

# MicrobiomePower

## Modelling the bioenergetics of a natural digester: the human gut microbiome

### ABSTRACT

The scientific mobility will be associated to a project starting at Arizona State University (ASU) on the evaluation of gut microbiome contribution to human bioenergetics. This project is led by Dr. Andrew Marcus from the Biodesign Swette Center for Environmental Biotechnology under the supervision of Pr. Bruce Rittmann.

- Objective 1 will be the development of a microbial ecology model of gut microbiome that would enable a precise evaluation of thermodynamic characteristics of gut microbial community.
- Objective 2 will be setting up and operating biocalorimetry experiments for a direct assessment of bioenergetics of mixed anaerobic microbial communities at lab scale. This objective will be dependent of the results of other applications that could fund the experimental setup and a prolonged mobility. This would allow optimizing the model developed in objective 1.
- Objective 3 will be the prospection of future possible collaborations between Biodesign Swette Center for Environmental Biotechnology, Laboratoire de Biotechnologie de l'Environnement and other labs from Labex Agro.

**Year :** 2018

**Project number :** 1502-604

**Type of funding :** AAP

**Project type :** AAP MOBILITE

**Research units in the network :**

**Start date :** 2018-07-01

**End date :** 2019-12-31

**Flagship project :** no

**Project leader :** LE QUEMENER Elie

**Project leader's institution :** INRA-INRAE

**Project leader's RU :** LBE

**Budget allocated :** 14580 €

**Total budget allocated ( including co-financing ) :** 14580 €

**Funding :** Labex

### ACTION

July-December 2018: preliminary experiments performed at ASU and data sharing

January-June 2019: Agropolis mobility: model development (objective 1)

July-December 2019: possible mobility prolongation for biocalorimetry experiments and model optimization

The major output expected from this mobility would be the development of a modelling framework for a precise evaluation of anaerobic microbial community thermodynamics. This framework could then be applied for energy balances in other contexts such as environmental biotechnology. This would also constitute a good basis for future collaboration projects with Pr. Bruce Rittmann, Dr. Andrew Marcus and other scientists from the Biodesign Swette Center for Environmental Biotechnology.