Wissenschaftliche Posterausstellung: Poster 3

The molecular basis of the wound healing effects of betulins

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Delayed wound healing and chronic wounds are still severe problems in medicine today and a challenging task for the treating physicians. Skin-wound healing is a biological complex process divided into three phases: inflammation, new tissue building and tissue remodelling. Besides of the conventional remedies phytomedicines turned out to be an interesting alternative to beneficially influence these phases. Here extracts from birch bark (Betula pendula) have gained more and more interest.

Triterpenes from the betulin type are the active compounds of birch bark extract, which was recently shown to exert promising wound healing effects in patients [1]. Studies have been undertaken to explain these in vivo effects. We could demonstrate that birch bark extract and its main ingredient, betulin, influences the first phase of the wound healing process by increasing proinflammatory cytokines, chemokines and cyclooxygenase-2 (COX-2) in human primary keratinocytes. These mediators play crucial roles in cell migration, proliferation and angiogenesis. Consequently, deficiency of these mediators have been shown to remarkably impair wound healing [2,3,4]. We could provide evidence with COX-2 that its mRNA increase is due to a mRNA stabilizing effect.

Controlled migration of keratinocytes at the wound edge, which is necessary for reepithelialization, is a further crucial step in the wound healing process and requires a coordinated interaction of cytoskeletal elements. The reorganization of the actin cytoskeleton is thereby considered as an important driving force in cell migration [5]. We could demonstrate that lupeol had a strong effect on the actin cytoskeleton even in very low concentrations of 1 nM, which could be one explanation for the strong wound healing activity proven in the scratch assay. Studies are in progress to gain further insights in the complex wound healing mechanism of birch bark extract.

References:

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