MMS5 e-Conference

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Development of de novo designed antimicrobial peptides against acne-related pathogen and their encapsulation into niosomal vesicles

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Abstract:

The development of antimicrobial peptides (AMPs), capable of dealing with antibiotic resistance problem in many microbes, has remained an ongoing challenge for decades. Moreover, de novo designed AMPs are growing since certain natural AMPs are toxic to mammalian cells. Among beauty skin problems, acne lesions and severities that are caused by infection of pathogen, such as *Propionibacterium acnes*, *Staphylococcus aureus*, *Staphylococcus epidermidis* and *Candida albicans*. Some antibiotic resistances of the pathogen have been found. Therefore, in the first year of this project focuses on creating novel peptides and evaluating their efficacy in killing acne-related pathogen. Six peptides were de novo designed using the helical wheel projection and the Antimicrobial Peptide Database, and synthesized using solid-phase methodology with Fmoc-protected amino acids. Peptides were used to evaluate antimicrobial activity by broth-microdilution assay, and *in-vitro* cytotoxic activities against human red blood cells, immune macrophages and human skin cells. Among six peptides, WSRR7, WSRR11 and WSRK11 were the best candidates because the peptides showed strong antimicrobial efficacy against acne-related pathogen and less toxicities on human red blood cells, macrophages RAW 264.7 and human skin HaCaT cells. The secondary structures of peptides were also investigated by Circular dichroism. Thus, the results in the first year of project indicate that de novo designed AMPs with less toxicities on human immune and skin cells have been succeeded.

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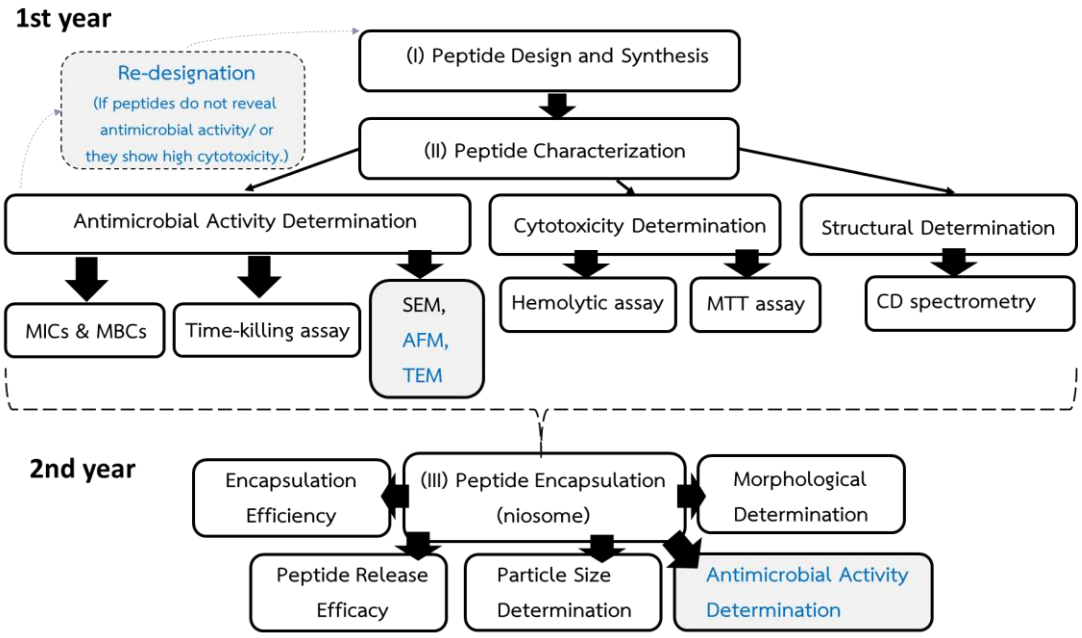
Graphical abstract



The research scope of the MRG 6280183 project