N 17. SUBA3 provides a tool for compartmentalised model reconstruction of Arabidopsis metabolism

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Genome-scale metabolic models have been successfully used to describe metabolism in microorganisms and mammalian cells. Computational models also contribute to plant metabolic engineering with aims to improve food crop yield and quality. The proteome of plant cells is highly compartmentalised and representative computational cell models are hampered by the lack of genome-wide knowledge about the subcellular location of proteins and protein complexes. The subcellular location database for Arabidopsis proteins (SUBA3,http://suba.plantenergy.uwa.edu.au) combines manual literature curation of large- scale subcellular proteomics, fluorescent protein visualisation and protein-protein interaction (PPI) datasets with subcellular targeting calls from 22 prediction programs. To determine protein location as objectively as possible, we have developed SUBAcon, a Bayesian approach that incorporates experimental localisation and targeting prediction data to best estimate a protein's location in the cell. These data have been used to construct genome-scale metabolic models for Arabidopsis cells compartmentalised into six organelle locations and their biological reactions. We have expanded our localisation data to include sub-organellar location data, which is currently used for reconstructing metabolic models of individual organelles. Sub-organellar locations and new tools to extract protein lists from defined subcellular and organellar bioreaction rooms will be available in future through the SUBA interface. These data and tools form the basis for important systems modeling in plants that enable the exploration of phenotypic effects in response to gene knockouts, insertions, nutrient restrictions and salinity.

N 18. Efforts And Results In Isolated Microspore Culture Of Capsicum Annuum L.

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Pepper is a widely known crop plant, which is known as a Hungaricum spice of Hungary. Furthermore, pepper is one of the most important basic ingredients in the Hungarian cuisine. Biotechnological approaches can give some opportunity to complete the conventional breeding methods. Capsicum annuum L. are known as a recalcitrant species in the view of doubled haploid plant production. However, three alternative methods based on androgenesis are published, namely: anther culture, shed microspore culture and isolated microspore culture. These methods can give a chance to reduce the time of the breeding process. Our experiments focused on the critical steps of isolated microspore culture. The isolated uni- and binucleated microspores were co-cultured with foreign ovaries (barley, durum wheat, wheat and triticale). The most effective ovary donors were the wheat and barley species in the view of embryo-like structure production. The microspore derived structures were transferred into regeneration medium. After three weeks of regeneration period, some of the structures showed different morphologies and rosettes of leaves, while healthy plantlets were regenerated for breeding. The regenerated doubled haploid plants have been integrated into Hungarian pepper hybrid breeding program. Despite of critical steps of microspore culture, three registered Hungarian pepper hybrids with microspore derived parents are available for farmers which are grown in the Carpathian - Basin. Research was supported by National Office for Research and Technology – Hungarian Scientific Research Fund (OTKA 80719 and OTKA 80766).