

## **PROJECT REVIEW**

### **“Determination of Inter-Day Variations in hGH Markers in Athletes”**

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Human growth hormone (hGH) is assumed to be abused as an anabolic hormone among athletes to enhance their physical performance.

Several methods to detect hGH doping are under development, among others the “Marker approach”.

Application of hGH effectuates a number of processes in the organism, which can lead to changes in the concentration of peptides and proteins. Some of these parameters measurable in serum are insulin-like growth factor I (IGF-I), acid labile subunit (ALS), IGF-binding protein-3, N-terminal propeptide of the type III procollagen (PIIINP), crosslinks (ICTP) and osteocalcin.

The concentration of these markers vary inter-individually. Therefore it is impossible to discriminate between treated and untreated athletes using only one of these markers. As a consequence, it is necessary to calculate a discriminant function combining some of these parameters. As a result of our hGH application study with 15 athletes, we published recently a discriminant function which separated hGH-treated and placebo-treated subjects clearly.

On the other hand there are indications that some markers are influenced by physical activities. As shown in some studies, acute physical stress influences the levels of these markers not very strong and only temporarily, but there are no data concerning the effects on long-term variation in physical stress (e.g. changes in intensity, category of physical activity, intermission and restart of training) on the parameters until now.

The proposed study will give information about the long-term intra-individual variations of hGH markers and about the effects of long-term changes in physical activities on the hGH marker level.

# **Determination of the inter-day Variation in hGH Markers in Athletes**

## **Results and Conclusions**

Concluding the results of the present study we can say:

1) The adaptation of the body to heavy physical stress can be observed in alterations of the marker levels caused by strong changes in intensity and category of the training workload.

2) The evaluation of possible suspicious cases in doping analysis has to be based on the following factors:

1. the concentrations of both single markers IGF-I and PIIINP,
2. the test score of a discriminant function,
3. the individual profile of the athlete.