



Supervisor's review of the PhD thesis of PhD candidate Kateřina Jiroutová

Kateřina Jiroutová came to my lab at the end of 2004. She started to work exclusively on diatoms, unicellular alga possessing complex red plastid, silica cell wall and many other interesting morphological and also metabolic features. Kateřina has been involved in two kinds of studies: *in silico* analysis of the tryptophan biosynthetic pathway and experimental targeting of nuclear encoded proteins in diatoms. The mentioned *in silico* analysis was closely related to other computer work, the annotation of selected metabolic pathways in the genome of marine pennate diatom *Phaeodactylum tricornutum*. During that quite important work, Kateřina annotated genes coding for enzymes of the tryptophan, phenylalanin and tyrosine synthetic pathways, non-mevalonate pathway for isoprenoid synthesis and carotenoid biosynthesis and degradation pathway. Tryptophan pathway represents one of the most interesting plastid localized metabolic routes, since only one of studied genes indole-3-glycerol phosphate synthase (InGPS) displays expected cyanobacterial origin. The rest of genes originate mostly in chromalveolate (secondary host) nucleus, or in the nucleus of endosymbiotic algae, the supposed ancestor of the diatom secondary plastid. Such level of gene substitution has not yet been found so far.

The last but not least part of Kateřina's work is represented by transfection studies on the marine diatom *P. tricornutum*. To learn this experimental procedure, Kateřina visited laboratory of Chris Bowler, one of leading scientist in genetic transformation of diatoms. Successful transfection experiments on *P. tricornutum* were later performed in my lab. In the case of psb28, small photosynthetic protein, Kateřina demonstrates functionality of *in silico* characterized targeting sequences. In particular she shows that psb28 gene is napped during the endosymbiotic gene transfer from the secondary plastid to the secondary host nucleus. This gene is, in the diatom *Thalassiosira pseudonana*, encoded in both, plastid and nuclear genomes, and both genes are transcribed. It has been well demonstrated that nuclear encoded psb28 is successfully targeted to the diatom plastid.

Kateřina has, in addition to her scientific work, done a great work in the managing of the routine functioning of the lab. She has substantially participated on teaching main lab procedures to the new students, and she took solicitous care of all algal cultures in the lab. Kateřina is always willing to help anybody in the lab.



In a summary, I can only cordially recommend Kateřina Jiroutová and her work for PhD defence.

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