عنوان مقاله:

Identification of novel antimicrobial peptide from Asian sea bass (Lates calcarifer) by in silico and activity characterization

محل انتشار:

بیستمین کنگره بین المللی میکروب شناسی ایران (سال: 1398)

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خلاصه مقاله:

Introduction and Objectives: The global crisis of antibiotic resistance increases the demand for the new promising alternative drugs such as antimicrobial peptides (AMPs). Accordingly, we have described a new, previously unrecognized effective AMP, named dicentracin-like, from Asian sea bass and characterized its antimicrobial activity by comparison with moronecidin. Materials and Methods: Gene expression analysis demonstrated the expression of dicentracin-like peptide in tissues of the immune system such as the skin and the head kidney, which is an important endocrine and lymphoid organ. Moronecidin and dicentracin-like exhibited a higher antibacterial activity against gram-positive bacteria relative to gram-negative ones, while both peptides showed a greater binding ability to gram-negative bacteria compared to gram-positive ones. This contradiction between antibacterial activity and binding affinity may be related to the outer membrane from gram-negative bacteria. Compared with moronecidin, dicentracin-like peptide showed more potent binding ability to all gram-positive and gram-negative bacteria. In addition, dicentracin-like peptide exhibited a high antibacterial activity against the investigated microorganisms, except against Staphylococcus aureus. A direct relationship was found between the binding affinity/cationicity and the antibiofilm activity of the peptides wherein, an elevation in pH corresponded to a decrease in their antibiofilm property. Time kill kinetics analysis against clinical Acinetobacter baumannii isolate indicated that bactericidal effect of dicentracin-like and moronecidin at inhibitory concentration (1XMIC) was observed after 4 and 6 hours, respectively, while bactericidal effect of both AMPs at concentration of 2XMIC was observed after 2 hours. Dicentracin-like peptide showed higher inhibitory activity at subinhibitory concentration (1/2XMIC), relative to moronecidin. Compared with moronecidin, dicentracin-like peptide possessed greater binding affinity to bacteria at high salt concentration, as well as at alkaline

pH; In addition, dicentracin-like exhibited a higher antibiofilm activity in comparison to moronecidin even at alkaline pH. Hemolytic analysis against human RBC revealed that hemolytic activity of moronecidin was more potent than that of dicentracin-like, which is consistent with its greater non-polar face hydrophobicity.Conclusions: In the present study, In Silico comparative sequence analysis and antimicrobial characterization led to identify a new, previously ... unrecognized antimicrobial function for named dicentr

کلمات کلیدی:

Antimicrobilal peptide, Acinetobacter baumannii, Staphylococcus aureus, in silico analysis