Obese adolescents exhibit a constant ratio of GH isoforms after whole body vibration and maximal voluntary contractions.

A. E. Rigamonti, M. Haenelt, M. Bidlingmaier, A. De Col, S. Tamini, G. Tringali, R. De Micheli, L. Abbruzzese, C. R. Goncalves da Cruz, M. Bernardo-Filho, S. G. Cella, A. Sartorio

BMC Endocrine Disorders 18: 96, 2018.

Background: Growth hormone (GH) is a heterogeneous protein composed of several molecular isoforms, the most abundant ones being the 22 kDa- and 20 kDa-GH. Exercise-induced secretion of GH isoforms has been extensively investigated in normal-weight individuals due to antidoping purposes, particularly recombinant human GH (rhGH) abuse. On the other hand, the evaluation of exercise-induced responses in GH isoforms has never been performed in obese subjects.

Methods: The acute effects of whole body vibration (WBV) or maximal voluntary contraction (MVC) alone and the combination of MVC with WBV (MVC + WBV) on circulating levels of 22 kDa- and 20 kDa-GH were evaluated in 8 obese male adolescents [mean age ± SD: 17.1 ± 3.3 yrs.; weight: 107.4 ± 17.8 kg; body mass index (BMI): 36.5 ± 6.6 kg/m^2; BMI standard deviation score (SDS): 3.1 ± 0.6].

Results: MVC (alone or combined with WBV) significantly stimulated 22 kDa- and 20 kDa-GH secretion, while WBV alone was ineffective. In particular, 22 kDa- and 20 kDa-GH peaks were significantly higher after MVC + WBV and MVC than WBV. In addition, 22 kDa-GH (but not 20 kDa-GH) peak was significantly higher after MVC +WBV than MVC. Importantly, the ratio of circulating levels of 22 kDa- to 20 kDa-GH was constant throughout the time window of evaluation after exercise and similar among the three different protocols of exercise.

Conclusions: The results of the present study confirm the ability of MVC, alone and in combination with WBV, to stimulate both 22 kDa- and 20 kDa-GH secretion in obese patients, these responses being related to the exercise workload. Since the ratio of 22 kDa- to 20 kDa-GH is constant after exercise and independent from the protocols of exercise as in normal-weight subjects, hyposomatotropism in obesity does not seem to depend on an unbalance of circulating GH isoforms. Since the present study was carried out in a small cohort of obese sedentary adolescents, these preliminary results should be confirmed in further future studies enrolling overweight/obese subjects with a wider age range.