

Development of intercellular lipids (lyotropic liquid crystal) which can induce skin regeneration

Rie Igarashi

Institute of Medical Science, St. Marianna University, School of Medicine

Tissue in body must quickly recognize injury to response to the rapid pace of epidermal growth. In skin, the epidermal cells must also react to danger signals from the surrounding extracellular lipid of the stratum corneum spaces and immediately participate by initiating the wound repair process. The topical administration of lyotropic liquid crystal on stratum corneum rapidly broke down the lipid lamella structure which would be recognized as a wound without organ-change. This can activate a variety of biological processes. This study set out to determine if the occur of the phase transition of lipid to neighbour different physicochemical structure can stimulate keratinocyte cells and what mechanism is responsible for this response. Using small angle x-ray scattering (SAXS) analysis, the response to the transient structural change of lipid was detected because it might result the diffusion of oil and/or water from liquid crystal towards lipid lamella phase. Simultaneously, significant increase of the growth factors and inflammatory cytokines were detected after the administration of liquid crystal. Not only the excess expression of cytokines but also the extent of TEWL as the barrier marker of skin increased. These observations suggest that the structural change of lipid can stimulate to trigger recognition of a slight injury in the wound defence and repair response as homeostasis. This method actually succeeded the improvement of photo-induced hyperpigmentation on human face.