**SOS5 mediates Arabidopsis seed coat mucilage adherence and organization through pectins.**

[Griffiths JS](http://www.ncbi.nlm.nih.gov/pubmed?term=Griffiths%20JS%5BAuthor%5D&cauthor=true&cauthor_uid=24808103)1, [Tsai AY](http://www.ncbi.nlm.nih.gov/pubmed?term=Tsai%20AY%5BAuthor%5D&cauthor=true&cauthor_uid=24808103), [Xue H](http://www.ncbi.nlm.nih.gov/pubmed?term=Xue%20H%5BAuthor%5D&cauthor=true&cauthor_uid=24808103), [Voiniciuc C](http://www.ncbi.nlm.nih.gov/pubmed?term=Voiniciuc%20C%5BAuthor%5D&cauthor=true&cauthor_uid=24808103), [Sola K](http://www.ncbi.nlm.nih.gov/pubmed?term=Sola%20K%5BAuthor%5D&cauthor=true&cauthor_uid=24808103), [Seifert G](http://www.ncbi.nlm.nih.gov/pubmed?term=Seifert%20G%5BAuthor%5D&cauthor=true&cauthor_uid=24808103), [Mansfield SD](http://www.ncbi.nlm.nih.gov/pubmed?term=Mansfield%20SD%5BAuthor%5D&cauthor=true&cauthor_uid=24808103), [Haughn GW](http://www.ncbi.nlm.nih.gov/pubmed?term=Haughn%20GW%5BAuthor%5D&cauthor=true&cauthor_uid=24808103).

**Abstract**

Interactions between cell wall polymers are critical for establishing cell wall integrity and cell-cell adhesion. Here, we exploit the Arabidopsis seed coat mucilage system to examine cell wall polymer interactions. Upon hydration, seeds release an adherent mucilage layer strongly attached to the seed, in addition to a non-adherent layer that can be removed by gentle agitation. Rhamnogalacturonan I (RG I) is the primary component of adherent mucilage, with homogalacturonan, cellulose, and xyloglucan constituting minor components. Adherent mucilage contains rays composed of cellulose and pectin that extend above the center of each epidermal cell. CELLULOSE SYNTHASE 5 (CESA5) and the AGP SALT-OVERLY SENSITIVE 5 (SOS5) are required for mucilage adherence through unknown mechanisms. SOS5 has been suggested to mediate adherence by influencing cellulose biosynthesis. We therefore investigated the relationship between SOS5 and CESA5. cesa5-1 seeds show reduced cellulose, RG I, and ray size in adherent mucilage. In contrast, sos5-2 seeds have wild-type levels of cellulose, but completely lack adherent RG I and rays. Thus, relative to each other, cesa5-1 has a greater effect on cellulose while sos5-2 mainly affects pectin. The double mutant cesa5-1 sos5-2 has a much more severe loss of mucilage adherence, suggesting that SOS5 and CESA5 function independently. Double mutant analyses with mutations in MUCILAGE MODIFIED 2 and FLYING SAUCER 1 that reduce mucilage release through pectin modification suggest that only SOS5 influences pectin-mediated adherence. Together, these findings suggest that SOS5 mediates adherence through pectins, and does so independently of, but in concert with, cellulose synthesized by CESA5.