Through form to function:

Root hair development and nutrient uptake

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Although it has been known for decades that only some root epidermal cells are destined to develop hairs (trichoblasts)\(^2\), the past few years have seen an explosion of information about how this occurs. The decision to become a trichoblast or not happens early in development. From the time of their formation in the meristematic zone, trichoblasts can be distinguished from atrichoblasts by differences in their cytoplasmic structure (e.g. reduced vacuolation)\(^3\). Two basic schemes describe root-hair-fate specification (Fig. 1). In plants, such as _Phleum_ and _Hydrocharis_, trichoblasts form from an asymmetrical division of a protodermal cell. A second theme of development is seen in _Arabidopsis_. In this plant, trichoblasts form from epidermal cells overlying the junction of two cortical cells. This patterning leads to files of trichoblasts interspersed with files of atrichoblasts\(^2\) (Fig. 1), and suggests intricate cell-to-cell communication soon after formation in the meristem. The cortical cells might relay positional information to the overlying epidermal cells to lay down these precise patterns of cell fate. Recent evidence suggests genes, such as _TRANSPARENT TESTA GLABRA (TTG)_ and _GLABRA2 (GL2)_ are also involved.