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Intra-Individual Variation of GH-dependent Markers in Athletes: Comparison of Population Based and Individual Thresholds for Detection of GH Abuse in Sports

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Abstract

The GH-2000 discriminant functions, using insulin-like growth factor I (IGF-I) and the N-terminal propeptide of type III procollagen (PIIINP), enabled the detection of Growth Hormone (GH) doping despite the broad inter-individual normal range of both peptides. The sensitivity of the discriminant function-based methodology may perhaps be further increased in future by applying individual athlete profiles. The purpose of the present study was to evaluate the intra-individual variability of IGF-I, PIIINP and the GH-2000 scores in athletes. For this purpose a total of eight blood samples were taken from each of fifty male and female elite athletes over a period of up to 18 months. The IGF-I and PIIINP levels, we found, lay predominantly within the reference range for elite athletes. The intra-individual variability for IGF-I ranged between 6 and 26 %, while that for PIIINP ranged between 6 and 33 %. The intra-individual variations of both parameters were higher in female than in male subjects and were found to be mostly moderate. We found that the intra-individual variations of the GH-2000 test scores, expressed as CV, ranged from 4 to 36 % and were in most of the subjects markedly smaller than the inter-individual variation. Individual cut-offs for the GH-2000 scores would be lower than population based ones in most of the cases.

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