Wheat microbe could help crops fight off fungal infection

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Abstract

Wheat is one of the world's most important crops. However, wheat production is currently threatened by various fungal diseases throughout the growing season. Fusarium head blight (FHB), caused by *Fusarium graminearum*, is one of the most important fungal diseases of wheat causing serious wheat yield losses, as well as mycotoxin contamination. One approach to combating this type of infection is through autophagy. Autophagy is a highly conserved physiologic process critical for macromolecule turnover, stress response, and survival in eukaryotes and plays an important role in fungal pathogenesis. *Streptomyces hygroscopicus* S89, a member of the natural wheat microbiota, has shown high efficiency in reducing mycelial growth of *F. graminearum*—possibly through autophagy. Researchers found that the antifungal compound rapamycin secreted by *S. hygroscopicus* S89 stimulates autophagic flux and affects the acetylome of *F. graminearum* by promoting the degradation of acetyltransferase Gcn5. Detailed analyses revealed a holistic mechanism of autophagy regulation. The researchers hypothesized that certain microbes or microbe-secreted compounds that target fungal autophagy flux might be employed against fungal diseases. Subsequent trials confirmed that the bacterium-driven autophagy regulation in *F. graminearum* significantly reduces disease symptoms without harming the host plant, providing a promising strategy for protecting wheat from fungal infection.