The cereal pathogen Fusarium pseudograminearum produces a new class of active cytokinins during infection

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The fungal pathogen Fusarium pseudograminearum causes important diseases of wheat and barley. During a survey of secondary metabolites produced by this fungus, a novel class of cytokinins, herein termed Fusarium cytokinins, was discovered. Cytokinins are known for their growth promoting and anti-senescence activities and the production of a cytokinin mimic by what was once considered a necrotrophic pathogen that promotes cell death and senescence challenges the simple view that this pathogen invades its hosts by employing a barrage of lytic enzymes and toxins. Through genome mining, a gene cluster in the F. pseudograminearum genome for the production of Fusarium cytokinins was identified and the biosynthetic pathway established using gene knockouts. The Fusarium cytokinins could activate plant cytokinin signalling, demonstrating their genuine hormone mimicry. In planta analysis of the transcriptional response to one Fusarium cytokinin suggests extensive reprogramming of the host environment by these molecules, possibly through crosstalk with defence hormone signalling pathways.

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