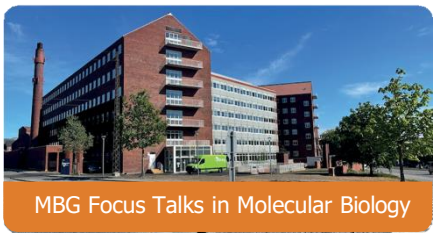
MBG FOCUS TALK

Hosted by Torben Heick Jensen



Tuesday 1 October 2024 @ 09:00-09:45
Faculty Club (1870-816)

Ulrich Hohmann

- Institute of Molecular Biotechnology (IMBA)
- Research Institute of Molecular Pathology (IMP)

Vienna, Austria

Mechanistic principles of nuclear (m)RNA export

The nuclear export of messenger RNA (mRNA) is a key step in eukaryotic gene expression. While key components of this pathway are known since decades and despite recent insights into the packaging of newly transcribed mRNAs into ribonucleoprotein complexes (mRNPs), the subsequent events that govern mRNA export are poorly understood.

We investigated the mechanism by which the piRNA precursor, an unusual transcript that hijacks the mRNA export pathway in the Drosophila germline, is exported from the nucleus. This research overturned many of our hypothesis, but ultimately led us to elucidate the molecular basis of mRNA export licensing, involving the remodelling of the mRNP-bound transcription-export complexes (TREX), the formation of export-competent mRNPs, the docking of mRNPs at the nuclear pore complex (NPC), and the release of mRNPs at the NPC to initiate export. Through biochemical and structural data, we uncover the ATPase DDX39/UAP56 as a central molecular switch that directs mRNPs through the TREX and the NPC-anchored TREX-2 complexes using its ATPase and mRNA-binding cycle. Our findings establish a mechanistic framework for a general and conserved (m)RNA export pathway.

AARHUS UNIVERSITY