

Red alert! How disease disables tomato plant's 'intruder alarm'

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How a bacterium overcomes a tomato plant's defences and causes disease, by sneakily disabling the plant's intruder detection systems, is revealed in new research out today (4 December) in *Current Biology*.

The new study focuses on a pathogen which causes bacterial speck disease in tomato plants. This bacterial invasion causes black lesions on leaves and fruit. Severe infection can cause extensive and costly damage to tomato crops, and researchers believe that understanding more about how this microbe works could lead to new ways of tackling it, and other plant diseases, without the need for pesticides.

Scientists have found that the pathogen is very effective at attacking tomato plants because it deactivates and destroys receptors which normally alert the plant to the presence of a dangerous disease - in the same way that an intruder would deactivate the burglar alarm before gaining entry to a house.

Professor John Mansfield from Imperial College London's Department of Life Sciences, one of the authors of the paper, says: "Once the receptors have been taken out, the plant's defences are 'offline' and the bacterium is able to spread rapidly, feeding on the plant without encountering any kind of resistance."

Together with colleagues at the Max Planck Institute in Cologne and Zurich-Basel Plant Science Centre, Professor Mansfield used an experimental model plant called *Arabidopsis*, which is also affected by

the disease, to examine what happens at the molecular level when bacterial speck infects a plant. The team found that the pathogen injects a protein into the host cell, which then deactivates and destroys, from the inside, receptors on the cell's surface which are designed to alert the plant to the presence of invading microbes.

Deactivating the receptors stalls the plant's defence mechanism in its initial stages - ordinarily the cell surface receptors would kickstart a chain reaction leading to the production of antimicrobial compounds to fight and kill off the bacterial invader.

Professor Mansfield says: "This area of research has a wider significance beyond black speck disease in tomato, because the microbes that cause plant diseases probably all employ similar attacking strategies to suppress resistance in their hosts. The more we understand about how the pathogens that cause disease overcome the innate immunity to infection in crop plants, the better our chances of developing approaches to disease control that do not require the use of potentially harmful pesticides."

Source: Imperial College London

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