Caenorhabditis elegans Metabolomics

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Introduction

Despite being one of the best-studied model organisms in biology, very little is known about the chemicals that the nematode *Caenorhabditis elegans* uses for communication or defense. *C. elegans*, a bacterivorous soil nematode found most often in decaying matter, lives in a complex environment that requires communication with other *C. elegans* for mating, recognition of bacterial food, and avoidance of pathogenic microorganisms.

Experimental, Results and Discussion

C. elegans secretions were collected at all life stages, analytically characterized, and bioassayed for mating behavior and bacterial interactions. NMR spectra were collected at each developmental life stage using the NHMFL 1-mm HTS probe (*1*). The spectra were analyzed using DemixC (*2*, *3*), and the resulting traces were used to automatically search the BMRB small molecule database for known compounds. The secretions were composed of nearly 40 organic acids, amino acids and sugars, and about 10 of these were identified using DemixC. The remaining compounds were identified using conventional NMR analysis, gas chromatography/mass spectrometry, and HPLC.

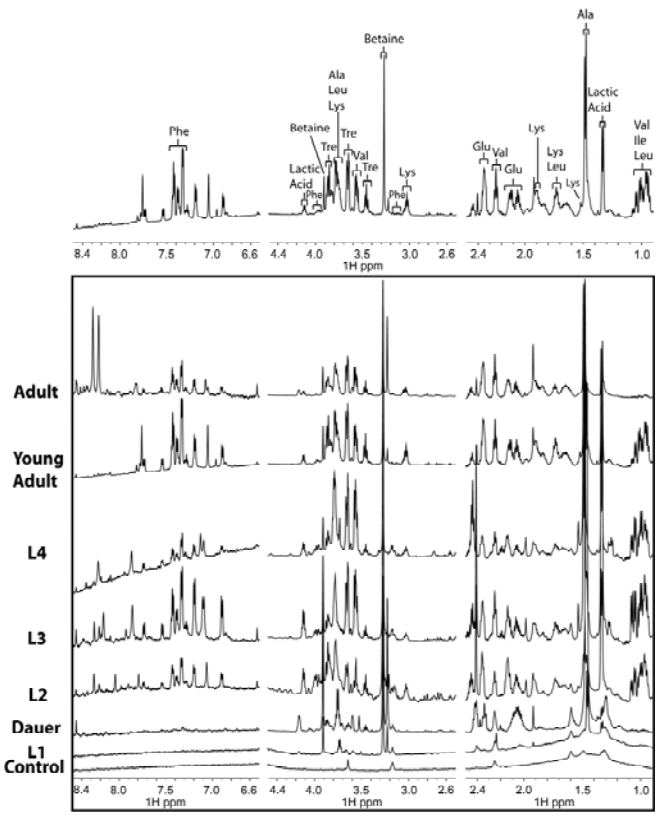

Figure 1. 1D NMR spectra as a function of *C. elegans* developmental stage. 1D and 2D NMR data were collected using the 1-mm HTS probe, and identities of some of the secreted metabolites are shown in the 1D young adult spectrum shown above.

Conclusions

These results will help us learn much more about the interactions that *C. elegans* has with its environment. The 1-mm HTS probe makes these studies much more feasible than with conventional NMR technology by reducing sample volume requirements.

Acknowledgements

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References

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