MBG FOCUS TALK

hosted by Section for Plant Molecular Biology

MBG Focus Talks in Molecular Biology

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Mogens Zielerstuen, Building 1422, AU Conf. Centre, Fredrik Nielsens Vej 2

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Arbuscular Mycorrhizal fungi and their endobacteria: a symbiotic microbiota

Arbuscular mycorrhizal fungi (AMF) are a crucial component of plant microbiota: thriving both in the rhizosphere and inside root tissues, they play key roles in nutrient cycling and plant health. In addition to some peculiar biological features (they are obligate multinucleated biotrophs), many of them possess endobacteria in their cytoplasm. These microbes are usually transmitted following a vertical transmission along the fungal sporal generations. Diverse bacterial populations may coexist in the same fungal spore, offering an interesting example of a fungal intracellular microbiota. The development of omics approaches has allowed us to sequence the genome of some endobacterial lines revealing a reduced genome and dependence on the fungal host. To understand the adaptive traits of this fungal-bacterial interaction, we applied transcriptomics and proteomics approaches to an isolate of Gigaspora margarita containing an endobacterial population identified as Candidatus Glomeribacter gigasporarum versus a cured line without endobacteria. RNA-seq analysis and iTRAQ quantitative proteomics of the AMF in the presence an absence of its endobacterium indicated that endobacteria have an important role in the fungal pre-symbiotic phase by enhancing fungal bioenergetic capacity, increasing its ATP production, and respiration. Fungal symbionts inside plant symbionts originate a complex interdomain network that probably affects fungal-plant interactions opening questions on the adaptation mechanisms and on the evolution of such interactions.