Research Topic for the ParisTech/CSC PhD Program
(one page maximum)

Subfield: Biology

ParisTech School: AgroParisTech

Title: Relationships between nutrition, the gut microbiota and obesity

Advisor(s): Dr Philippe Gérard
Micalis Institute, Amipem Team
INRA, AgroParisTech, Université Paris-Saclay, Jouy-en-Josas
E-mail : philippe.gerard@inra.fr
Website : https://www.micalis.fr/micalis_eng/

Short description of possible research topics for a PhD:

The human intestine harbours a complex bacterial community called the gut microbiota. This microbiota is specific of each individual despite the existence of several bacterial species shared by the majority of adults. The influence of the gut microbiota in human health and disease has been revealed in the recent years. Particularly, the use of germ-free animals and microbiota transplant showed that the gut microbiota may play a causal role in the development of obesity and associated metabolic disorders, and lead to identification of several mechanisms. In humans, differences in microbiota composition, functional genes and metabolic activities are observed between obese and lean individuals suggesting a contribution of the gut microbiota to these phenotypes. Thanks to our germ-free animal facility, we will study the relationships between diet, the gut microbiota and obesity using microbiota transplants to germ-free mice in order to identify the bacterial species favouring or protecting from obesity.

Required background of the student:

Microbiology
Bioinformatics and/or animal experimentation would be appreciated

A list of 5 (max.) representative publications of the group: (Related to the research topic)

Llopis M, Cassard-Doulcier AM, Wrosek L, Boschat L, Ferrere G, Bruneau A, Puchois V, Martin JC, Lepage P, Le Roy T, Lefèvre L, Langelier B, Cailleux F, González-Castro AM, Rabot S, Gaudin F, Agostini H, Prévot S, Berrebi D, Ciocan D, Jousse C, Naveau S, Gérard P, Perlemuter G. Intestinal microbiota contributes to individual susceptibility to alcoholic liver disease. Gut, 2016, 65:830-9.

Rabot S, Membrez M, Blancher F, Berger B, Moine D, Krause L, Bibiloni R, Bruneau A, Gérard P, Siddharth J, Lauber CL, Chou CJ. High fat diet drives obesity regardless the composition of gut microbiota in mice. Scientific Reports, 2016, 6:32484.

Gérard P. Gut microbiota and obesity. Cellular and Molecular Life Sciences , 2016, 73:147-62.

Le Roy T, Llopis M, Lepage P, Bruneau A, Rabot S, Bevilacqua C, Martin P, Philippe C, Walker F, Bado A, Perlemuter G, Cassard-Doulcier AM, Gérard P. Intestinal microbiota determines development of non-alcoholic fatty liver disease in mice. Gut, 2013; 62:1787-1794.