

Master Project Proposal

Title: Antibiofilm effect of a fish-derived antimicrobial peptide on Gram-positive and Gram-negative bacteria

Synopsis:

The increasing bacterial resistance to conventional antibiotics poses a serious health problem that needs to be overcome. Biofilms have great significance for public health, because biofilm-associated microorganisms exhibit dramatically decreased susceptibility to antimicrobial agents. Antimicrobial peptides (AMPs) are found in the innate immune system of a wide range of organisms. Identified as one of the most promising alternatives to conventional molecules used against infections, the main advantage of AMPs is their low propensity to resistance. The number of nature-driven or synthetically designed peptides has been increasing year by year. AMPs have been found to be active against a broad range of microorganisms, including not only Gram-positive and Gram-negative bacteria, but also fungi, protozoa and viruses. Two different AMPs (Pa-MAP 1.5 and 1.9) were synthetically created based on an antifreezing peptide from the Antarctic fish *Pleuronectes americanus*. Both peptides showed distinct structural features and biological activities and at the same time promising therapeutic results against bacteria. In order to get new insights on the mode of action of these peptides, the present work aims to study the mode of action of both peptides on bacterial biofilms.

The main objectives of the work are:

- 1) Determine the optimal conditions that shape biofilm formation of clinically relevant bacteria.
- 2) Determine the dependence of biofilm age with its susceptibility.
- 3) Determine the efficacy of AMPs against biofilms (formation and inhibition assays).

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Remunerated or volunteer training: volunteer