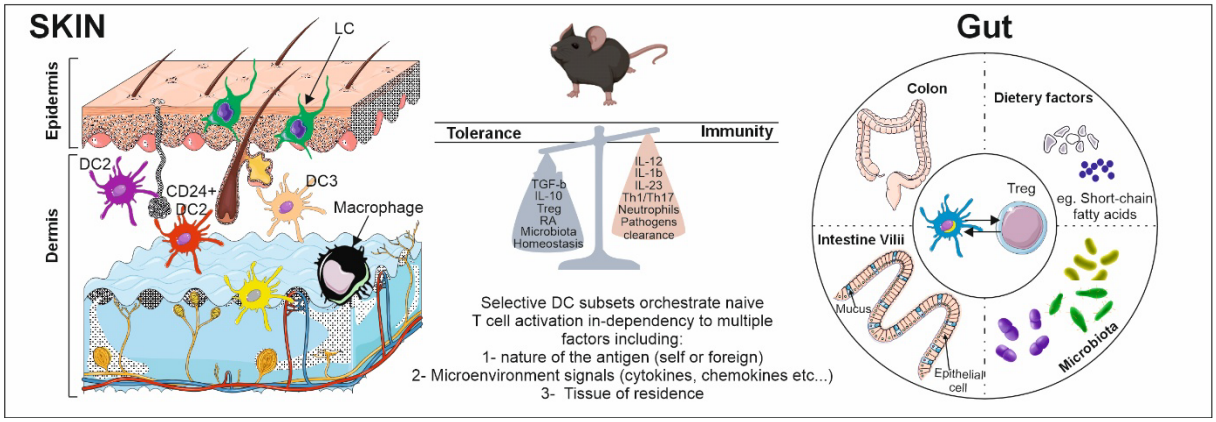
Jena School for Microbial Communication
Graduate School of Excellence

Postdoc project title

Understanding DC and mononuclear phagocyte functionality in relation to the commensal community and their metabolites

Nounagnon Romaric, Tochoedo
Supervisor: Prof. Diana Dudziak

Abstract:

Investigating the phenotype and function of dendritic cells is challenging, particularly in non-lymphoid organs such as the skin and gut. Through their repertoire of antigen recognition, dendritic cells accurately interpret environmental cues to orchestrate appropriate T cell activation in accordance with the local immune state (homeostasis versus pathogenesis). In particular, how dendritic cells integrate both inflammatory signals (e.g. LPS present on the surface of commensal bacteria) and anti-inflammatory signals (commensal bacteria-derived metabolites, such as short-chain fatty acids) to ensure immune tolerance in the gut and skin remains unclear. In our current project, we aim to comprehensively analyze the interaction between dendritic cell subpopulations and their microenvironmental immune stimuli (e.g. commensal bacteria and their metabolites) in the murine gut and skin during homeostasis and disease conditions, using next-generation technologies including FACS, scRNAseq, confocal microscopy, and cell culture platforms.

Our study aims to reveal how the spatial positioning of dendritic cell subpopulations induced by the microbiome in the gut dictates their functions, and how any disturbance in this process could lead to life-threatening conditions such as sepsis. A summary of our current research focus is provided below.