

JOIN OUR BIOMIMETICS PROJECT



TNO innovation
for life

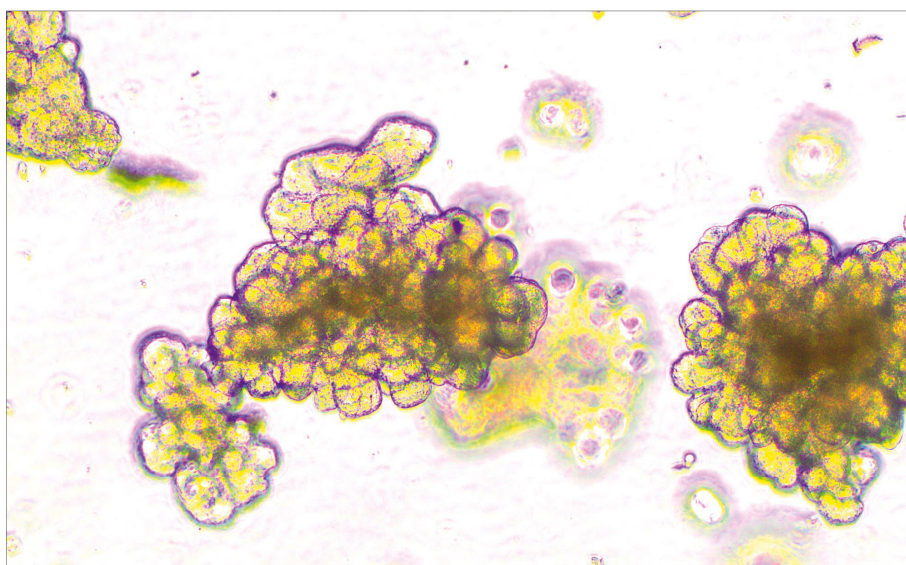
We are looking for partners in our new project Biomimetics that will start in 2017. The first few months of a newborn's life are the most critical for healthy brain, eye, and immune system development with proper nutrition as key to ensuring that each of these milestones are met. Many studies have shown the role of nutrition for proper immune homeostasis later in life to combat diseases in areas such as chronic intestinal inflammatory disease and food allergies or intolerance.

The function of intestinal epithelia in fortifying the mucosal immune tolerance is a well-established factor in the process of nutrient absorption. However, the factors that induce maturation of intestinal epithelia in the presence of nutritional factors found in human breast milk or infant formula are poorly understood. It is thus critical to fully understand this interaction to develop nutritional strategies to protect the neonatal intestine from infections and other diseases later in life.

PREDICTIVE *IN VITRO* SCREENINGS PLATFORM

The ongoing trend towards healthy food products poses continuous challenges for the food industry in developing innovative products that are truly beneficial. To demonstrate the effects of these products on improving health, scientific support from *in vitro* studies

(and possibly animal studies) are required before embarking on costly and time-consuming human studies. The *in vivo* predictive value of *in vitro* studies determines to a large extent the success rate of novel developments. Currently available *in vitro* tools such as cell lines poses too many limitations to fully represent the biochemical processes and mechanisms at play during nutrition absorption in the human gastro-intestinal tract. The use of more advanced systems such as intestinal organoids that incorporate the various cell types present in *in vivo* intestinal epithelium bears the promise of an *in vitro* tool with increased physiological predictability.



INNOVATION APPLIED

TNO is executing a distinctive shared research project to establish a biomimetic platform that aims to recreate the biological conditions during intestinal maturation and its response in the presence of various nutrients. This gut-on-a-chip essentially allows food ingredients to be tested in a model intestinal system at an earlier point in the research and development process, potentially eliminating or shortening animal studies, and thereby streamlining food manufacturers' goals of producing novel health-promoting food ingredients and products.

The team of scientists at TNO have considerable expertise and experience in implementing these sophisticated technologies and have been working on such projects since the introduction of organs-on-a-chip in the biochemical field. We are actively seeking partnerships with the private sector and academic institutions to develop improvements in a wide variety of products and processes.

INTENDED IMPACT

The use of relevant, predictive and translational preclinical models to study nutritional ingredients is essential in the R&D process. Transformative technologies such as TNO's nutrient absorption platform offers the opportunity for food companies and their ingredient suppliers to support their developments by sound scientific approaches. A partnership with TNO enables a facilitated approach to digestive research questions with a team of knowledge experts equipped to see through the R&D process.

TYPE OF PARTNERS

This consortium already consists of TNO, an established academic research institution and an industry leader in innovative, science-based infant formula products. These novel developments can be applied with additional partners and we welcome requests for additional information from consortium partners in the following industries:

- Food
- Ingredient suppliers
- Beverage
- Pharmaceutical/Biotech
- Personal care

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TNO HEALTHY LIVING

TNO initiates technological and societal innovation for healthy living and dynamic society.

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