How an aggressive fungal pathogen causes mold in fruits and vegetables

3 October 2013

A research team led by a molecular plant pathologist at the University of California, Riverside has discovered the mechanism by which an aggressive fungal pathogen infects almost all fruits and vegetables.

The team discovered a novel "virulence mechanism"—the mechanism by which infection takes place—of *Botrytis cinerea*. This pathogen can infect more than 200 plant species, causing serious gray mold disease on almost all fruits and vegetables that have been around, even at times in the refrigerator, for more than a week.

Study results appear in the Oct. 4 issue of the journal *Science*.

Many bacterial, fungal and oomycete pathogens deliver protein effectors—molecules the pathogens secrete—into the cells of hosts to manipulate and, eventually, compromise host immunity.

The new study represents the first example of a fungal pathogen delivering RNA effectors, specifically small RNA effector molecules, into host cells to suppress host immunity and achieve infection of the host plant.

"To date, almost all the pathogen effectors studied or discovered have been proteins," said lead author Hailing Jin, a professor of plant pathology and microbiology. "Ours is the first study to add the RNA molecule to the list of effectors. We expect our work will help in the development of new means to control aggressive pathogens."

Small RNAs guide gene silencing in a wide range of eukaryotic organisms. In the case of *Botrytis cinerea*, small RNAs silence the expression of host defense genes, resulting in the host plant cells being less able to resist the fungal attack. The process is similar to how protein effectors weaken host immunity in the case of most pathogens.

"What we have discovered is a naturally-occurring cross-kingdom RNAi phenomenon between a fungal pathogen and a plant host that serves as an advanced virulence mechanism," Jin said.

RNA interference or RNAi is a conserved gene regulatory mechanism that is guided by small RNAs for silencing (or suppressing) genes.

Next, Jin and colleagues plan to continue investigating if the novel mechanism they discovered also exists in other aggressive pathogens.

More information:
www.sciencemag.org/content/342/6154/118.abstract

Provided by University of California - Riverside