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STUDIES OF ANTIMICROBIAL PEPTIDES IN THE GREEN SEA URCHIN *STRONGYLOCENTROTUS DROEBACHIENSIS*

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Sea urchins are interesting animals to study as sources for novel compounds that might have promising activities and properties. For the first time from sea urchins, we have recently isolated and characterized two novel families of antimicrobial peptides (AMPs) from the green sea urchin, *Strongylocentrotus droebachiensis*.

The first family of AMPs, named strongylocins, is the cysteine-rich peptides isolated from extracts of the coelomocytes (blood cells). Strongylocins contain 6 cysteines and have a novel cysteine arrangement pattern when compared to other cysteine-rich peptides in the Antimicrobial Peptide Database (<http://aps.unmc.edu/AP/main.php>). Their putative precursor peptides contain a signal peptide, a prosequence and a native region. Their gene sequences indicate that strongylocins (except strongylocin 1b) have three introns and four exons. The mature strongylocins are active against both Gram-positive and Gram-negative bacteria. Similar genes were found in the sister species, *S. purpuratus*. Recombinant products of these genes inhibited growth of bacteria by a nonlytic, presumably intracellular mechanism.

The other family of AMPs, named centrocins, has a heterodimeric structure (a heavy chain and light chain linked by a disulfide bridge). The gene sequences of centrocins code for a signal peptide, two prosequences and a native region. These genes contain one intron and two exons. The native peptides were highly potent against bacteria. A synthetically made heavy chain had anti-fungi and anti-yeast properties in addition to being active against bacteria.

All together, these two families of AMPs from *S. droebachiensis* have promising antibacterial properties for development and future exploitation.