Biomedical Engineering Seminar Series

2nd Semester, Academic Year 2017

Date: April 10, 2018
Time: 11.00 AM – 12.00 PM
Room 6373, 3rd level, Building 3,
Faculty of Engineering; Mahidol University

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"Development of CXCR4 inhibitors for topical treatment of psoriasis"

Psoriasis is a chronic inflammatory skin disease that is often associated with systemic comorbidities and impaired skin barrier function. Recently, the chemokine CXCR4 was found to play an important role in the pathogenesis of psoriasis. In this study, we aimed to test skin penetration of recently developed polymeric CXCR4 antagonists (PAMD) and assess their potential as topical treatment of psoriasis with low systemic toxicity of CXCR4 inhibition. We have synthesized positively charged PAMD, reversible negatively charged PAMD-COOH, and hydrophobically modified PAMD-OA. The best performing negatively charged PAMD demonstrated low toxicity in keratinocytes in vitro and high retention and deep penetration in both healthy and psoriatic mouse skin. The favorable penetration of the PAMD-COOH was aided by the acidic skin environment. Imiquimod-induced psoriasis mouse model was used to test the therapeutic activity. We observed psoriasis attenuation by the topical application of PAMD and PAMD.COOH. The activity of the topical treatment was comparable to the subcutaneous injection of small molecule CXCR4 inhibitor AMD3100. Overall, topical application of CXCR4 antagonistic polymers may serve as novel treatment of psoriasis.

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