Interaction network of antimicrobial peptides of *Arabidopsis thaliana*, based on high-throughput yeast two-hybrid screening

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Plants are constantly in interaction with pathogens, such as microorganisms or insects. One mechanism used by plants to respond to infection is the production of antimicrobial peptides (AMPs). AMPs are generally low-molecular-weight peptides, produced by microorganisms and multicellular organisms and possessing microbicidal activity [1], mainly via pathogen cell lysis. In plants, most AMPs are small cysteine-rich peptides, divided in different classes such as defensins, thionins or lipid tranfert proteins. In addition to direct *in vitro* microbicidal activity, there are a few cases where other *in vivo* functions have been described for plant AMPs. Some AMPs would act as storage proteins in seed [2], others would respond to abiotic stress [3]. It has been recently shown that genes encoding AMP-like cysteine-rich peptides have been underpredicted in plant genomes [4]. In the genome of *A. thaliana*, 317 genes encoding “defensin-like” proteins have been identified, in contrast with the low number of defensins (only 15) previously described in these species. As a consequence, these peptides remain functionally uncharacterized. To better understand the *in vivo* role of AMPs and AMP-like peptides, we explored the protein interactions of 15 selected AMPs or AMP-like peptides of *A. thaliana*. With the corresponding genes, we generated an interaction network, using high-throughput yeast two-hybrid screening and a collection of *ca*. 8000 open reading frames of *A. thaliana*, called AtORFeome2.0 [5]. Most of these interactions involve four transcription factors of the same family, probably involved in regulating cell division, expansion, and differentiation. Some interactions suggest novel hypothetical roles for plant AMPs or AMP-like peptides. At least, two preys are involved in defence responses, suggesting a possible role of their respective AMP or AMP-like partners in defence signalling pathways or regulation.

References

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