



KEYNOTE SPEAKER : Takeshi HARAYAMA

IPMC CNRS Université Côte d'Azur

Project: FACiL - “Functions of Acyl-Chains in Lipid Membranes”

**Complexity and Diversity of Lipid Systems:
Understand, Manipulate, and Break the Rules**

Cellular membranes are made from a plethora of lipids with different structures. The lipid composition of membranes is affected by the diet, which might be part of the mechanisms how “good” or “bad” fats affect our health. However, the roles of individual lipid species remain often unclear. Especially, the biological functions of different acyl-chains that constitute the hydrophobic part of membranes are understudied, severely limiting our understanding of many biological processes. We previously identified and analyzed multiple acyl-chain-incorporating enzymes, lysophospholipid acyltransferases, and unveiled the complex regulation of membrane lipid acyl-chains. Based on this knowledge, we could study the benefit of having normal acyl-chains *in vivo* and found their importance in the prevention of lung diseases. To further elucidate the roles of lipid acyl-chains, we established a highly efficient CRISPR-Cas9 strategy to disrupt lipid metabolism and manipulate lipid composition in a well-controlled and reliable manner. This unveiled the various roles of acyl-chains in sphingolipids, giving novel insights into the formation of plasma membrane subdomains. In the future, my research group will analyze the roles of lipid acyl-chains covering a broad range of interests, from basic biophysics to genetic diseases.