

Neuropeptide discoveries could someday help defeat the dreaded cockroach

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Close up of a cockroach. Credit: Wikipedia/public domain

Cockroaches are notorious for their abilities to survive and reproduce, much to humanity's chagrin. In addition to scurrying around at night, feeding on human and pet food, and generating an offensive odor, the pests can transmit pathogens and cause allergic reactions. Now, researchers reporting in *ACS' Journal of Proteome Research* have identified neuropeptides produced by the American cockroach (*Periplaneta americana*) that could someday be targeted by new, more selective and effective pesticides.

Neuropeptides are small proteins produced by neurons or endocrine cells that send messages to other cells. In insects, neuropeptides often act as neurotransmitters, hormones or [growth factors](#), influencing an organism's development, growth, metabolism, behavior and reproduction. Therefore, disrupting these processes by targeting neuropeptides or their receptors is a potential new approach to pest control. Recently, Na Li and colleagues determined the genome sequence of *P. americana*. Now, they wanted to use this sequence, combined with peptide analysis, to characterize the neuropeptides of the American cockroach and study how their expression varies by tissue, [developmental stage](#) and sex.

The researchers searched the *P. americana* genome for genes predicted to encode neuropeptides and found 67 potential neuropeptide precursor genes. Then, they isolated peptides from four different cockroach tissues. Using [mass spectrometry](#), the team identified 35 neuropeptides that were predicted by the genome sequence, as well as one new neuropeptide that hadn't been previously predicted or identified. Some of them were expressed in only a single tissue, whereas others were found in many tissues. Neuropeptide expression also varied between developmental stages and sexes, with most neuropeptides being more abundant in adult males. One neuropeptide, called sNPF, that was more highly expressed in females appeared to stimulate feeding behaviors, the researchers say, so it could be an attractive target for pest control measures.

More information: Huanchao Zeng et al. Genomics- and Peptidomics-Based Discovery of Conserved and Novel Neuropeptides in the American Cockroach, *Journal of Proteome Research* (2020). [DOI: 10.1021/acs.jproteome.0c00596](https://doi.org/10.1021/acs.jproteome.0c00596)

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