GH responses to two consecutive bouts of neuromuscular electrical stimulation in healthy adults.

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Background: It is well established that repeated GHRH administration or repeated voluntary exercise bouts are associated with a complete blunting of GH responsiveness when the administration of the second stimulus follows the first one after a 2-h interval.

Aim: To evaluate GH responses to neuromuscular electrical stimulation (NMES) in healthy adults.

Methods: Six volunteers (mean age ± S.D. 31.7 ± 5.5 years) were studied before and after two consecutive bouts of NMES exercise (a series of 20 contractions at the maximum of individual tolerance, frequency: 75 Hz, pulse duration: 400 ms, on-off ratio: 6.25-20 s) administered at a 2-h interval.

Results: Baseline GH levels (mean: 0.3 ± 0.2 ng/ml) significantly increased after the first NMES (peak: 4.2 ± 3.7 ng/ml), with a complete normalization after 120 min (0.3 ± 0.3 ng/ml). The administration of the second bout of NMES of comparable characteristics also resulted in a significant GH increase (peak: 5.2 ± 3.2 ng/ml), which was comparable with that observed after the previous one. GH net incremental area under the curve after the first and second bouts of NMES were not significantly different (155.1 ± 148.5 and 176.9 ± 123.3 ng/ml per h, $P = 0.785$).

Conclusions: Unlike repeated pharmacological stimuli and voluntary exercise bouts, subsequent sessions of NMES administered at a 2-h interval appear to circumvent feedback mechanisms and to re-induce the GH responses, thus indicating a possible different underlying mechanism elicited by different GH-releasing stimuli.