



Supervisor's evaluation on PhD student Marek Pazderník

Marek's PhD studies started in October 2015 and his project was focused on the regulatory role of ferrochelatase enzyme (FeCh) in chlorophyll-producing organisms. Ferrochelatase catalyses synthesis of heme, an essential cofactor for virtually any form of life. However, in oxygenic phototrophs, heme is produced in the same branched tetrapyrrole with chlorophyll, another critical molecule for the cell. It has been known for more than two decades that the FeCh enzymes from cyanobacteria, algae and plants possess an extra domain at the C-terminus (LHC-like domain), which shows high similarity to a family of chlorophyll-binding proteins. Before the Marek's project started we have collected data that in the model cyanobacterium *Synechocystis* 6803, the lack of the FeCh LHC-like domain dramatically improves the photosynthetic performance of a set of poorly-growing mutants. These results suggested a crucial regulatory role of the LHC-like domain but what is the mechanism behind remained unclear.

In first two years of his studies Marek isolated the FeCh LHC-like domain, which was expressed as a separated protein in *Synechocystis*, and later, he isolated also the full-length *Synechocystis* FeCh in its dimeric form. These Marek's challenging biochemical experiments provided clear-cut evidence that the FeCh LHC domain is capable to bind chlorophyll and carotenoid molecules. Results have been published in the Journal of Biochemical Chemistry. In the second half of his studies, Marek focused on the function of the FeCh chlorophyll-binding domain in the cell, he has identified growth conditions under which the proliferation of the LHC-domain mutant is inhibited. In addition, he discovered a complex between *Synechocystis* FeCh and another protein named CurT, this interaction was confirmed by a chemical crosslinking combined with protein mass spectrometry. These results are not published yet but I'm very sure it will happen in a near future. Marek spent three months in total in two German laboratories (Helmholz

Institute, Braunschweig and University of Bochum), specialized on the sequencing of RNA and protein mass spectrometry, respectively.

Marek was very independent PhD student, completely focused on his topic. Thanks to his intelligent and analytical mind, Marek has no problem to understand, from very beginning, the scientific questions we are working on. Experiments were precisely designed and performed. In the laboratory Marek behaved always correctly (professionally); however it should be noted that Marek is an extreme individualist, working mostly alone and, even after years, he stayed socially distant towards people around. Communication between us was not always easy since Marek is generally not willing to put to any subject more effort than he considers as a minimum needed. It would not be a problem, if we both can agree on where the minimum lies; but it was not often the case. The combination of Marek's 'low-effort' attitude with his a bit childish nature, very high self-confidence and self-contentedness resulted in an uneasy cocktail for the tutor. Looking back, discussions with Marek about *what should be done* provided me a kind of mental training; I would however not recommend such a kind of training to more impulsive supervisors.

I want to emphasize that I recognize Marek's PhD studies as successful with a solid body of data obtained and a nice paper published. Studies finished on time, which is worth noting. Marek wrote the thesis pretty much himself, he relatively well sums up the most important results into a compact text. I consider certain (firm) conclusions and speculations as premature but I respect that this is the Marek's thesis and the conclusions should be of him. I strongly believe that the this work meets all criteria for the PhD degree.

Třeboň, November 10nd, 2019

Roman Sobotka

