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Abstract

Bacterial Contamination Control with Antimicrobial Peptides in Bovine Semen Cryopreservation.

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Abstract: Cryopreserved semen must remain free of microorganisms to be used in artificial insemination in a safe way. Despite the sanitary controls, many cryopreserved semen straws are contaminated with microorganism, some of which display antibiotic resistance. Therefore, this technology involves the risk of spreading pathogens, threatening the health of inseminated females. Our objective was to explore antimicrobial peptides for bacterial control in bovine semen cryopreservation. Using microdilution susceptibility test, we assessed the potency of seven dermaseptin S4 analogues, including three newly designed: S4(5-28)a, K20S4(5-28) and K4S4(1-15), against *Escherichia coli*, *Staphylococcus aureus* and aerobic bacteria isolated from frozen-thawed bovine semen, belonging to the genera *Bacillus*, *Staphylococcus* and gram positive cocci. K4S4, S4 (5-28) a, K20S4 (5-28) and K4S4 (1-15) a, with a net charge of +5, were the most potent peptides. S4 (5-28) and K4S4 (1-15), with a net charge of +4, had lower activity. K4S4 (1-16) a, that possess increased charge (+6) but is less hydrophobic than K4S4 (1-15) a (0.43 and 0.52, respectively), had less activity. Modifying the charge-hydrophobicity relationships of the peptides, resulted in short analogues that displayed high activity in the micromolar range (<10µM) against problematic bacteria in semen contamination. These results suggest a potential for development of peptide-based antibiotics applicable in bovine semen cryopreservation.

Keywords: Antimicrobial peptides, semen contamination, bovine semen, bacterial resistance, antibiotics.

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