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**On the Cover:** Plants have the ability to form calluses from almost any tissue. However, evidence indicates that a population of living cells is often required to support callus growth, suggesting an involvement of cell-to-cell communication. Phytosulfokine (PSK), a 5-amino-acid sulfated peptide, is the primary signal molecule responsible for this cell-to-cell communication. PSK binds the membrane-localized receptor PSKR1, which is a leucine-rich repeat receptor kinase (LRR-RK) that has been purified from solubilized carrot microsomes by ligand-based affinity chromatography. Matsubayashi et al. (pp. 45–53) have shown that loss-of-function and gain-of-function mutations of the Arabidopsis PSK receptor gene (*AtPSKR1*) alter cellular longevity and potential for growth without interfering with basic morphogenesis of plants. Leaves of Arabidopsis loss-of-function mutant of *AtPSKR1* gradually lost their potential to form calluses as tissues matured and exhibited premature senescence phenotypes. In contrast, leaves of Arabidopsis plants overexpressing *AtPSKR1* exhibit greater longevity and significantly greater potential for callus formation than leaves of wild-type plants, irrespective of their age. Combined with the finding that PSK precursor genes are more strongly expressed in mature plant parts than in immature plant parts, these results strongly suggest that PSK represents a new class of peptide hormones that affect the potential for cellular growth and longevity of individual cells. The cover photograph shows the vigorous callus formation from the leaf disks of Arabidopsis plants overexpressing *AtPSKR1* (8 d of culture). The image was created by Yoshikatsu Matsubayashi.

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<sup>[W]</sup> Indicates Web-only data.

<sup>[OA]</sup> Open Access articles can be viewed online without a subscription.