



Structural Biology Brussels (SBB)

has the honor to invite you to the public defense of the PhD thesis of

Raul Yhossef TITO TADEO

to obtain the degree of Doctor of Bioengineering Sciences

Joint PhD with Katholieke Universiteit Leuven

Title of the PhD thesis:

Beyond bacteria: analysis of the micro-eukaryotic complement of the human gut microbiota

Promotors:

Prof. dr. Jeroen Raes
Prof. dr. Han Remaut

The defense will take place on

Wednesday June 20 2018

at Katholieke Universiteit Leuven,
Rega Instituut, aula Eric De Clercq (06.B204)
Herestraat 49, 3000 Leuven

Members of the jury:

Prof. dr. ir. Eveline Peeters (chairman, VUB)
Prof. dr. ir. Frédéric Leroy (secretary, VUB)
Prof. dr. Kim Roelants (VUB)
Prof. Em. Jan Ceuppens (chairman, KUL)
Prof. dr. Katrien Lagrou (KUL)
Prof. dr. Kevin Verstrepen (KUL)
Dr. Laure Segurel
(MNHN, Musée de l'Homme, France)
Dr. Christen Rune Stensvold
(Statens Serum Institut, Denmark)

Curriculum vitae

Raul Tito was born in Huaraz, Peru. He studied Biological Sciences, with mention in Molecular Biology and Genetics, at the Universidad Nacional Mayor de San Marcos in Lima, Peru. He has a Master in Genetic Anthropology and Genetics from Universidad de Granada, Spain, and has worked as a research scientist in multiple academic institutions in the USA including Arizona State University, University of Illinois at Urbana Champaign and University of Oklahoma, focusing on human and microbial genetics of extinct and extant populations. In 2013 he started his doctoral work, under the mentorship of Jeroen Raes.

Abstract of the PhD research

The human body harbours a diverse microbial community belonging to the three domains of life: Bacteria, Archaea and Eukarya. Yet, most of the studies of the intestinal microbiota neglect the eukaryotes, which taxonomic and functional characterisation remains insufficient.

Intestinal eukaryotes include protist, fungi and helminths, some of which have purported associations to disease. However, the disease-association of some eukaryotes has been challenged due to its inconsistency across studies. Considering that functional differences have been established even at the intra-genus level, it is possible that some of the observed inconsistencies might trace back to this, mostly uncontrolled, diversity.

Eukaryotes appear to be a common component of the intestinal ecology, especially in non-industrialised societies. While some species, like *Blastocystis*, are common across the world, the largest diversity of gut eukaryotes is observed in rural communities.

Although the biological role of gut eukaryotes is unclear, their assumed pathogenic potential makes them a target for medical interventions. Eradication of alleged parasitic eukaryotes is standard of care, with unforeseen potential consequences to the gut homeostasis.

Continuous transition of human subsistence modes is associated with changes in the gut microbiota. Microbial diversity is reduced with industrialization raising questions about which are the microorganisms we are losing and, with them, what functions are disappearing or evolving within the human gut. Multiple studies have described consistent elements of the gut microbiota (a microbial core); however, to date no study has identified a multi-domain core microbiota.

The main aims of this doctoral thesis are: 1) To characterize the (understudied) taxonomic diversity and distribution of eukaryotes in the faecal microbiota, and 2) To characterise the multi-domain gut microbiota across a gradient of urbanisation.