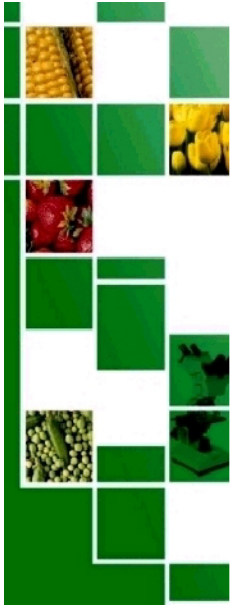


SynGene Biotek Inc.

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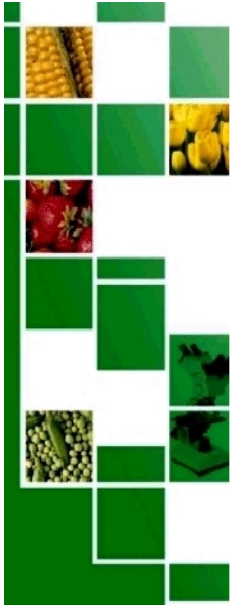




GENOMICS - CROP PROTECTION

- **Fungal, bacterial and viral pathogens cause enormous losses**
- **Resistance to pathogens represents a huge commercial advantage**
- **Plant breeding for resistance is a continual struggle**
- **Natural genetic resistance often narrow and undermined by pathogen adaptation and mutation**
- **Recombinant strategies offer potential advantages – expression of AMPs**





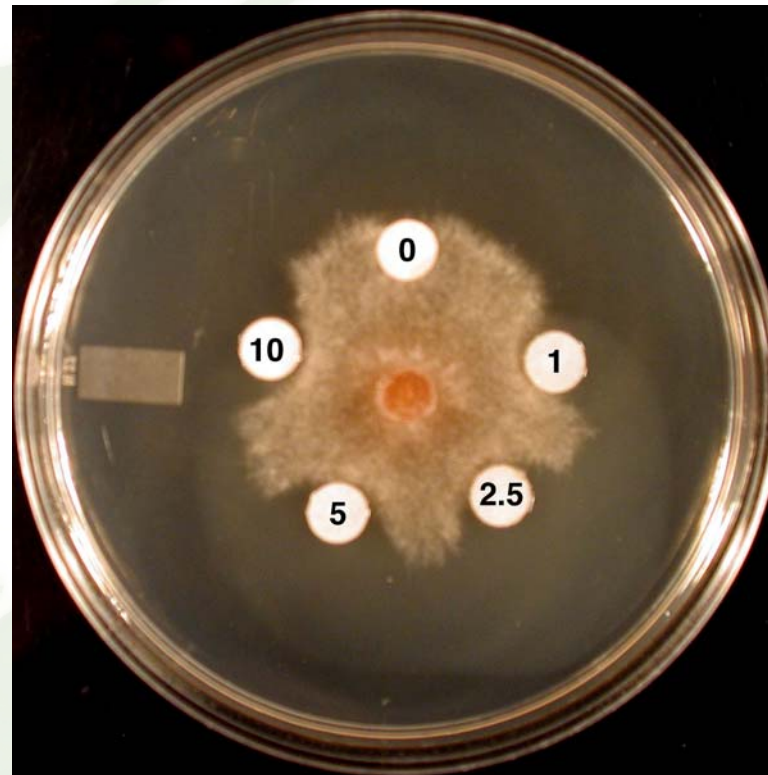
Properties of Antimicrobial Peptides

- **Broad spectrum of activity**
- **More than 800 naturally occurring genes known**
- **Work at fairly low concentrations**
- **Most small peptides, cationic with amphipatic structure**
- **Mechanism of action believed to relate to ability to bind to ions on membrane surface, integrate into the membrane and coordinate to form pores**
- **Pathogens become leaky and rapidly lose viability**



Peptide Screening Against Pathogens

Pathogen
growth
inhibition
by specific
peptides

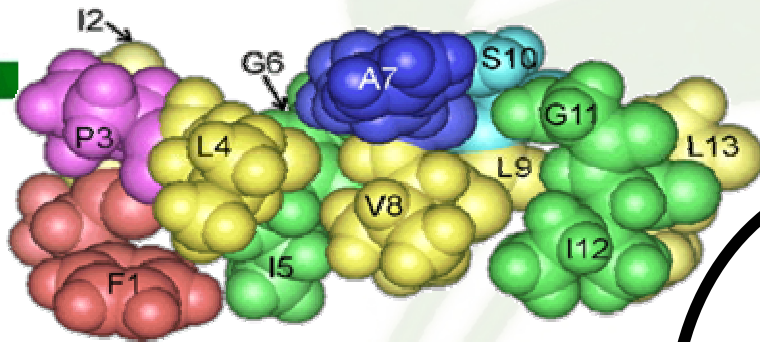


Peptide concentration ($\mu\text{g/ml}$)

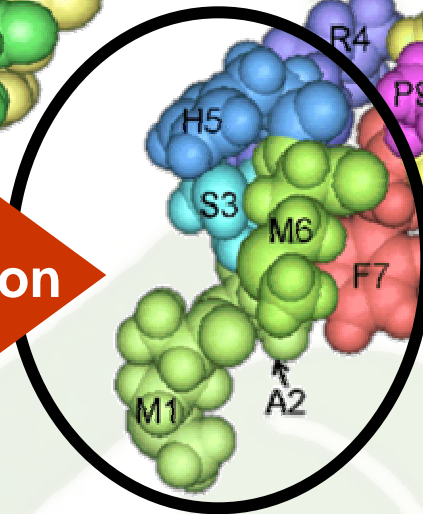


Modification of Selected Peptides

Antimicrobial peptide



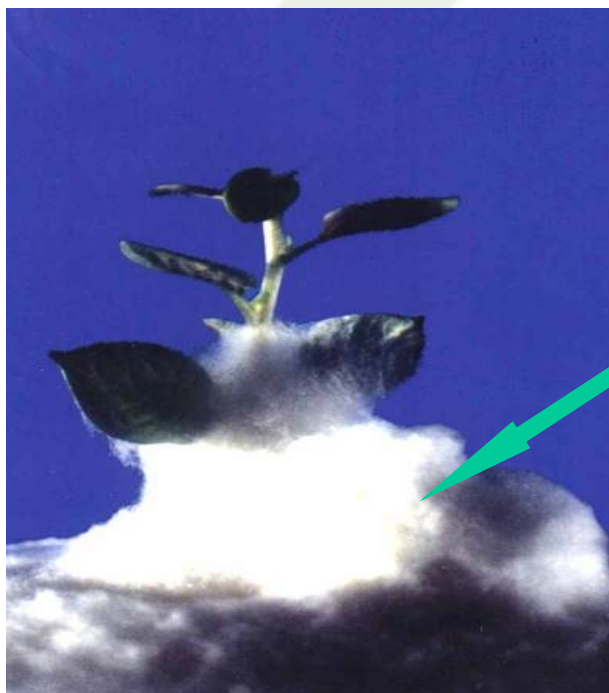
Modified Region



Modified antimicrobial peptide with stabilizing extension sequences



***Demonstrating strong resistance to
virulent fungi & bacteria***



Phytophthora sp.

Fusarium sp.

Alternaria sp.

Rhizoctonia sp.

Pythium sp.

+

***Many bacterial
phytopathogens***



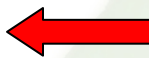
***Resistance to P.
erythroseptica***

"Pink Rot"

Mycelial plug



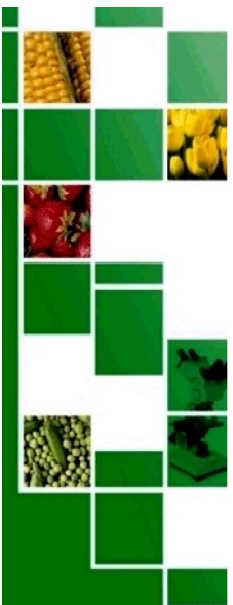
Control

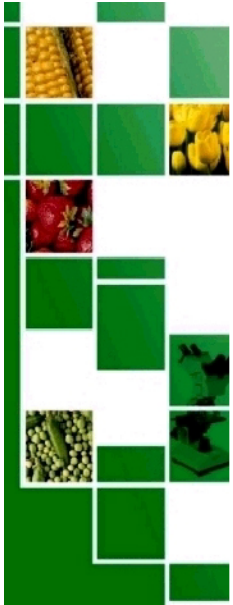


Vector control



Transgenic

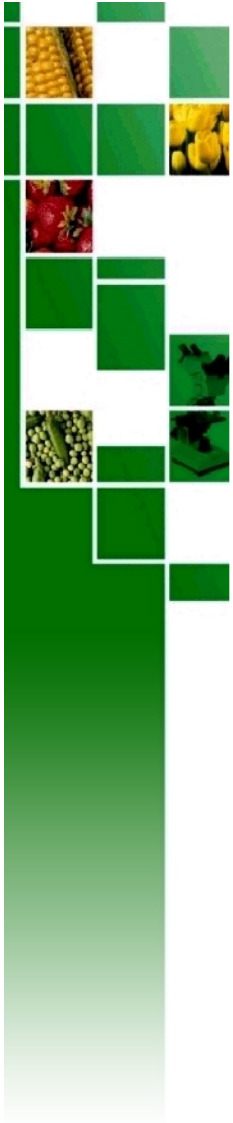




Genomic Research Needed

- Three families of AMPs now expressed in canola, (DH, single copy, homozygous, fertile)
- Need to define and confirm mechanism of action
- Some AMPs active against viruses, nematodes
- AMPs known to be highly immunogenic in animals
- Are AMPs stimulating innate immunity systems in plants?
- Can genomic technologies be used to study this and identify mechanisms of action.





Coordinates

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