Small molecules are important

But the metabolome is underexplored

Comparative metabolomics enables discovery of small molecule structure and function without purification

**Genotype Phenotype**

Spectroscopy NMR, MS

Small molecule structures & functions
DANS: Differential Analysis via 2D NMR Spectroscopy

2D NMR-overlays of different mutants

- Discovery and structure elucidation of new small molecules and small-molecule-function in nematodes
- Discovery of new metabolites and pathways in fungi
- Suitable for characterizing lines that vary genetically (nematode races, breeding lines)

Ascarosides are important signaling molecules in C. elegans and they are conserved.

**PLANT PARASITIC NEMATODES:**
Nematodes cause severe crop losses via root damage and plant virus transmission

- Initial screen revealed related pheromones in nematodes from all clades.
- “related”: chemically similar. Now easily identifiable based on knowledge gained with C. elegans, Pristionchus pacificus, and other species.
- more than 20 different species investigated so far, including a few parasites
Ascarosides: a modular library of signaling molecules

- Active at exceedingly low concentrations
- Specific to nematodes (but widespread within nematodes)
- Stable
- Relatively inexpensive to synthesize in the lab
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Key References:
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