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Responses of saliva testosterone, cortisol, and testosterone-to-cortisol ratio to a triathlon in young and middle-aged males

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Saliva testosterone and cortisol have been suggested to represent the biologically active forms of the respective hormones. This study investigated the acute responses of saliva testosterone, cortisol, and testosterone-to-cortisol ratio (T/C) after a triathlon in young and middle-aged recreationally-trained males. Thirty-five subjects were divided into the Young (18-35 years, n=12) or Middle-aged (MA, 40-56 years, n=23) group. Pre- and post-race saliva testosterone and cortisol concentrations were measured by radioimmunoassays. Baseline testosterone was lower in MA, compared to the Young group. Cortisol and T/C decreased significantly after the race in both groups. Testosterone increased after the race in MA. Race-induced change in T/C was correlated with age ($r=-0.686$, $p<0.05$) in the Young group and change in cortisol in both groups. ($r=-0.729$, $p<0.01$ in Young; $r=-0.714$, $p<0.01$ in MA). Race-induced change in testosterone was correlated with age ($r=0.487$, $p<0.05$). This study suggested that the decline in T/C after intensive endurance exercise may be more significant with advancing age until mid-30 s, then it may reach the plateau after the fourth decade of life. The age-related decline in testosterone may be temporarily normalized after intensive endurance exercise in middle-aged men. Race-induced change in cortisol was the major determinant of that in T/C.

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