Functional Genomics of Cell Wall Biosynthesis in *Arabidopsis thaliana*

SCHELLER, Henrik Vibe ; HARHOLT, Jesper; SØRENSEN, Susanne Oxenbøl; ORFILA, Caroline

Department of Plant Biology, The Royal Veterinary and Agricultural University
40 Thorvaldsensvej, DK-1871 Frederiksberg C, Copenhagen, Denmark

Plant cells are surrounded by a strong wall, which is composed mainly of polysaccharides. Many valuable traits in plants depend on cell wall metabolism: The cell wall is essential for cell form, development and differentiation, and the wall is the first line of defense against invading pathogens and herbivores. Very little is known about how the polysaccharides in the wall are formed and how they are integrated into the wall. Many different enzymes are necessary for biosynthesis of the polysaccharides; the majority are glycosyltransferases but also acetyltransferases, methyltransferases and transglycosidases are involved.

The overall objective of the project is to assign function to genes involved in the biogenesis of plant cell wall polysaccharides. To achieve this, a functional genomics strategy is pursued using *Arabidopsis thaliana* as the model species.

More than 50 *Arabidopsis* lines with insertional knock-out of putative glycosyltransferases and acetyltransferases have been selected using bioinformatics tools. Homozygous lines have been produced and verified by genetic analysis and PCR. In the initial further analysis, lines with a visual phenotype, typically a reduction in growth, have been selected. Analysis of the lines is in progress and the characterization of wall polysaccharides using specific antibodies and monosaccharide composition will be reported at the meeting. Furthermore, the activity of biosynthetic enzymes involved in formation of pectin, xylan and xyloglucan have been determined in different parts of the plants. Preliminary studies have shown that one line is deficient in xylan while another line is deficient in polysaccharide acetylation. Further analyses, including more detailed characterization of polysaccharides and heterologous expression will be reported.