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**"Genomics of phototrophic protists: Communication between compartments and the extracellular/intracellular transition"
presented by Franziska Hempel and Uwe Maier**

Primary plastids, which are present in green algae, land plants, red algae and glaucocystophytes, are surrounded by a double membrane (plastid envelope). They evolved by the incorporation of a cyanobacteria-like cell and its reduction to a plastid. Other, complex organised plastids originated in secondary endosymbiosis. Here, a eukaryote with primary plastids was engulfed by another eukaryote and reduced to a plastid surrounded by either three or four membranes. One group of secondarily evolved organisms captured a red alga and incorporated it as the secondary endosymbiont. In 1999, Thomas Cavalier-Smith introduced the Chromalveolates as a possible monophyletic group evolved by from this event. Under this assumption one can postulate that the progenitor, capturing a red alga and stabilizing it as a secondary endosymbiont, evolved a protein transport system for crossing the additional plastid membranes. As it is not likely that such an invention was repeated after the separation into the different modern groups of chromalveolates, similar trafficking mechanism should be present in secondary evolved organisms with a four-membrane plastid of red algal origin. Here we show the results of our genomic and cell biological investigations concerning the distribution of protein transport systems in different members of chromalveolates. In addition, we introduce our project concerning the transition of free-living cyanobacteria into intracellular endosymbionts.

Short CV

1989–1995 Assistant Professor; Albert-Ludwigs-University Freiburg.
1995–1997 C3-Professor (Associate Professor) for Plant Systematic,
 University of Bayreuth.
since 1997 C4-Professor (Full Professor) for Cell Biology, Philipps-University
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