

Case study: Optimal quality of human residual colon tissue.

In collaboration with VitalTissue, TNO¹ used the *ex vivo* InTESTine™ model to assess whether the human residual colon tissue provided by VitalTissue met the quality criteria validated for this model system. The data presented below, derived from two biological replicates, are representative of a series of four tissue shipments supplied by VitalTissue to TNO's Unit for Health & Work between June and August 2026.

Logistics and transport.

Following its removal in the operating room, the residual tissue is collected in containers filled with a cold preservation buffer. The cooled tissue is transported securely in the buffer to the research facility, where it is used for scientific experiments on the same day.

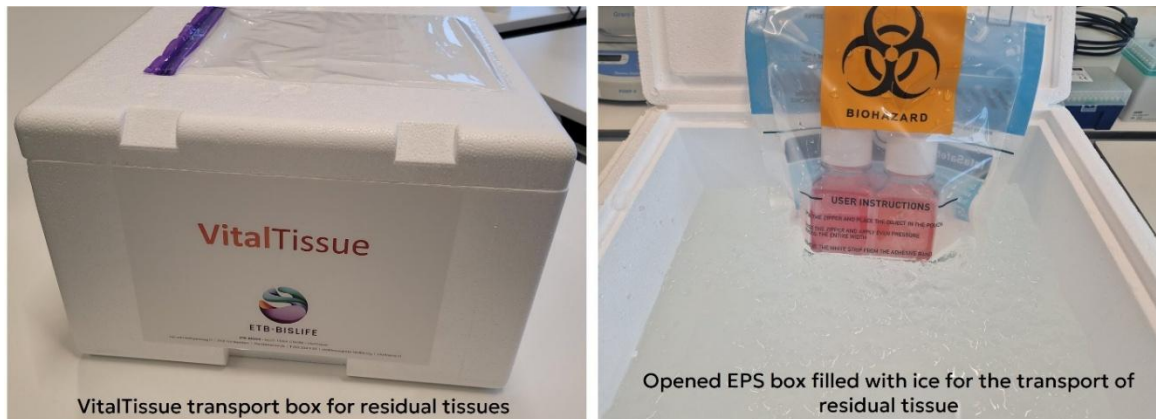


Figure 1. Human residual colon tissue is transported directly from the operating room in an EPS (expanded polystyrene) box on ice.

Isolation of the mucosal membrane from the residual colon tissue.

The functionality of the intestinal epithelium is assessed within the mucosal membrane, which is isolated from the colon tissue.

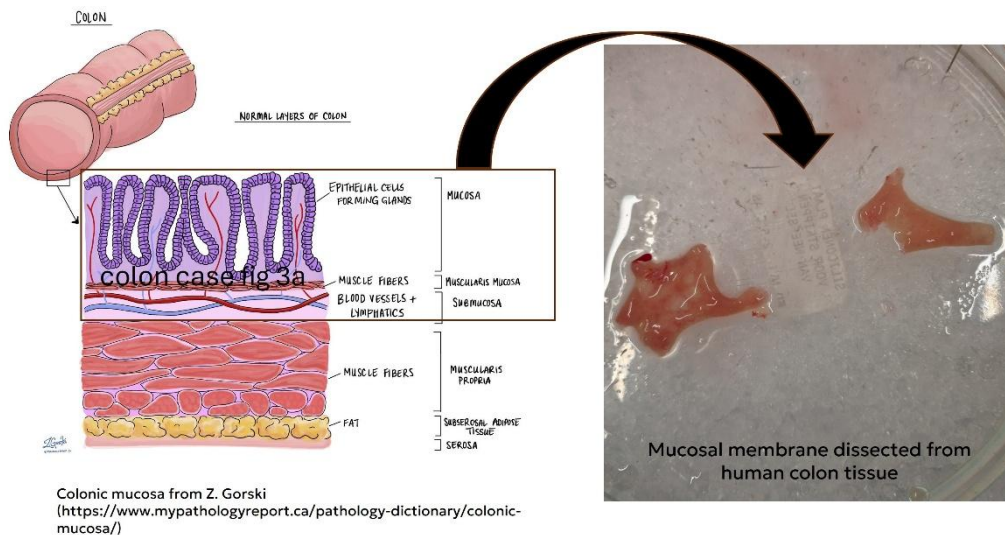
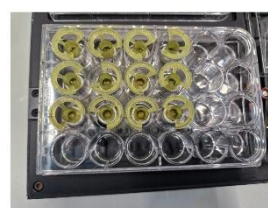
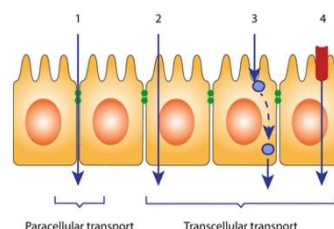
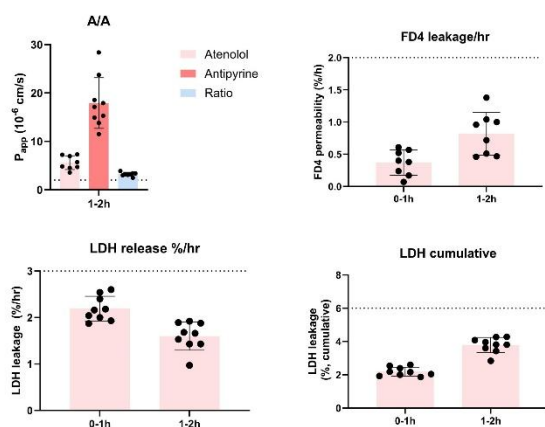


Figure 2. The mucosa and submucosa—which contain the intestinal epithelium—are isolated from the colon (large intestine) specimen while kept on ice in a Petri dish.

Quality control: Functionality and integrity of the intestinal epithelium.

The high quality of the residual colon tissue was demonstrated by measuring paracellular and transcellular transport across the mucosal membrane using the InTESTine™ *ex vivo* model system. These results confirm that the colon tissue is functional. In addition, specific biomarkers indicate that the intestinal epithelium is viable (minimal release of lactate dehydrogenase) and that the intestinal barrier remains intact (low permeability to FITC-labeled dextran 4000).

Control parameter	Marker	Cut-off criteria
Transport functionality	Transcellular/paracellular transport ratio of small molecules	Papp ratio >2
Barrier integrity	FD4 (FITC-Dextran 4000) permeability	<1%/h
Viability	Lactate dehydrogenase secretion	<3%/h



ex vivo intestinal tissue model (InTESTine™)

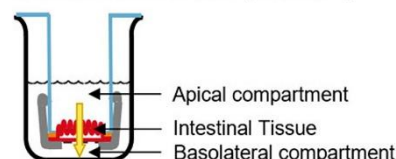


Figure 3. Results and test setup for colonic epithelium TNO¹: the intestinal epithelium in the residual colonic tissue is intact and functional.

Conclusion.

This case study confirms the VitalTissue supply chain and quality assurance processes function optimally, ensuring that the physiological integrity and viability of human residual colonic tissue are fully preserved. This makes the material exceptionally well-suited for high-quality translational research and the development of New Approach Methodologies (NAMs), including advanced *ex vivo* model systems, organ-on-chip models, and organoids.

Are you curious about what this tissue could mean for your research? Visit www.vitaltissue.nl or contact us directly to discuss the possibilities for your specific research design.

¹TNO Biomedical Research - Human Biology & DMPK (Drug Metabolism and Pharmacokinetics), unit Health & Work. https://www.tno-pharma.com/Intestine_en.html