Irisin concentration in children with GHD before and on rhGH therapy

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Introduction

In recent years, one of the most frequently studied focuses is the pathophysiology of adipose and muscle tissue; however, in the literature there is no report about regulatory proteins (myokines/adipomyokines), which expression affects the body's metabolism and communication between tissues especially in children population.
Irisin (Ir) is one of the adipomyokines, which induces the conversion of white adipocytes into beige adipose tissue, and Ir deficiency may be a factor contributing to the development of metabolic diseases.

Aim

The aim of the project was to evaluate the effect of rhGH treatment on Ir concentration in children with GHD in relation to the selected bone parameters.

Study group and rhGH treatment

The study group consisted of 78 patients (boys 45, girls 33) with GHD diagnosed in one pediatric tertiary center.
Their median age was 7.43 years [4.88;10.48].
The control group consisted of 24 children of a similar age and sex.
Patients with GHD were treated with rhGH given subcutaneously once daily at bedtime, in a dose 0.023 mg/kg/day.
The dose of rhGH was adjusted to body weight every 3 months.
No other medication was conducted during the study.
Patients with coexisting endocrine diseases or other conditions which could interfere with estimated parameters were excluded.

The description of GHD group and control group

	GHD group (n=78) before rhGH	Control group (n=24)	p
Age		7.18 [5.60;9.18]	0.422
Height [cm]	111 [104;127]	127 [115;141]	0.002
Height SDS	-2.86 [-3.13;-2.39]	0.46 [-0.22;1.06]	0.000
BMI	15.33 [14.47;16.68]	16.9 [14.91;19]	0.045
BMI SDS	-0.2 ± 1.43	0.73 ± 1.76	0,007
Irisin	9.02 [7.71;10.14]	8.08 [6.53;11.22]	0,296
IGF-1 SDS	-1.64 [-1.99;-1.31]	-0.81 [-1.54;-0.48]	0.000
IGFBP-3 SDS	-0.66±0.89	-0.17±0.55	0.002
25-OHVitaminD	26.4 [23.4;31.5]	28.55 [22.3;34.5]	0.54
PTH	24.9 [17.25;31.55]	23.25[14.9;31.0]	0.611
Calcium	9.8 [9.4;10.1]	9.6 [9.45;9.9]	0.351
Phosphate	4.54 [4.12;4.9]	4.7 [4.4;4.9]	0.385
Alkaline phosphatase	189 [169;225]	239 [179;281.5]	0.006

The description of GHD group, before and after rHGH

	GHD group (n=78) before 6 month rhGH	GHD group (n=78) after 6 month rhGH	p
Age	7.43 [5.88;10.48]	7.92 [6.37;10.95]	0.186
Height [cm]	111 [104;127]	117 [108;131]	0.030
Height SDS	-2.86 [-3.13;-2.39]	-2.37 [-2.72;-2,00]	0.000
BMI	15.33 [14.47;16.68]	15.49 [14.43;16.65]	0,924
BMI SDS	-0.36 [-1.16;0.77]	-0.49 [-1.42;0.32]	0,329
Irisin	9.02 [7.71;10.14]	8.74 [7.21;10.37]	0,621
IGF-1 SDS	-1.64 [-1.99;-1.31]	-0.75 [-1.31;-0.17]	0.000
IGFBP-3 SDS	-0.66±0.89	-0.06±0.84	0.000
25-OHVitaminD	26.4 [23.4;31.5]	26.45 [21.40;34.50]	0.796
PTH	24.9 [17.25;31.55]	23.5 [17.10;33.20]	0.971
Calcium	9.8 [9.4;10.1]	9.70 [9.50;10.00]	0.503
Phosphate	4.54 [4.12;4.9]	4.80 [4.40;5.10]	0.007
Alkaline phosphatase	189 [169;225]	240.00 [212;289]	0.000

Measurements

Prior to and following a period of 6 months of treatment with rhGH anthropometrical data were recorded, and biochemical parameters were measured: Irisin (ug/ml), IGF-1 (ng/ml), IGFBP-3 (ug/ml), 25-OHvitaminD (ng/ml), PTH (pg/ml), calcium (mg/dl), phosphate (mg/dl), alkaline phosphatase (U/l).
Blood was sampled in the morning in fasting conditions.
SDS for height, BMI, IGF-1, and IGFBP-3 was calculated.
The obtained data was subjected to statistical analysis.

Results

We did not find statistically important difference in Ir concentration between GHD children and control group.
Of the 78 children with GHD we did not observed any significant difference in Ir levels between neither the age groups nor the sex groups (boys and girls). We did not find any association between Ir and BMI or bones markers.

Conclusions

The replacement doses of rhGH applied in children with GHD do not significantly affect the concentration of Ir.
It seems valuable to extend the observation period during rhGH therapy.