Exercise-induced effects on growth hormone levels are associated with ghrelin changes only in presence of prolonged exercise bouts in male athletes.

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Aim: The aim of this study was to evaluate growth hormone (GH) and ghrelin levels in response to physical exercise in athletes.

Methods: Two different exercise workloads were administered in two different groups of athletes. Group A athletes (19 males, 18 females; mean age ± standard deviation: 25 ± 6.7 years), performing a 60-90 min training session at approximately 80% of VO_2max, were sampled for GH and ghrelin determinations before and immediately at the end of a training session on-the-field. Group B athletes (4 males; mean age: 28.2 ± 7.2 years) performed two consecutive 30-min cycling sessions at 80% of individual VO_2max at different time intervals between bouts (2 and 6 h) in two different days. GH and ghrelin concentrations were determined in blood samples collected at 15-min intervals during exercise and following 1 h of recovery.

Results: In group A athletes, GH levels increased after the training session ($P < 0.0001$), with no differences between males and females. In male athletes, ghrelin levels significantly decreased after the training session (from 1 506.4 ± 859 to 1 254.8 ± 661.7 pg/mL, $P < 0.05$), while no significant changes were found in females. No correlations were observed between GH and ghrelin levels at rest and after training. In group B athletes, GH levels significantly increased after the first exercise bouts (peak: 26.8 ± 11.2 and 17.3 ± 3.5 ng/mL, respectively), while the pattern of GH response was different after the second bout of exercise performed at 2-h or 6-h interval. In fact, peak GH concentration in response to the second bout (4.3 ± 1.6 ng/mL) was lower ($P < 0.01$) than that of the first bout when the interval elapsed was only 2 h, while a recovery of GH responsiveness was evident after the 6-h interval between the two exercise bouts (11.9 ± 3.3 ng/mL). As far as ghrelin levels are concerned, no significant changes were observed during and after the two exercise bouts performed at the different time intervals.

Conclusion: GH responses to prolonged exercise bouts (60-90 min) are associated with changes in ghrelin levels only in male athletes, while repeated exercise bouts of lower duration (30 min), capable to determine marked GH responses, are divorced from changes in ghrelin concentrations.