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Chronic maternal separation in mice impaired immuno-metabolism in older offspring on standard diet

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Abstract Title (171)

Chronic maternal separation impaired immuno-metabolism in elder offsprings mice on standard diet.

A short description of your research project (3000)

Our research project focuses on early and long course consequences of adverse events during perinatal period on intestinal barrier functions and immune system maturation and education. Indeed, perinatal period has been identified as a critical window for intestinal barrier and immune system establishment leading to an appropriate relationship between host and intestinal content i.e. homeostasis. Adverse events during this period might be responsible for disestablishment of host - microbiota relationship responsible for various diseases where an inappropriate host immune response toward luminal content has been identified. Luminal content is represented by food and microbial antigens. A rupture of tolerance toward microbiota has been observed in organic (inflammatory bowel diseases) and functional (irritable bowel syndrome) gastrointestinal disorders whereas during food intolerance, dietary factors are the target of the exacerbated immune response.

We address the consequences of adverse events during perinatal period on intestinal barrier functionality and immune response in different model challenged with stress, chemical or infections within the framework of collaborations.

We developed an expertise in the field of intestinal barrier, immune system and microbiota analysis in adult but also in young rodents. Concerning intestinal barrier, we develop experimental protocols to measure intestinal permeability in vivo and ex vivo, enteric antimicrobial peptides expression and antimicrobial assay toward commensal bacteria, visceral sensitivity in response to colorectal distension, immune response associated to intestinal epithelium. Regarding immune system, we perform not only immune cells characterization but also evaluation of their functionality.

Recently, a growing body of evidence highlighted the tight link between immune response and metabolism named immuno-metabolism. Metabolic disorders including type 2 diabetes and obesity are characterized by a low grade inflammation, intestinal hyper-permeability and microbiota dysbiosis. Within the framework of collaboration, we included the consequences of adverse events during perinatal period on metabolism at adulthood.

Abstract of the project you want to present

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Metabolic disorders including Type 2 diabetes (T2D) and obesity are worldwide epidemic problems. Those multifactorial diseases are characterized by a low grade inflammation associated with intestinal hyperpermeability and fecal microbiota dysbiosis. Beside diet and lifestyle habits, early life adverse events have been identified as a powerful trigger in the development of various chronic diseases, including T2D, at adulthood.

MS is a model widely used in rodents as a paradigm of traumatic stress in early life. Previous work from the laboratory demonstrated that MS induced low grade inflammation and intestinal hyperpermeability in young adult without metabolic disorders. Herein, we wondered if those mice mimicking some of the features observed in metabolic diseases develop glucose metabolism defects by aging. One year old mice submitted to MS and fed standard diet developed glucose intolerance and insuline resistance, associated with an increase of humoral immune response against commensal *Escherichia.coli* and fecal dysbiosis in favor of *Enterobacteriaceae* without jejunal hyperpermeability. Furthermore, glucose intolerance was associated with elevated TNF α secretion in the spleen.

For the first time, we demonstrated that early life stress triggers glucose intolerance in non-genetically non-dietary challenged elder mice. This study highlights stress as a risk factor for metabolic disorders and perinatal period as a critical window for the development of metabolism homeostasis.

Short tabular CV

Hanna Ilchmann

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Education / Experiences

- 2016: M2R physiopathology of metabolic and cardiovascular diseases, Toulouse France
Consequences of early life adverse events on immunometabolism in elder mice
Sandrine Ménard, Toxalim INRA, Toulouse
- 2015: M1 BioSanté Physiopathology, Toulouse, France
Development of STAU1 KO and STAU2 KO in HeLa et H460 cells Eric Lacazette, CRCT, Toulouse
- 2014: Bachelor of science, Giessen, Allemagne
The role of intestinal immunity in type II diabetes, Lucile Garidou, I2MC, Toulouse
Evaluation of the probiotic activity of *Bacteriodes vulgatus* in mice, Matteo Serino, I2MC, Toulouse

Own publications (500)