World Congress on APPLIED MICROBIOLOGY
&
World Congress on ANTIBIOTICS

August 13-14, 2018
Rome, Italy

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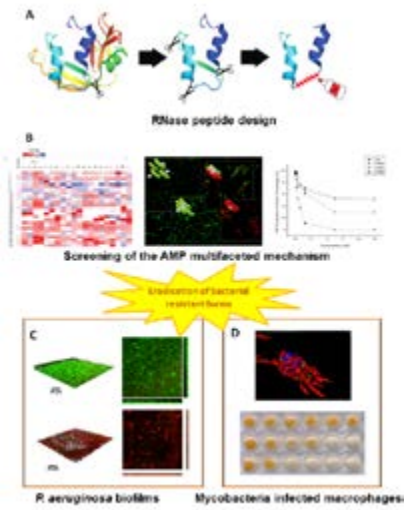
Human ribonucleases and derived peptides to tackle antimicrobial resistance

Emergence of bacterial resistance to most common antibiotics urges the design of novel antimicrobial drugs. Antimicrobial proteins andpeptides (AMPPs) are key players of the host innate immunity and exert a rapid and multifaceted action that reduces the development of bacterial adaptation mechanisms. Our research group has been long-time exploring the mechanism of action of human ribonucleases involved in host defence. Human host defence RNases are members of the vertebrate specific RNase A superfamily. They are expressed by a diversity of innate immune cells and are endowed with antimicrobial properties. Secreted upon infection, they contribute to protect our body fluids from invading pathogens. We have identified the structural determinants that determine the protein antimicrobial activity. A combined multifaceted action ensures an efficient eradication of bacterial resistant forms such as biofilm communities and macrophage intracellular resident *Mycobacteria*. Based on structure-functional studies and by applying a positional scanning library we have identified the minimal pharmacophore entity and designed derived peptides that encompasses most of the parental protein properties. The results underline the potentiality of RNases and derivatives as alternative antibiotics to combat bacterial resistance.

Funding: Ministerio de Economía y Competitividad (SAF2015-66007P) and Agència de Gestió d'Ajuts Universitaris i de Recerca, Programa Indústria del coneixement (2016 PROD-00060), co-financed by FEDER funds.



Biography

Ester Boix is leading the research group on "Human host defence RNases" at the Universitat Autonoma de Barcelona, Spain. She was awarded in 2002 as a Ramon y Cajal senior researcher and is Full Professorship accredited since 2016. She has published more than 70 papers in peer-review journals, mostly as a corresponding author. Her main research interests are focus on the mechanism of action of human antimicrobial RNases, as promising proteins for drug design. Her research group is pioneer in the development of expression protocols for recombinant RNases, first report of human RNases structural studies by X-ray crystallography and identification of RNases host defence properties. Latest works are based on structural- functional studies of antimicrobial RNases towards the identification of functional domains applied to the design of novel antibiotic agents to combat bacterial resistance.

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