Gender-, age-, body composition- and training workload-dependent differences of GH response to a discipline-specific training session in elite athletes: a study on the field

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Ninety-nine Italian elite athletes (61 M, 38 F, mean age±SE: 24.1±0.6 yr, age range: 17-47 yr) of different disciplines volunteered to participate in this investigation. Basal GH concentrations were significantly higher (p<0.0001) in females (6.2±1.1 ng/ml) vs males (1.9±0.5 ng/ml). Basal GH values were negatively correlated with age and body mass index (BMI); no significant correlation was found between GH and IGF-I levels. Among female athletes, 8/38 had basal GH values higher than 10 ng/ml [2/8 athletes were taking oral contraceptives (OC)], while among males 6/61 had values higher than 5 ng/ml. In females, training sessions significantly increased (p<0.0001) basal GH concentrations (peak GH: 18.5±1.9 ng/ml), while in males GH responses were lower than in females (11.8±1.4 ng/ml, vs F: p<0.005). Six out of 38females and 6/61 male athletes were considered GH hypo-responders (i.e. negative difference between peak GH and basal GH values), the large majority of them being subjects with elevated basal GH concentrations. In responsive athletes, peak GH values occurred immediately at the end of the training session both in males and in females; GH concentrations rapidly declined during recovery. No significant correlations were found between peak GH and age, body weight and BMI in either gender. GH responses were directly related (p<0.001) to the intensity of the workload during the sessions. In conclusion, the present study demonstrates that: 1) some elite athletes had increased GH concentrations before training, which were however associated with normal IGF-I levels; 2) GH peaks after a discipline- specific training session were significantly higher in females than in males performing the same discipline, gender-related differences disappearing when post-exercise total GH outputs (area under the curve) were compared; 3) peak GH values were directly correlated with training workload; 4) GH concentrations rapidly declined during recovery, values at the end of the post-training GH sampling being generally lower than those found in basal condition.