

## Cytokinin Signaling Networks

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### Abstract

Despite long-standing observations on diverse cytokinin actions, the discovery path to cytokinin signaling mechanisms was tortuous. Unyielding to conventional genetic screens, experimental innovations were paramount in unraveling the core cytokinin signaling circuitry, which employs a large repertoire of genes with overlapping and specific functions. The canonical two-component transcription circuitry involves His kinases that perceive cytokinin and initiate signaling, as well as His-to-Asp phosphorelay proteins that transfer phosphoryl groups to response regulators, transcriptional activators, or repressors. Recent advances have revealed the complex physiological functions of cytokinins, including interactions with auxin and other signal transduction pathways. This review begins by outlining the historical path to cytokinin discovery and then elucidates the diverse cytokinin functions and key signaling components. Highlights focus on the integration of cytokinin signaling components into regulatory networks in specific contexts, ranging from molecular, cellular, and developmental regulations in the embryo, root apical meristem, shoot apical meristem, stem and root vasculature, and nodule organogenesis to organismal responses underlying immunity, stress tolerance, and senescence.

### References

Hwang, I., Sheen, J., & Müller, B. (2012). Cytokinin signaling networks. [\*Annual review of plant biology\*, 63, 353-380.](#)