

Thursday, September 27, 2018

5:15-5:45 p.m.

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Cross-kingdom RNAi and small RNA trafficking between plants and fungal pathogens

Small RNAs (sRNAs) are a class of short non-coding RNAs that mediate gene silencing in a sequence-specific manner. We have demonstrated that some sRNAs from eukaryotic pathogens, such as *Botrytis cinerea*, the fungal pathogen that causes grey mold disease on more than 1000 plant species, can travel into host plant cells and suppress host immunity genes for successful infection (Weiberg et al., Science 2013).

We recently discovered that such cross-kingdom RNAi is bi-directional. Plants can also send small RNAs into pathogens using extracellular vesicles to silence its virulence genes as part of its immune responses. During the co-evolutionary arms race with the pathogen, plants have adapted exosome-like extracellular vesicles as one of the major pathways to deliver sRNAs into fungal cells and induce cross-kingdom RNAi (Cai et al., Science 2018).

Furthermore, we also discovered that *B. cinerea* can take up double-stranded RNAs and sRNAs from the environment. Applying sRNAs or dsRNAs that target *Botrytis Dicer* genes on the surface of fruits, vegetables and flowers significantly inhibits grey mold disease (Wang et al, Nature Plants, 2016). Such pathogen gene-targeting RNAs represent a new generation of fungicides that are durable and environmentally-friendly.