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**MICROBIOLOGY & MOLECULAR GENETICS**

**Departmental Journal Club**

**MICR 6120**

**Monday**

**March 6th, 2017**

11:30am-12:20pm

RM 215 LSE.

Presented by

Judyth Gulden  
PHD Student

Title:    A Novel RNase 3/ECP Peptide for Pseudomonas aeruginosa Biofilm Eradication That Combines Antimicrobial, Lipopolysaccharide Binding, and Cell-Agglutinating Activities  
  
Authors: David Pulido,Guillem Prats-Ejarque,Clara Villalba,Marcel Albacar,Juan J. González-López,Marc Torrent,Mohammed Moussaoui,Ester Boix

Eradication of established biofilm communities of pathogenic Gram-negative species is one of the pending challenges for the development of new antimicrobial agents. In particular, Pseudomonas aeruginosa is one of the main dreaded nosocomial species, with a tendency to form organized microbial communities that offer an enhanced resistance to conventional antibiotics. We describe here an engineered antimicrobial peptide (AMP) which combines bactericidal activity with a high bacterial cell agglutination and lipopolysaccharide (LPS) affinity. The RN3(5-17P22-36) peptide is a 30-mer derived from the eosinophil cationic protein (ECP), a host defense RNase secreted by eosinophils upon infection, with a wide spectrum of antipathogen activity. The protein displays high biofilm eradication activity that is not dependent on its RNase catalytic activity, as evaluated by using an active site-defective mutant. On the other hand, the peptide encompasses both the LPS-binding and aggregation-prone regions from the parental protein, which provide the appropriate structural features for the peptide’s attachment to the bacterial exopolysaccharide layer and further improved removal of established biofilms. Moreover, the peptide’s high cationicity and amphipathicity promote the cell membrane destabilization action. The results are also compared side by side with other reported AMPs effective against either planktonic and/or biofilm forms of Pseudomonas aeruginosa strain PAO1. The ECP and its derived peptide are unique in combining high bactericidal potency and cell agglutination activity, achieving effective biofilm eradication at a low micromolar range. We conclude that the designed RN3(5-17P22-36) peptide is a promising lead candidate against Gram-negative biofilms.