Phosphorylation of PSD-95 as a Mechanism to Regulate Signaling Scaffolds

The experiments during the course of the project showed that Dendra2 is useful for imaging experiments, where one wants to know the localization of the protein before applying photoconversion, it also offers a possibility to track the degradation and new synthesis of protein separately. The main disadvantage is that only a small fraction can be effectively converted, limiting the application to high expression systems or abundant proteins. Moreover, the behaviour of Dendra2 as a fusion protein needs more evaluation.

Neither CaMKII nor CDK5 appear to have an effect on PSD-95 N-terminal cleavage as shown with mutants of the phosphorylation sites. However, the CaMKII phosphorylation site has been shown to affect PSD-95 spine stability and similar effects could result from the CDK5 phosphorylation sites.

In future experiments, life-time imaging experiments will determine the stability of PSD-95 with phosphomimicking and non-phosphorylatable versions of PSD-95. Complementation with electrophysiology will reveal the effect of these mutants of synaptic transmission and plasticity and eventually lead to the understanding of how PSD-95 can dynamically regulate synaptic strength.