

Pathogenic fungus harbours endosymbiotic bacteria for toxin production.

Partida-Martinez LP, Hertweck C (2005) Pathogenic fungus harbours endosymbiotic bacteria for toxin production. *Nature* 437(7060), 884-888.

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Abstract

A number of plant pathogenic fungi belonging to the genus *Rhizopus* are infamous for causing rice seedling blight. This plant disease is typically initiated by an abnormal swelling of the seedling roots without any sign of infection by the pathogen. This characteristic symptom is in fact caused by the macrocyclic polyketide metabolite rhizoxin that has been isolated from cultures of *Rhizopus* sp.. The phytotoxin exerts its destructive effect by binding to rice beta-tubulin, which results in inhibition of mitosis and cell cycle arrest. Owing to its remarkably strong antimitotic activity in most eukaryotic cells, including various human cancer cell lines, rhizoxin has attracted considerable interest as a potential antitumour drug. Here we show that rhizoxin is not biosynthesized by the fungus itself, but by endosymbiotic, that is, intracellular living, bacteria of the genus *Burkholderia*. Our unexpected findings unveil a remarkably complex symbiotic-pathogenic relationship that extends the fungus-plant interaction to a third, bacterial, key-player, and opens new perspectives for pest control.

Involved units

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