Active transport systems as an element that controls the molecular cross-talk between symbionts during arbuscular mycorrhiza formation

The initial colonisation of land by plants was important stage in the evolution of living organisms. It is believed that the formation of a cuticle, that covers the aerial epidermis of plants as well as the development of the arbuscular mycorrhizal symbiosis (AM), played a critical role in plants adaptation to a new terrestrial environment. Arbuscular mycorrhiza represents the most widespread type of symbiotic association established between the majority of land plants and fungi of the phylum *Glomeromycota*, providing significant advantages in nutrient acquisition. Interesting recent discoveries in the field of AM show that the precursors of cutin may represent a new class of signalling compounds essential for micorrhization. What is worth emphasising is that this intimate, symbiotic interaction requires efficient signal exchange at almost all AM developmental stages. Molecular cross-talk between symbionts, is indispensable for partners recognition as well as their effective cooperation.

Among the active transport systems potentially involved in translocation of cuticular lipids, come to the fore members of the diverse and ubiquitous family of ATP-binding cassette (ABC) proteins. Function of ABC transporters in aerial tissues is often linked with cuticle formation, most likely by exporting their particular lipid components to the epidermal cell surface. In the light of the current knowledge intriguing is to address the question about the role of ABCs in cutin monomers translocation also in root during AM formation. Analysis of transcriptomic data and phylogenetic tree allowed us to identify ABC proteins in model legume plant *Medicago truncatula*, that potentially participate in the transport of cutin monomers during different steps of AM development.

Arbuscular mycorrhiza symbiosis improves nutrient uptake and enhances plant tolerance to biotic and abiotic stresses, thereby allows reducing chemical fertilizers and pesticide inputs. Better understanding of the molecular mechanisms behind signal exchange between plant and fungal partner is crucial to exploit AM more effectively in the near future what can have an impact on sustainable agriculture development.