Proteins used to map the aging process

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Loss of muscle mass is not only associated with disease, such as HIV and cancer, but also with the normal aging process. Anabolic steroids are sometimes used to reverse loss of lean muscle tissue but they can have unwanted side effects. New research, published in BioMed Central's open access journal *Immunity and Aging*, shows that nine proteins, isolated from blood, alter with age and that the profile of some of these proteins can be reversed by testosterone treatment.

In a combined study, researchers from Boston University School of Medicine and University of Texas Medical Branch compared protein levels in serum samples from two groups of healthy men - young men aged 18-35 and older men aged 60-75. Seven proteins, which were either growth factors (IGF-1, IL-7, IL-12p40, PDGFβ), or were involved in immune response (ENA78, MIP-1β, IP-10), and pro-collagen (PIIINP) were all reduced in older men. In contrast the monokine MIG, also involved in immune activity, was elevated.

Testosterone treatment increased lean muscle mass, and levels of the appetite suppressing hormone leptin, for both groups of men. Testosterone also increased levels of PIIINP and IGF-1 in young men and the researchers saw a similar increase in a small group of older men.

Dr Monty Montano said, "The blood proteins we found that altered with healthy aging also have links to maintenance of muscle, such as IGF-1 and pro-collagen, or are involved in regulation of the immune system, possibly reducing T-cell and neutrophil responses with age. Additionally all of the proteins we found are involved with the signaling pathways

controlled by AKT, NFκβ and TGFβ which are known to be associated with aging."

Dr Montano continued, "It is no simple matter to find a one size fits all test for aging – our results suggest that there is a difference in response to anabolic steroids between young and older men, despite both groups increasing in muscle mass. It seems that testosterone replacement does not necessarily mean a restoration of full testosterone functionality for the older man."

More information: Identification of serum biomarkers for aging and anabolic response, Camellia Banerjee, Jagadish Ulloor, Edgar L Dillon, Qusai Dahodwala, Brittani Franklin, Paola Sebastiani, Melinda Sheffield-Moore, Randall J Urban, Shalender Bhasin and Monty Montano, *Immunity & Ageing* (in press) www.immunityageing.com/

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