ATOPIC ECZEMA/DERMATITIS

MODELLING ATOPIC DERMATITIS IN VITRO: INVOLVEMENT OF THE MICROBIOTA, IMMUNE CELLS AND KERATINOCYTES IN A 3D TISSUE

J. Bourland[(1)] - S. Balzaretti[(1)] - F. Carriero[(1)] - M. Meloni[(1)]

Vitroscreen, In Vitro Research Laboratory, Milan, Italy[(1)]

Introduction: Atopic dermatitis (AD) is the most common form of eczema. It affects mainly young children and is characterized by lesions and pruritus. It involves a dysregulation of the immune system and of the microbiota as well as an impairment of barrier function: however, its development is a complex process not entirely understood.

Objective: To better understand this pathology as well as assess the efficacy of new products, we developed an in vitro model of atopic dermatitis based on reconstructed human epidermis infiltrated by immune cells further colonized by Staphylococcus aureus.

Materials and methods: Reconstructed human epidermis (RHE) with a mechanically impaired barrier were colonized with S. aureus on the apical side. A double porosity polycarbonate filter allowed the co-culture and infiltration of THP-1 on the basal side. Tissue response was assessed after 4 and 16h by qRT-PCR of inflammatory genes (TNF-□, TSLP, TLR-2), antimicrobial peptide (human β-defensin 2) and barrier proteins (filaggrin, CLDN1, ZO-1). Infiltration of myeloid cells derived from THP-1 was assessed by CD86 immunostaining as well as by modulation of IL-8 expression.

Results: At 4h and 16h, THP-1 were observed in the colonized epidermis, mainly in the basal layer. A significant increase of the expression of IL-8, TLR-2 and TNF-□ indicated an inflammation in the THP-1-RHE model in presence of S. aureus. TSLP was increased by 10-fold. S. aureus colonization of the RHE co-cultured with THP-1 resulted in a decrease filaggrin expression both at gene and protein level. Human β-defensin 2 increased by more than 100-fold in the AD model, reflecting keratinocyte reaction to S. aureus.

Conclusions: The THP-1-RHE cell migration model seems to better recapitulate the features of AD in vitro by taking into account the keratinocyte innate and inflammatory response and the immune-mediated response in presence of a S. aureus colonization.