Joint KJELDGAARD & DANDRITE Lecture

Thursday 17 November 2016 at 13.15 - 14.00
AIAS auditorium(building 1632-201), Høegh-Guldbergs Gade, 8000 Aarhus C

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Linking protein phosphorylation and degradation: How a specific phospho-signal serves as a degradation tag

Protein turnover is a tightly controlled process critical for the removal of aberrant polypeptides and for cellular signaling. Whereas ubiquitin marks eukaryotic proteins for proteasomal degradation, a general tagging system for the equivalent bacterial Clp proteases is not known. To address this point, we analyzed the targeting mechanism of the ClpC:ClpP proteolytic complex, the major protease in Bacillus subtilis. Quantitative affinity proteomics using a ClpP trapping mutant show that proteins phosphorylated on arginine residues are selectively targeted to ClpC:ClpP. In vitro reconstitution experiments reveal that the McsB-mediated arginine phosphorylation is required and sufficient for the degradation of substrate proteins. The docking site for phosphoarginine is located in the N-terminal domain of the ClpC ATPase as resolved at high resolution in a co-crystal structure. Together, our data demonstrate that pArg functions as a bona fide degradation tag for the ClpC:ClpP protease. This system, widely distributed across Gram-positive bacteria, is functionally analogous to the eukaryotic ubiquitin-proteasome system.

Host: Group Leader Anne von Philipsborn, Dept. Molecular Biology and Genetics, DANDRITE - Danish Research Institute of Translational Neuroscience, Aarhus University

The Kjeldgaard Lecture Series is organised by Dept. Molecular Biology and Genetics
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