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Innovative nanoformulation of antimicrobial peptides

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Resistance to traditional antibiotics is a rapidly increasing problem, which in the future could make infections impossible to treat and bring the state of medical care back to the pre-antibiotic era from the beginning of the last century. Antimicrobial peptides (AMPs) have a huge potential as new, sustainable therapeutics against infectious diseases, as they are less prone to induce high-level resistance due to their fast and nonspecific mechanism of action. A large variety of AMPs have been identified, analyzed and modified in order to increase their function and efficiency for drug delivery applications. However, the number of products based on AMPs introduced in the market is few. One of the main reasons is the challenge related to the stability of peptides during storage, as well as after administration, which dramatically reduces their efficiency. These challenges can be overcome with novel formulation strategies. In the EU-funded project FORMAMP, the possibility to use different nanoparticles as carriers for AMPs has been explored. Lipid-based, polymer-based and mesoporous silica-based nanoparticles have been used for different AMPs and applications. The peptide-loaded nanocarriers have been further formulated in functional dosage forms for local administration at the infected site (skin and lung).

Gels, creams and ointments have been developed for recurrent skin infections, whereas, aerosols and powders for inhalation are being formulated for tuberculosis and cystic fibrosis. The project was recently finalized and in this presentation I will summarize the main findings both in terms of nanoformulation strategies and the successful development for treatment of tuberculosis and skin and soft tissue infections.

Biography

Lovisa Ringstad currently holds the position of Deputy Head for the Formulation Development Section at RISE Research Institutes of Sweden. She has a PhD in Pharmaceutical Physical Chemistry from Uppsala University, Sweden (2009). At RISE, she has lead several public and privately funded projects related to formulation development, with specific focus on pharmaceuticals and she is the Coordinator of the FORMAMP project (FP7 collaborative project, www.formampproject.com). Her main research interests are directed towards formulation development, skin delivery and biophysical understanding on the interaction between formulation components as well as with surrounding tissue/cells/bacteria. She has published more than 20 papers in peer-reviewed journals.

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