ANTI-INFECTIVES

# In a class of their own

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A recent study in *Microbiology* describes a new class of Gram-positive bacteriocins, which the authors speculate might be the Gram-positive equivalent of the colicins — large antimicrobial proteins that are produced by Gram-negative species.

Bacteriocins are ribosomally encoded proteinaceous molecules that are produced by both Gram-negative and Gram-positive species and inhibit the growth of other bacteria. Pearl Swe and colleagues were interested in the high-molecular-mass bacteriocins that are produced by Gram-positive species as, to date, only a few of these large (Mr >10,000) molecules have been characterized. They focused on three molecules they had identified in a previous study — streptococcin AM57 (SA-M57), a 17 kDa bacteriocin from *Streptococcus pyogenes*, and two putative bacteriocins, EF1097 from *Enterococcus faecalis* and YpkK from *Corynebacterium jeikeium*.

The mature forms of these molecules were expressed in *Escherichia coli* and purified. All three had nanomolar activity against a range of Gram-positive species, but no activity against Gram-negative species. Protein-sequence alignment revealed that they share little sequence similarity with other bacteriocin classes or with each other. Based on *in silico* structural analysis, however, the authors were able to propose that each bacteriocin comprises two main structural elements — a carboxy (C)-terminal domain with conserved secondary structure that is responsible for the antibacterial activity and an unstructured amino (N)-terminal domain that might be responsible for targeting this activity. This hypothesis was supported by functional analyses in which the N- and C-terminal domains were expressed singly and in chimeric combinations.

The authors went on to suggest that EF1097 and YpkK should be renamed enterococcin V583 and corynicin JK, respectively, and that these bacteriocins, along with SA-M57 and the previously characterized *Streptococcus dysgalactiae* bacteriocin dysgalactin, form a distinct class of Gram-positive bacteriocins.

How do these bacteriocins kill cells? *In vitro* analysis revealed that cell death does not result from lysis or murolytic activity; however, further work will be required to fully elucidate the mechanism of action and the basis of target specificity.

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**ORIGINAL RESEARCH PAPER** Swe, P. M. *et al.* *ef1097* and *ypkK* encode enterococcin V583 and corynicin JK, members of a new family of antimicrobial proteins (bacteriocins) with modular structure from Gram-positive bacteria. *Microbiology* **153**, 3218–3227 (2007)