Increasing crop resistance to pathogens

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We all know that animals have an immune system - but plants have systems to fight infection too. Plant cells have receptor proteins which bind with parts of a pathogen. These receptor proteins are located on the surface of plant cells and enable the plant to recognize what kind of attacker needs to be repelled. Working with international colleagues, researchers at the University of Tübingen have discovered a pattern common to many microbes which can set off a plant's immune reaction. The nlp20 peptide fragment is a component of toxins in bacteria, fungi and oomycetes. A common pathogen producing this nlp20-containing virulence factor is Phytophthora infestans, which causes potato blight. The disease led to the Great Famine of 1845 in Ireland - and it still causes significant damage to potato and tomato crops today.

Isabell Albert, Hannah Böhm, Thorsten Nürnberger and other researchers at the Center for Plant Molecular Biology (ZMBP), working with scientists at the universities of Utrecht, Würzburg and Tsinghua (Beijing) have identified genes in the model plant Arabidopsis thaliana which are important for recognising nlp20. If they could be transferred to crops such as the potato, they could significantly reduce the potato's vulnerability to diseases like Phytophthora infestans. Their research results are published in the latest edition of *Nature Plants*.

The researchers describe how the pathogen is recognized as soon as the nlp20 toxin fragment connects with the RLP23 receptor protein. Together with the coreceptors SOBIR1 and BAK1, it forms a complex which sends a signal to the cell, which sets off various immune reactions within the plant. In this study, ZMBP researchers experimented to find out whether a genetic transfer of the receptor responsible for Phytophthora makes its preferred hosts more resistant to it. "The results show that crop plants like potatoes and tomatoes give an immune response as soon as they contain this recognition complex, and that if infected, they show far fewer symptoms than unmodified plants," says Dr. Isabell Albert. The exceptionally wide distribution of nlp20 therefore offers one way of making food crops more resistant to a broad spectrum of pathogens.

More information: Isabell Albert et al. "An RLP23–SOBIR1–BAK1 complex mediates NLP-triggered immunity," *Nature Plants* (2015). DOI: 10.1038/nplants.2015.140

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