Novel Peptide Capable of Stimulating Disease Resistance in Plants

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ABSTRACT

Pamela Ronald and researchers at the Joint BioEnergy Institute (JBEI) have discovered raxX, a novel peptide that activates the Xa21 immune response pathway, capable of conferring robust disease resistance, and methods for its use. Application of the peptide activates the plant immune responses and eliminating bacterial infection. Engineering plants to express both raxX and Xa21 under an inducible control is expected to lead to robust resistance in diverse plant species.

FULL DESCRIPTION

Cell surface pattern recognition receptors (PRRs) are essential to innate immune responses in plants. These receptors are able to identify pathogens with certain pathogen associated molecular patterns (PAMPs) at the cell surface and then initiate an intracellular immune response. In plants, cell surface recognition of PAMPs is typically carried out by receptor kinases. In rice, one such receptor kinase is XA21 which mediates recognition of *Xanthomonas oryzae pv. oryzae* (*Xoo*), a bacterium that causes bacterial blight. Upon XA21 cell surface recognition of *Xoo*, the receptor kinase mediates a robust immune response within the cell.

Pamela Ronald and researchers at the Joint BioEnergy Institute (JBEI) have developed a synthetic polypeptide that upon exposure to a plant that expresses XA21, is capable of stimulating the XA21 pathway, thus enhancing disease resistance in the plant. Once exposed to the peptide, a plant will have a more robust immune response upon contact with naturally occurring pathogens such as *Xoo*. Improved immunity can help to stabilize crop production in areas by bacterial blight. Additionally, target plants can be engineered to constitutively express Xa21 and inducibly express the novel peptide. The result is the ability to engineer plants with resistance to a wide variety of potential pathogens.

The Joint BioEnergy Institute (JBEI, www.jbei.org) is a scientific partnership led by the Lawrence Berkeley National Laboratory and including the Sandia National Laboratories, the University of California campuses of Berkeley and Davis, the Carnegie Institution for Science and the Lawrence Livermore National Laboratory. JBEI's primary scientific mission is to advance the development of the next generation of biofuels.

APPLICATIONS

- Conferring disease resistance in plants by stimulating an innate immune response

FEATURES/BENEFITS

- Synthetic polypeptide
- Enhanced disease resistance
- Robust immune response
- Target plants can be engineered to constitutively express the receptor and inducibly express the peptide

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,407,691	09/10/2019	2014-882
United States Of America	Published Application	20200048654	02/13/2020	2014-882

Additional Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Improved Xylan Extraction
- Improved Saccharification Efficiency by Inhibiting a Xylosyltransferase

INVENTORS

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OTHER INFORMATION

KEYWORDS

plant disease, disease resistance, pattern recognition receptor, PRR, Xanthomonas, crop protection

CATEGORIZED AS

- **Agriculture & Animal Science**
- Plant Traits
- Transgenics

RELATED CASES

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