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Publication date:
2009

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Newman, M-A. (2009). *Bacterial polysaccharides suppress induced innate immunity by calcium chelation*. Poster session presented at Plant Biotech Denmark, Annual Meeting 2009, Faculty of Life Sciences, University of Copenhagen, Denmark.

Plant Biotech Denmark
Annual meeting 2009
29-30 January

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Faculty of Life Sciences
University of Copenhagen

PBD
Plant Biotech Denmark

4. Bacterial Polysaccharides Suppress Induced Innate Immunity by Calcium Chelation.

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Bacterial pathogens and symbionts must suppress or negate host innate immunity. However, pathogens release conserved oligomeric and polymeric molecules or MAMPs (Microbial Associated Molecular Patterns), which elicit host defenses. Extracellular polysaccharides (EPSs) are key virulence factors in plant and animal pathogenesis, but their precise function in establishing basic compatibility remains unclear. Here, we show that EPSs suppress MAMP-induced signaling in plants through their polyanionic nature and consequent ability to chelate divalent calcium ions. In plants, Ca^{++} ion influx to the cytosol from the apoplast (where bacteria multiply) is a prerequisite for activation of myriad defenses by MAMPs. We show that EPSs from diverse plant and animal pathogens and symbionts bind calcium. EPS-defective mutants or pure MAMPs, such as the flagellin peptide flg22, elicit calcium influx, expression of host defense genes, and downstream resistance. Furthermore, EPSs, produced by wild-type strains or purified EPS, suppress induced responses but do not block flg22-receptor binding in Arabidopsis cells. EPS production was confirmed *in planta,* and the amounts in bacterial biofilms greatly exceed those required for binding of apoplastic calcium. These data reveal a novel, fundamental role for bacterial EPS in disease establishment, encouraging novel control strategies.

Ref:
Aslam *et al.* (2008). Bacterial polysaccharides suppress induced innate immunity by calcium chelation. **Current Biology** 18: 1078-1083.