defensins and cancer

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Abstract

Introduction

Antimicrobial peptides (AMP) have been isolated and characterized from a wide range of animal, plant and bacterial species and are known to play important roles in the host defence system and innate immunity 1

(AMP) are polypeptides of fewer than 100 amino acids contain a positive net charge (from +2 to +9), high lysine and arginine content, and a significant number of hydrophobic residues (≥30%) 2.

These properties permit the peptides to fold into amphipathic conformations upon contact with cell membranes, and the positively charged polar face help the molecules bind to the membrane through electrostatic interaction with the negatively charged head groups of phospholipids 3

The history of AMPs dates back to 1922 with the discovery of lysozyme by Alexander Flemming. The first reported animal originated AMP is defensin, which was isolated from rabbit leukocytes in 1956 4. at the same time, it was also proven that human leukocytes contain AMPs in their lysosomes.

for mammals, there are two main genetic categories for AMP, have been implicated in antimicrobial activity of phagocytes, inflammatory and epithelial secretions. Defensins are widely distributed in epithelial cells and phagocytes, 5. Cathelicidins are structurally and evolutionarily distinct antimicrobial peptides that are similar to defensins in abundance and distribution 6

The great diversity of AMP differs from one animal species to another. In this review I will focuson defensins because, in a medical among all the antimicrobial peptides, defensins are particularly prominent in humans, as evidenced by the large number of expressed human genes 6 , the various forms that are present in human tissues, and the ubiquitous occurrence of defensins in inflamed or infected human tissues 2.

Mammalian defensins are cationic AMP, with relatively arginine-rich nonglycosylated peptides with a molecular mass of 3.5–4.5 kDa. Their structure typically contains three intramolecular disulphide bridges between six cysteine residues 7. As mentioned for AMP in general, the classification of defensins is based on their structure, which divides them into three groups: a-defensins, b-defensins, and h-defensins [7,8]. In a-defensins, intramolecular bonding occurs between cysteines 1-6, 2-4, and [**???**]: 10.1080/13102818.2019.1611385, whereas in b-defensins it is between 1-5, 2-4, and 3-6 [**???**]: 10577203. Human defensins are produced in leukocytes and are also secreted by different epithelial cells and mucosal tissues. These human peptides have antimicrobial activity against a large number of gram-positive and -negative bacteria, fungi, and viruses [**???**]: 10.1016/0092-8674(91)90632-9. table 1

α-Defensins	sequence
HNP-1	ACYCRIPACIAGERRYGTCIYQGRLWAFCC
HNP-2	CYCRIPACIAGERRYGTCIYQGRLWAFCC
HNP-3	DCYCRIPACIAGERRYGTCIYQGRLWAFCC
HNP-4	VCSCRLVFCRRTELRVGNCLIGGVSFTYCCTRVD
HNP-5	ATCYCRTGRCATRESLSGVCEISGRLYRLCCR
HNP-6	TCHCR-RSCYSTEYSYGTCTVMGINHRFCCL

β-defensins	sequence

β-defensins	sequence
hBD-1	GNFLTGLGHRSDHYNCVSSGGQCLYSACPIFTKIQGTCYRGKAKCCK
hBD-2	GIGDPVTCLKSGAICHPVFCPRRYKQIGTCGLPGTKCCKKP
hBD-3	GIINTLQKYYCRVRGGRCAVLSCLPKEEQIGKCSTRGRKCCRRKK
hBD-4	EFELDRICGYGTARCRK-KCRSQEYRIGRCPN-TYACCLRKWDESLLNRTKP

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