Abstract text:

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The tetrapyrrole biosynthetic pathway provides the vital cofactors and pigments for photoautotrophic growth (chlorophyll), several essential redox reactions in electron transport chains (heme), the N- and S-assimilation (siroheme) and photomorphogenic processes (phytochromobilin). While the biochemistry of the pathway is well understood and almost all genes encoding enzymes of tetrapyrrole biosynthesis have been identified in plants, the posttranslational control and organization of the pathway is currently under intensive exploration. Posttranslational mechanisms controlling the metabolic activities of tetrapyrrole of synthesis are of particular importance, since this pathway needs a tight adaptation to environmental challenges to ensure adequate synthesis of end-products and the avoidance of accumulation of photodynamic metabolic intermediates at any time of development and environmental condition. Using the example of glutamyl-tRNA reductase (GluTR), the rate-limiting enzyme in tetrapyrrole biosynthesis, multiple posttranslational mechanisms will be presented that control activity, stability, protein-protein interaction and subcompartmental localization of a single enzyme.