

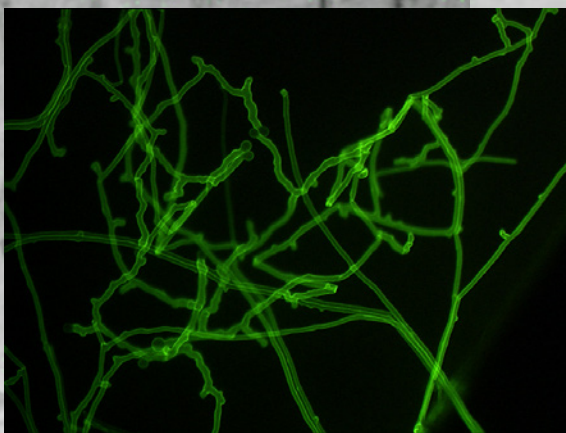
Aphanomyces euteiches Cell Wall Fractions Containing Novel Glucan-Chitosaccharides Induce Defense Genes and Nuclear Calcium Oscillations in the Plant Host *Medicago truncatula*

N-acetylglucosamine-based saccharides (chitosaccharides) are components of microbial cell walls and often act as molecular signals during host-microbe interactions. In the legume plant *Medicago truncatula*, the perception of lipochitooligosaccharide (LCO) signals produced by symbiotic rhizobia involves the Nod Factor Perception (NFP) lysin motif receptor-like protein and leads to the activation

Right : *Aphanomyces euteiches* hyphae showing green fluorescent lectin-labelled chitosaccharides at their surface.

Below : structural motif found in the *A. euteiches* cell

wall glucan-chitosaccharides. Background of the poster shows green fluorescent protein-labelled nuclei of *Medicago truncatula* root epidermal cells treated with *A. euteiches* glucan-chitosaccharides.



of the so-called common symbiotic pathway (CSP). In rice and *Arabidopsis*, lysin motif receptors are involved in the perception of chitooligosaccharides released by pathogenic fungi, resulting in the activation of plant immunity. Here we report the structural characterization of atypical chitosaccharides from the oomycete pathogen *Aphanomyces euteiches*, and their biological activity on the host

Medicago truncatula. We show that these chitosaccharides are linked to β -1,6-glucans, and contain a β -(1,3;1,4)-glucan backbone whose β -1,3-linked glucose units are substituted on their C-6 carbon by either glucose or N-acetylglucosamine residues. This is the first description of this type of structural motif in eukaryotic cell walls. Glucan-chitosaccharide fractions of *A. euteiches* activate the expression of defense marker genes in *M. truncatula* seedlings independently of a functional NFP protein. Furthermore, one of the glucan-chitosaccharide fractions elicits atypical calcium oscillations in the nucleus of epidermal root cells. In contrast to the asymmetric oscillatory calcium spiking induced by symbiotic short-chain chitin fragments and LCOs, this response depends neither on NFP nor on the CSP. These findings thus open new perspectives in oomycete cell wall biology, elicitor recognition and signaling in legumes.

