Expression systems for the production of pharmaceutical or technical proteins in barley

Götz Hensel

Leibniz Institute of Plant Genetics and Crop Plant Research, Plant Reproductive Biology, Gatersleben, Germany; hensel@ipk-gatersleben.de.

Molecular Farming became an interesting option for the production of complex recombinant proteins. As a consequence it was an increasing demand for highly efficient and cost effective expression systems. Beside transient expression systems for tobacco leaves seeds and cereal grains are naturally prone for the production and storage of proteins. Since barley belongs to the most important crops worldwide in the last decade numerous genomics tools and resources such as specific cDNA libraries, EST databases, molecular markers as well as physical and genetic maps have been developed for this species. In addition a powerful cereal transformation platform based on the use of *Agrobacterium tumefaciens* has been established in our laboratory. Either immature embryos or isolated microspores stimulated to undergo embryogenic development have been routinely used as gene transfer targets. The employment of these methods has resulted in the transformation of various spring and winter type cultivars of barley. Functional gene analyses and biotechnological approaches further require cell-specific promoters. In this respect, we are facing the general problem that most promoters from dicotyledons are not useful in monocotyledonous plants. For the production of recombinant proteins in the barley grain two systems based on the wheat α-*GLIADIN* and the oat *GLOBULIN1* promoter with specificities for the endosperm were developed. Expression pattern and quantifications with the reporter gene *gfp* will be presented. Examples are presented for the production of recombinant proteins in barley grains.