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11 | Maintenance of the ubiquitin-proteasome system activity correlates with visible skin benefits.

Imbert I, Gondran C, Oberto G, Cucumel K, Dal Farra C, Domloge N.; Int J Cosmet Sci. 2010 Jun 21. doi: 10.1111/j.1468-2494.2010.00575.x.

ABSTRACT

Researches on longevity and anti-ageing molecules have clearly evidenced the potential to increase lifespan of the cells. These recent scientific data raise interests and questions on the capacity of the cells to live longer and maintain their fundamental mechanisms of protection, reparation or degradation of abnormal proteins to maintain their capital of healthy and functional cellular activity. In this concern, this study was focused on the ubiquitin-proteasome system as an essential cellular tool to maintain the pool of functionally active proteins allowing renewal of proteins and degradation of damaged proteins. As the proteasome keeps the 'cells health capital', it should be particularly interesting to associate the maintenance of the proteasome activity with increasing longevity. Indeed, although oxidative stress damage increases with ageing leading to collagen and cellular membrane alterations, it also leads to a reduction in the proteasome activity which is critical for the cells. The aim of this study was to better understand the cellular role of the proteasome and to provide new data showing the skin beneficial effects in activating the overall system of ubiquitination and proteasomal degradation. For this purpose, in vitro, ex vivo and in vivo experiments were performed to evaluate the effects of maintaining the ubiquitin-proteasome activity in basal and stress conditions on young versus aged cells. Experiments have included evaluation of a newly developed dimerized tripeptide targeting specifically the ubiquitin-proteasome pathway. Our results have demonstrated that maintenance of this essential mechanism that participates in abnormal protein elimination and protein renewal allows maintaining cellular integrity that correlates with visible skin benefits.