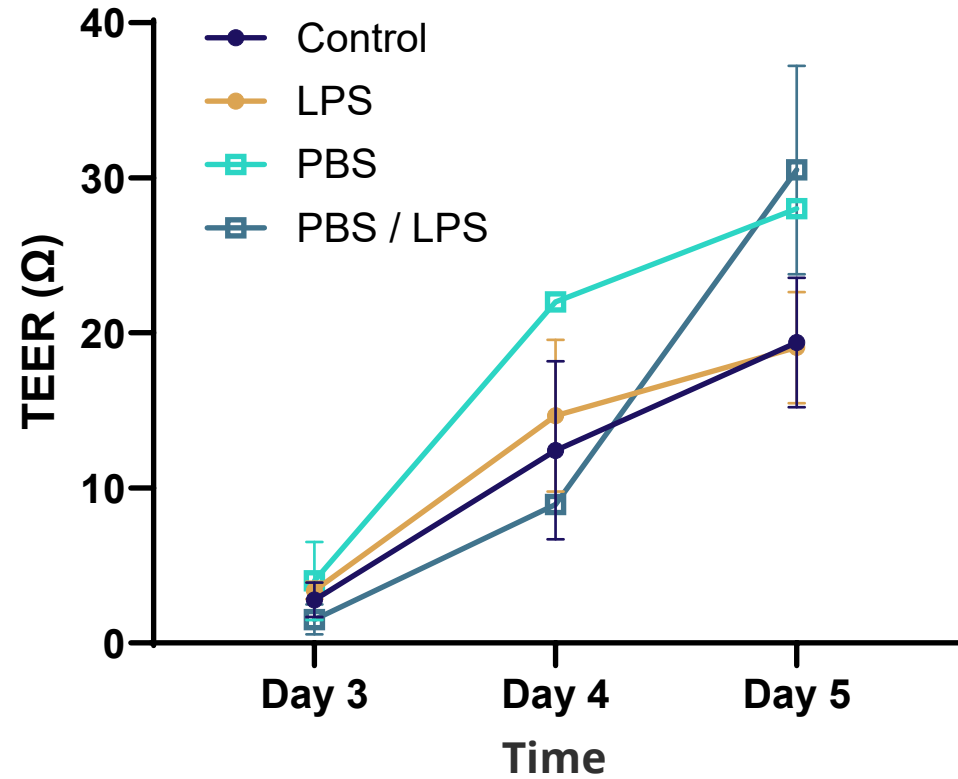


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Circuit model fitting



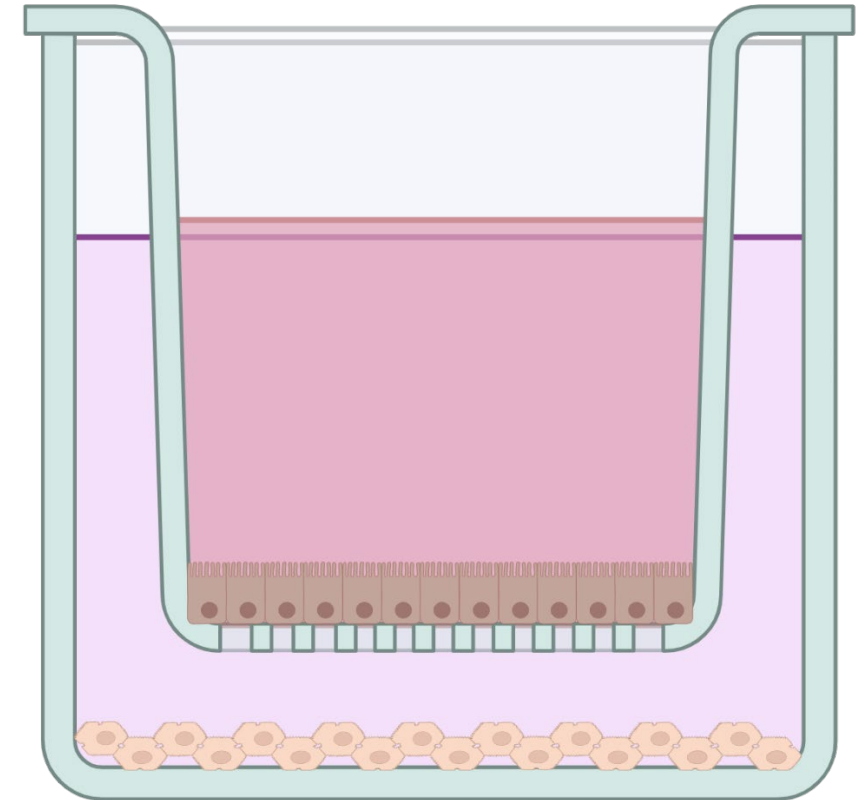
Co-culture response to stress



Conclusions and take-home message



- We have developed a highly representative gut-liver axis model utilizing ATCC's HepatoXcell™ Pro Primary Human Hepatocytes and Caco-2 intestinal cell lines.
- The Artemis ST by Locsense is an effective tool to measure electrical impedance and membrane barrier function.
- The Caco-2 transwell intestinal barrier demonstrates substantial resistance to LPS-induced chemical stress, resulting in the preservation of hepatic culture integrity.



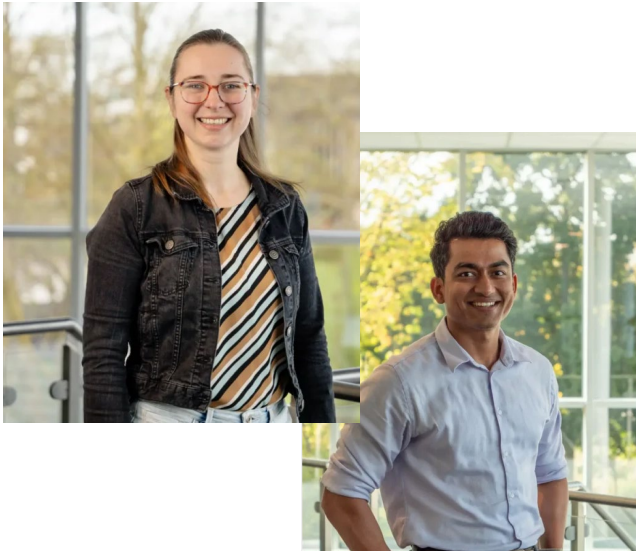
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ATCC

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Emma Todd
Carolina Lucchesi, PhD





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CREDIBLE LEADS TO INCREDIBLE

Questions