Discovery and Engineering of GFP-like Proteins

Background:

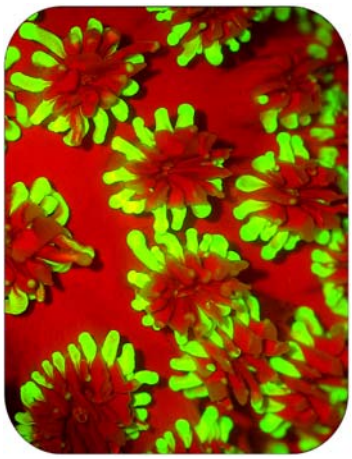
Fluorescent proteins from the GFP family have become indispensable imaging tools for cell biology. A wide variety of these proteins were discovered in non-bioluminescent anthozoa in recent years. Some of them feature exciting new properties, including the possibility to control the fluorescence emission intensity and/or color by light. Fluorescent highlighter proteins enable many interesting applications based on regional optical marking in live cells and tissues. Aside from the demand for novel markers, specific applications require engineering of certain properties of the marker proteins.

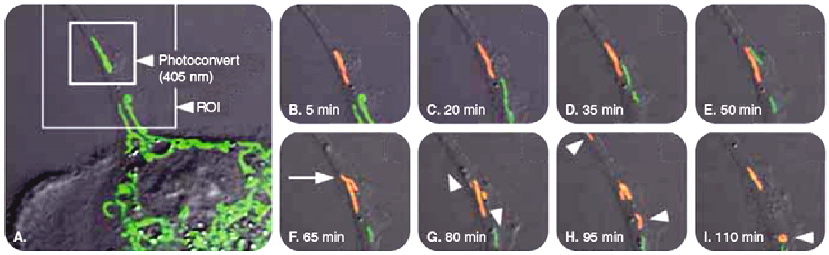
Outcomes:

- Novel marker proteins from marine organisms
- Improved photoactivatable marker proteins
- Fluorescent sensors based on GFP-like proteins

Progress to date:

We cloned over 40 novel GFP-like proteins from marine organisms, including several photoactivatible proteins, for instance a novel orange photoconvertible protein. Engineering efforts yielded monomeric variants with improved properties for cell biological applications.





Left: Micrograph of fluorescent coral polyps. Reef corals are a rich source for novel marker proteins including photoactivatable variants. Above: Tracking of mitochondria using an engineered variant of the green-to-red photoconvertible protein EosFP from the coral *Lobophyllia hemprichii.*

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