S006  Microcins in action: amazing defence strategies of Enterobacteria

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Probably the oldest and most widespread antimicrobial strategy in living organisms is the use of antimicrobial peptides. Bacteria secrete such defence peptides termed bacteriocins they use for microbial competitions. Microcins are less than 10 kDa bacteriocins produced by \textit{Escherichia coli} and related enterobacteria through the ribosomal pathway. They are synthesized as linear precursors, which can further undergo complex posttranslational modifications resulting from dedicated maturation enzymes encoded in the microcin gene clusters, and are processed by a proteolytic cleavage. Microcins exert potent bactericidal activities that use subtle and clever mechanisms to cross outer- and inner-membranes of gram-negative bacteria. To cross the outer-membrane, siderophore-microcins hijack receptors involved in iron acquisition. The lasso-peptide microcin J25, which is characterized by a knotted arrangement where the C-terminal tail is threaded through an N-terminal macrolactam ring, uses a hydroxamate siderophore receptor and the inner-membrane protein SbmA for import in sensible bacteria, where it inhibits bacterial transcription through binding to RNA polymerase. Microcin C, a heptapeptide adenylate, requires an outer-membrane porin and an inner-membrane ABC-transporter to reach the cytoplasm, where it is processed by proteases into a non-hydrolyzable aspartyl-adenylate analogue. Therefore, despite showing different killing mechanisms and the absence of any structural homology, microcins have the common characteristic to use Trojan horse strategies to penetrate sensible bacteria. They offer new and promising tracks for further design and engineering of novel efficient antibiotics.