

MUCILAGE ATTACHMENT TO SEEDS PROVIDES EVIDENCE OF A NOVEL LINK BETWEEN CELLULOSE AND PECTIN

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In certain plant species, including *Arabidopsis*, seed coat epidermal cells accumulate a large quantity of polysaccharides that are released as mucilage upon imbibition. Once released, *Arabidopsis* seed coat mucilage appears as two distinct layers, the outer non-adherent composed of unsubstituted rhamnogalacturonan I (RG-I), and the inner adherent one mainly made of RG-I and cellulose. *CELLULOSE SYNTHASE5* and *MUCILAGE-MODIFIED (MUM)5* have both been shown to be required for anchoring the mucilage pectin to the seed coat surface [1-5]. The identity and molecular role of *MUM5* remained to be determined. A comparison of sequentially extracted seed mucilage components from *cesa5* and *mum5* mutants was carried out. Both mutants showed a redistribution of mucilage pectin from the inner adherent layer to the outer soluble one. *cesa5* further showed a clear reduction in cellulose content, whereas *mum5* had a wild-type cellulose content, but had reduced Xyl contents in the outer mucilage layer. Accordingly, *MUM5* was identified as a putative xylosyltransferase. Biochemical and *in vitro* binding assay data demonstrated that xylan chains are attached to RG-I chains and mediate the adsorption of mucilage to cellulose microfibrils. The importance of having both a correctly synthesized cellulose scaffold and pectin structure will be discussed with regard to mucilage partitioning into non-adherent and adherent layers.

[1] Western *et al.* (2001) *Plant Physiol* **127**:998-1011; [2] Macquet *et al.* (2007) *Plant Cell Physiol* **48**:984-999; [3] Harpaz-Saad *et al.* (2011) *Plant J* **68**:941-953; [4] Mendu *et al.* (2011) *Plant Physiol* **157**:441-453; [5] Sullivan *et al.* (2011) *Plant Physiol* **156**:1725-1739.