Modeling dermatophytosis in reconstructed human epidermis

Émilie Faway[1], Ludivine Cambier[2], Catherine Lambert de Rouvroit[1], Bernard Mignon[2] and Yves Poumay[1]

[1] URPHYM-NARILIS, University of Namur, Namur, Belgium

[2] FARAH, Faculty of Veterinary Medicine, University of Liège, Liège, Belgium

Key words: dermatophytosis – reconstructed human epidermis – infection model

Dermatophytosis, a superficial fungal infection of keratinized structures, occurs with an increasing prevalence in humans. However, both the mechanisms used by dermatophytes to adhere and invade the *stratum corneum*, and the responses exhibited by underlying human keratinocytes during this infection, are still incompletely understood. Here, we report the development of an *in vitro* model of dermatophytosis through infection of reconstructed human epidermis (RHE) by arthroconidia of the anthropophilic *Trichophyton rubrum* species. Modulating density of the inoculum together with duration of the exposure to this pathogen, limited infection of *stratum corneum* without invasion of lower layers was obtained, mimicking a typical *in vivo* situation. Fungal elements were detected using Periodic-Acid Schiff-staining histochemistry performed on sections of infected RHE and quantified by quantitative PCR on RHE lysates, allowing to monitor infection over time. This model brings improvements to available tools dedicated to better understand the interactions between dermatophytes and epidermis, as well as to evaluate novel preventive or therapeutic antifungal agents. Indeed, topical miconazole for instance is demonstrated to suppress fungal infection in this RHE model.