

The effects of changes in cutaneous steroidogenesis with advancing age on the function of skin

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The sex steroids, androgens and estrogens, play essential roles in many health conditions of men and women. However, the level of circulating sex steroids decreases with advancing age, mainly due to the aging of gonads in both sexes. Moreover, in men, a decline in testosterone is associated with many physiological signs of aging, such as a decrease in muscle mass and strength, bone mass, skin thickness, and hair; poor wound healing; and an increase in fat mass, especially visceral adipose tissue. However, the changes in the production and secretion of sex steroids with age in several steroidogenic organs, muscle, bone, skin in men are not well documented.

Therefore, to uncover the changes in steroidogenesis in skin with age, we analyzed the changes in the levels of sex steroids in young and aged male mice. First, we demonstrated that cutaneous testosterone levels were higher in aged mice than in young mice. Then, we demonstrated that Hsd17b3 localized in sebaceous glands is responsible for the upregulation of cutaneous testosterone levels in aged mice. Inhibition of hyperproduction of cutaneous testosterone by treatment with an inhibitor of Hsd17b3 increased the hair length of aged mice. Finally, we demonstrated that the suppression of hair length by elevated testosterone levels was mediated by ZIP9, but not by the androgen receptor, in hair follicle cells of aged mice.