Press Release

Control of Cellular Recycling Pathways

Researchers shed light on the highly organized and complicated regulation of cellular turnover

Together with researchers from the University of Rome/Italy and the Italian National Institute for Infectious Diseases scientists from the Freiburg Institute for Advanced Studies (FRIAS) and the Center for Biological Systems Analysis (ZBSA) shed light onto the highly organized and complicated regulation of cellular turnover. Work contributed by the Freiburg-based research group led by biochemist Dr. **Jörn Dengjel**, Junior Fellow of the FRIAS School of Life Sciences – LifeNet, has just been published in the prestigious journal *Nature Cell Biology*.

Bio-molecules within human cells are constantly being synthesized and degraded. This turnover is important for basic cellular processes, but it also plays a role in stress responses. Its deregulation has been linked to several diseases, amongst others cancer and neurodegenerative disorders like Parkinson's. By combining analytical and cell biological approaches, the international research team between Freiburg and Rome identified a new pathway regulating protein interactions and their influence on cellular recycling.

One of the recycling pathways, autophagy or cellular "self digestion", has been a focus of Jörn Dengjel's research for many years. In times of poor energy supply, this self digestion helps to secure the cells' survival. A protein that plays an important role in autophagy regulation is AMBRA1. In their paper, the Freiburg-based research group identified a dynamic phosphorylation site on the protein AMBRA1. Dengjel's Italian colleagues could further show that during growth factor shortage phosphorylation on this

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specific site is removed, activating AMBRA1, which in turn leads to increased cellular turnover and survival of the cells.

Jörn Dengjel has been conducting research as Junior Fellow of the FRIAS School of Life Sciences – LifeNet since 2008. At the ZBSA he is leading the research group “Spatio-temporal protein dynamics during autophagy”.

Original paper:
Francesca Nazio, Flavie Strappazzon, Manuela Antonioli, Pamela Bielli, Valentina Cianfanelli, Matteo Bordi, Christine Gretzmeier, Joern Dengjel, Mauro Piacentini, Gian Maria Fimia & Francesco Cecconi (2013): “mTOR inhibits autophagy by controlling ULK1 ubiquitylation, self-association and function through AMBRA1 and TRAF6”, Nature Cell Biology 2013, doi:10.1038/ncb2708.
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