Quantitative Analysis of Chloroplast Protein Targeting Pathways

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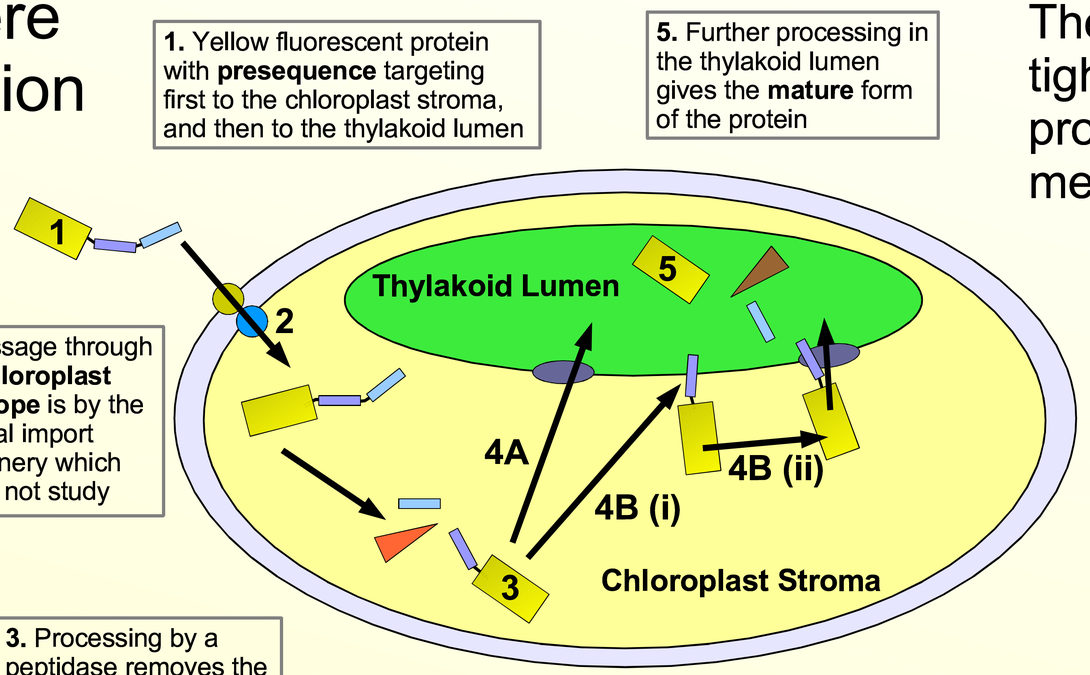
Protein targeting is required to move proteins from the site of synthesis to where they perform their function

This is especially important for chloroplasts, the plant organelles responsible for photosynthesis, because proteins must move across the **thylakoid membrane**.

We are working on developing *in vitro* chloroplast import and thylakoid import experiments that allow translocation of a fluorescent protein for **fluorescence bioimaging** and Western blotting.

The twin-arginine translocation pathway (Tat pathway) is of particular interest



The Tat pathway is able to move tightly folded, **cofactor-binding** proteins across the thylakoid membrane of chloroplasts.

Spatial simulations will allow a unified analysis of the data available

The first step is to relate the **non-spatial** localisation data of protein to the **spatial** data from fluorescence microscopy.

Methods of discretization such as finite difference, **finite element, and meshfree methods** will be applied, as appropriate, to describe the protein interactions and membrane processes.

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