Instituto de Biología Funcional y Genómica

Programa de Seminarios Externos

"Dionisio Martín Zanca"

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Exploration of new ecology by horizontal acquisition of novel lipid metabolic functionality

Abstract

Horizontal gene transfer is a source of metabolic innovation and adaptation to new environments. Yet, how horizontally transferred metabolic functionalities are integrated into host cell biology remains an open question. In this work, I use the fission yeast Schizosaccharomyces japonicus to probe how eukaryotic lipid metabolism is rewired in response to the acquisition of a horizontally transferred squalene-hopene cyclase Shc1. I will present our recent work showing that Shc1-dependent production of hopanoids, the structural mimics of eukaryotic sterols, allows S. japonicus to thrive in anoxia, where sterol biosynthesis is not possible. I will demonstrate that glycerophospholipid fatty acyl asymmetry, prevalent in S. japonicus, is crucial for accommodating both sterols and hopanoids in membranes, and explain how Shc1 functions alongside the native sterol biosynthetic pathway to support membrane properties. Through engineering experiments in the sister species S. pombe, which naturally lacks Shc1, I will show that the acquisition of Shc1 may entail new physiological traits; however, to maximize Shc1 performance, sterol biosynthesis must be dampened. This work sheds new light on the mechanisms underlying cellular integration of horizontally transferred genes in eukaryotes and provides broader insights into the evolution of membrane organization and function..

Viernes 27 Septiembre 2024

Hora: *10:30 pm*
Lugar: *Salón de actos del IBFG*
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