Crop Research Institute,  
Department of Genetic Resources for Vegetables,  
Medicinal and Special Plants (“Genebank”)  

invites you to the series of short talks  
on biological topics:  

Engineering synthetic protein scaffolds for efficient substrate channelling in plants  

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The presentation is taking place on Wednesday,  
26th September 2018 at 13:00 o’clock in the conference room of CRI, Olomouc-Holice, building D.  

Metabolic engineering in plants provides attractive and cost-effective routes for synthesizing a range of compounds such as therapeutics, biodegradable plastics or biofuels. In order to achieve industrial viability, there is a need for high production yields of these compounds. Spatial control over enzyme organisation presents a promising strategy for improving metabolic flux and yield of end products. This can be accomplished by using synthetic protein scaffolds that spatially recruit metabolic pathway enzymes and facilitates substrate channeling. Although this approach was recently proved to increase end product concentration by more than 70 times in bacterial host, it still has not been proved to work in plants. Here we expressed scaffold subunits from interaction domains from metazoan signalling proteins together with its ligands and bacterial cohesin domain and its interacting dockerin. All scaffold building domains and ligands were successfully expressed in N. benthamiana leaf tissue and showed to interact and form complexes with its corresponding ligands. This system was used to recruit enzymes from heterologous metabolic pathways in order to increase effective concentration of their end products in N. benthamiana leaves. Several biosynthetic pathways were tested and usefulness of protein scaffolds was assessed.