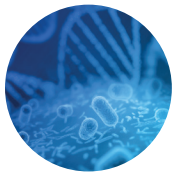


Use Case 4: Phenotyping of the Gut-Brain Axis in Healthy Individuals

This use case, alongside Use Case 5, explore the gut-brain axis to map its role in health and disease, aiming to identify microbiome-based biomarkers for gut-related disorders and neurological disorders.

Focus disease



Gut microbiome and gut-brain interactions that are relevant to understanding deviations in mental and somatic disorders related to the gut microbiota, such as obesity, inflammatory bowel disease, and irritable bowel syndrome.

Data modalities and providers

Genetic, text, microbiome, and neuroimaging data from RUMC, UNIPD, and public/open sources.



Scientific approach



Analysis of microbial DNA from fecal samples to assess gut microbiota composition.

Linking gut microbiome profiles with brain function and structure using a deeply phenotyped healthy population and analysis with a modality integration technique such as a Linked ICA.

Evaluate associations between gut microbiota, environmental factors, and health outcomes.



Expected Outcomes



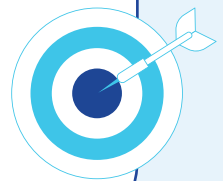
Identification of gut microbiota variations potentially linked to brain functions and behaviors.



Discovery of potential gut microbiome alterations linked to a specific pollutant, common genetics data and worse prognosis for metabolic health parameters.



Establishment of a baseline for gut-brain interactions in health and certain somatic and mental disorders.



Impacts



Creating new strategies for precision-medicine drug development.



New paradigms for integrating genomics and multimodal data.



Increase public trust about the safety and efficacy of data sharing.