Cells must sense and regulate their internal NH$_4^+$ levels to modulate nitrogen levels and avoid NH$_4^+$ toxicity. Bai et al. (pages 1497–1511) identify an Arabidopsis [Ca$^{2+}$]$_{cyt}$-associated protein kinase (CAP1), a receptor-like kinase that mediates NH$_4^+$ homeostasis. CAP1 also regulates the polar growth of root hairs by maintaining tip-focused cytoplasmic Ca$^{2+}$ gradients. The cap1-1 mutation specifically affects root hair tip elongation and the morphology of root hairs on Murashige and Skoog medium and produces elevated levels of cytoplasmic NH$_4^+$. Ammonium depletion from the medium reestablished the Ca$^{2+}$ gradient necessary for normal root hair tip growth in the mutant. The image shows abnormal root hairs in a cap1-1 mutant grown on Murashige and Skoog medium.
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