

MODELING OF THE ITURINIC ANTIMICROBIAL LIPOPEPTIDE MYCOSUBTILIN AT INTERFACES

Dr. Claire LOISON*, Dr. Mehmet Nail Nasir, Dr. Emmanuel Benichou, Dr. Francoise Besson and
Prof. Pierre-Francois Brevet

CNRS, Université Lyon 1, Institut Lumière Matière, F-69622 Villeurbanne, France

The resistance of bacteria and fungi to available antibiotics is a major concern worldwide, leading to enormous effort to develop innovative drugs with new modes of actions.

Two families of natural peptides are in this respect promising: host-defense cationic antimicrobial peptides, and lipopeptides.

Iturinic lipopeptides, in particular Mycosubtilin, shows interesting biocide activity against pathogenic fungi. Its interactions with the lipidic membranes of the pathogens seem to be at the origin of the biological activities.

Cholesterol or ergosterol have been shown to play a role in Mycosubtilin activities, but the precise molecular mechanisms of the interactions need to be further elucidated. In our theoretical approach, using molecular dynamics simulations, we investigated the interaction between iturinic lipopeptides and various interfaces: the air/water interface, phospholipids or sterols monolayers, and lipidic bilayers.

Specific interactions of the lipopeptide with sterols are observed, they may be decisive in the selectivity of its antimicrobial activity. These results are discussed along with experimental data, for example the effect of mutations on the biocide activity of Mycosubtilin.

References :

- * M. N. Nasir and F. Besson, *Langmuir* (2011) Vol. 27 (17), p.10785.
- * M. N. Nasir et al., *Phys. Chem. Chem. Phys.* (2013) Vol. 15, p. 19919.
- * C. Loison et al., *Phys. Chem. Chem. Phys.* (2014) Vol. 16, p. 2136.