microGUT: An *in vitro* model of the human gastrointestinal tract

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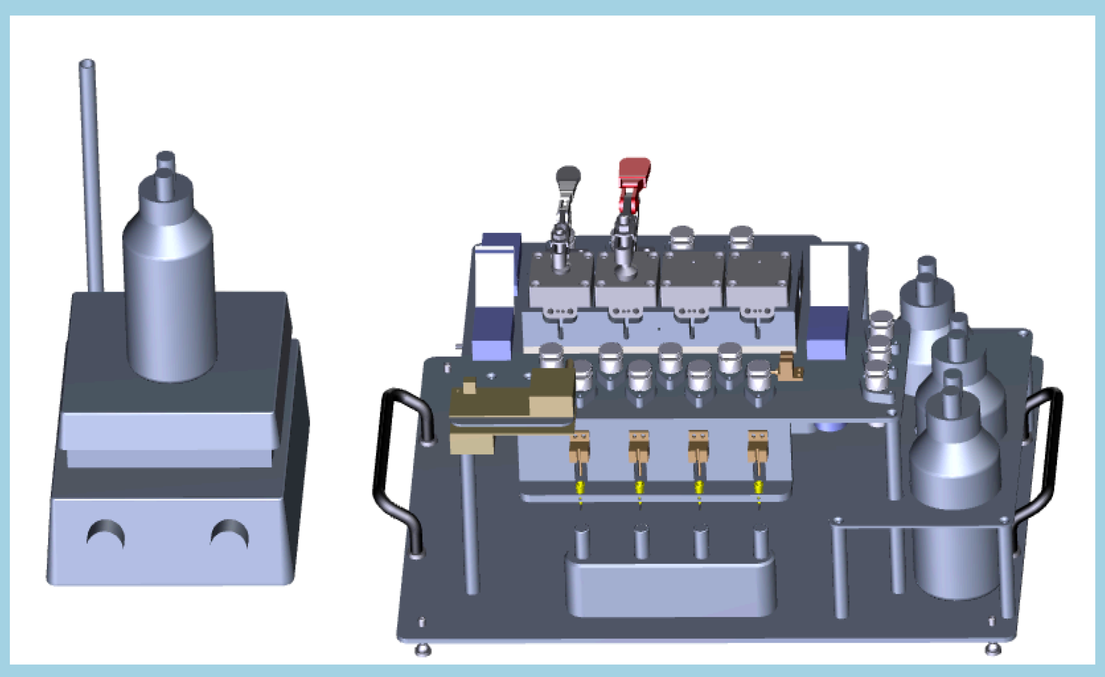
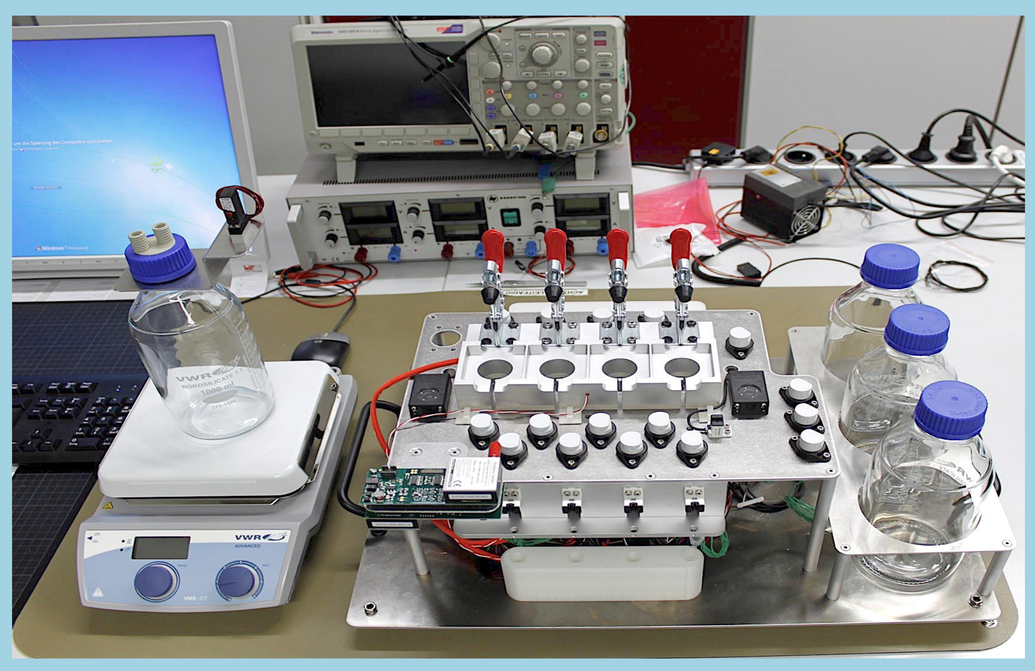
microGUT: Objectives

Objective: To design, develop and validate an automated microfluidics-based dynamic *in vitro* model of the human gastrointestinal tract allowing comprehensive recapitulation of the human gut microbiota (GM) along with compatible downstream high resolution molecular omic analyses. To facilitate *in vitro* investigations of GM modulatory properties of pre- and probiotics as well as bio-actives relevant for food and feed formulations.

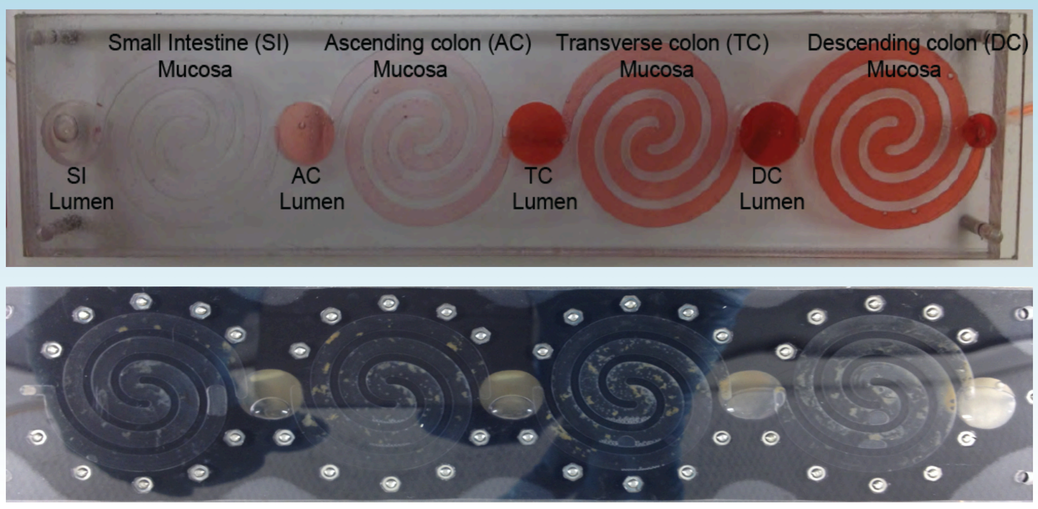
microGUT: The technology

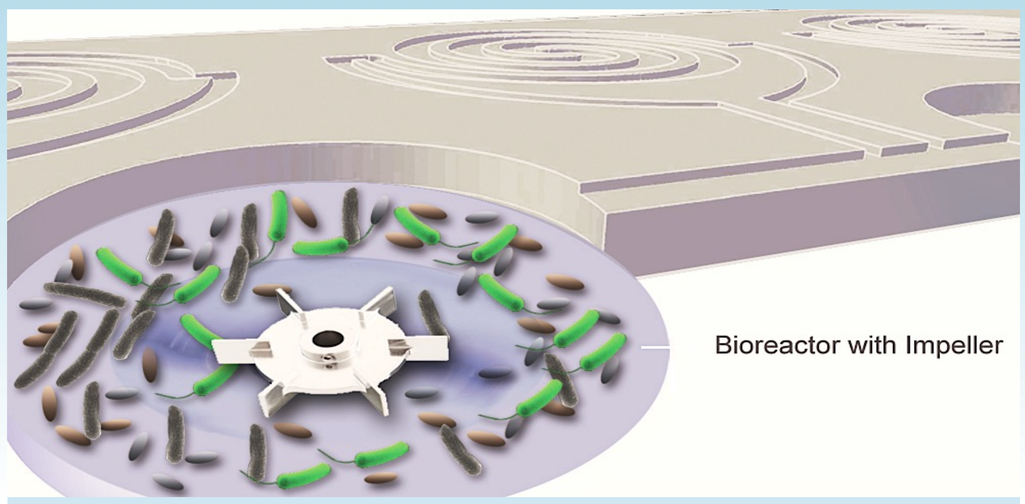




Model overview: The microGUT model is an automated desktop-sized microfluidics-based model of the human gastrointestinal tract (GIT) simulating the conditions representative of the GIT physiology, with personalized passage times, automated sampling and continuous real-time oxygen and pH monitoring and control across the GIT.

microGUT: mucosal and luminal micro-niches





microGUT facilitates the cultivation of complex gut microbiota encompassing mucosal and luminal strains. Growth of diverse GM species, 592 species (out of 635, pooled inoculum from 3 donors) survived for 2 weeks in the device. Due to advanced automated micro-bioreactor technology and simulation of diverse micro-niches in small volumes in combination with downstream protocols suitable for omics analysis, the microGUT platform provides significant advancements to existing *in vitro* gut fermentation models.

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