"EFFECTS OF GROWTH HORMONE TREATMENT ON IMMUNITY."

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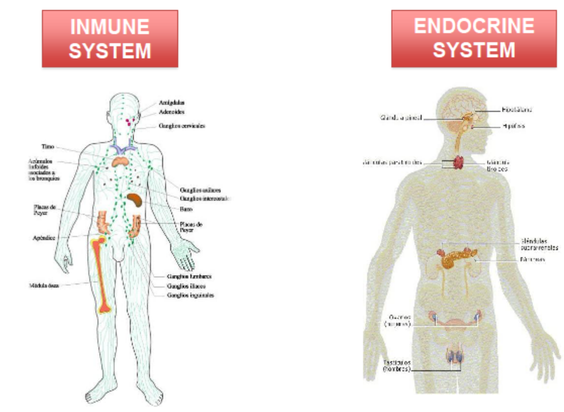
Introduction

- As well as **acting** on longitudinal growth, growth hormone (**GH**) also has a number of metabolic effects, and is involved in the regulation, functioning and development of the **immune system**.
- The immune system and the endocrine system share a number of ligands and receptors, so that there is a bidirectional **communication between them**. GH and IGF-1 are secreted by several immunocompetent cells, act by regulating the development and function of the immune system and also their receptors are expressed on other cells and organs of the immune system.
- Both have a direct and complex **influence** on peripheral immune cells and central **immune organs**.

Figure 1- Rrelationship between the endocrine and immune system.



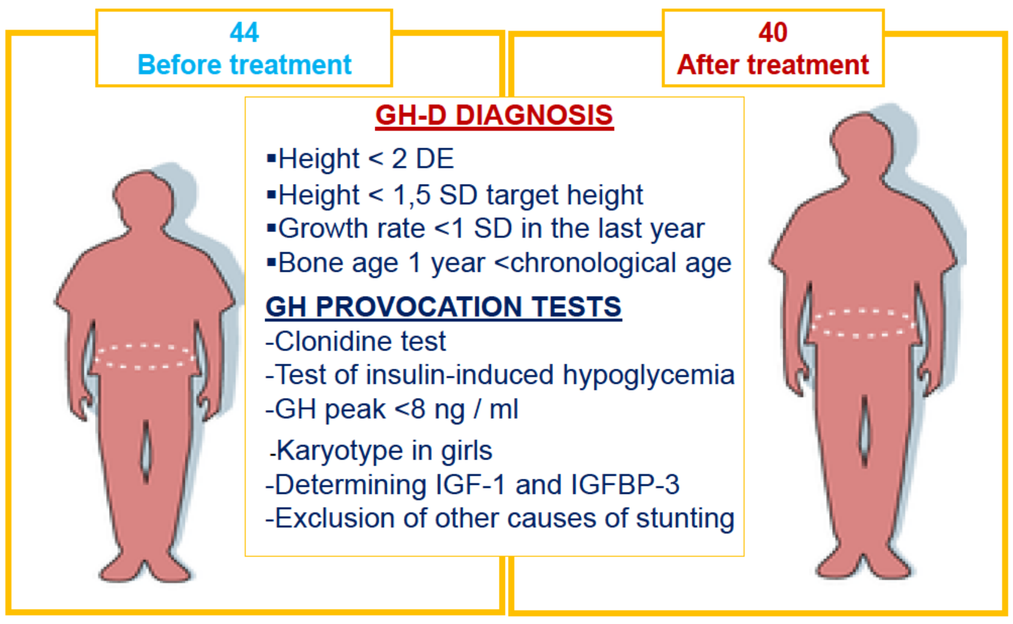
Object

"To evaluate the **immune** profile in **GH-deficient children** **after** six months' GH treatment."

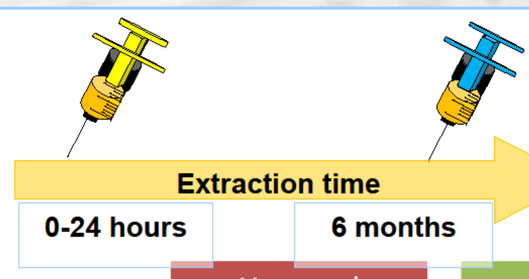
Subject

44 pre-pubertal children with **GH-deficient**.

Age: 11,12 años ±2,37. Gender: 44% male and 56% femele.



Methods



1 **Blood collection:**

Humoral Immunity	Cellular Immunity	Hormones

• IgA
• IgG
• IgM
• C1 inhibitor
• C3 y C4
	• **Count leukocytes**
	• lymphocytes
	  • monocytes
	  • neutrophils
	• **Lymphocyte subpopulations**
	  • CD3+
	  • CD4+
	  • CD8+
	  • CD4+/CD8+
	  • CD19+
	  • NK
		• IGF-1
		• IGFBP-3

Results

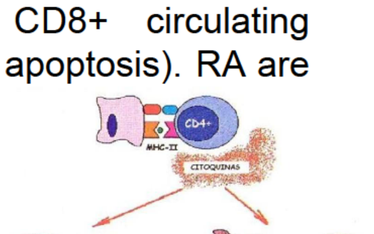
After 6 months' GH therapy, a significant reduction was observed in IgG and IgM, together with a significant increase in IGF-1 ($p<0.05$). A moderate decline in CD3+, CD4+, CD8+, CD19+ and NK cell levels was also recorded. (Table 1)

Table 1. Comparison of the humoral and cellular immunity, IGFBP-3 and IGF1 before and after six months after treatment

	BEFORE	AFTER TREATMENT	p
Leucocitos / µl	6408,00 ± 1283,85	6732,80 ± 1546,77	0,337
Linfocitos / µl	3652,00 ± 5843,31	2487,20 ± 580,60	0,182 +
Monocitos / µl	404,80 ± 104,72	450,00 ± 166,43	0,178
Neutrófilos / µl	3109,20 ± 937,59	3397,60 ± 1403,57	0,381
IgM (mg/dl)	**137,48 ± 65,85**	**125,21 ± 58,45**	**0,047 ***
IgG (mg/dl)	**985,68 ± 152,60**	**938,76 ± 163,03**	**0,012 ***
IgA (mg/dl)	125,44 ± 36,82	119,46 ± 32,25	0,086
C1 inhibidor (mg/dl)	33,35 ± 6,11	31,51 ± 5,19	0,159
C3 (mg/dl)	114,91 ± 13,57	112,02 ± 17,68	0,384
C4 (mg/dl)	22,22 ± 7,17	20,07 ± 6,60	0,193
CD8 (cel/mm)	603,42 ± 223,98	563,00 ± 152,16	0,289
CD4 (cel/mm)	915.47 ± 335.39	876.56 ± 241.84	0.422
CD4/CD8 (cel/mm)	1,55 ± 0,34	1,58 ± 0,30	0,451
CD3 (cel/mm)	1621,69 ± 544,22	1534,72 ± 375,96	0,314
NK (cel/mm)	342,97 ± 174,71	311,78 ± 122,33	0,583 +
CD19 (cel/mm)	308,81 ± 108,30	296,86 ± 123,94	0,620
IGFBP-3 (µl/ml)	2,40 ± 0,53	2,39 ± 0,87	0,998
IGF-1 (ng/ml)	**218,47 ± 114,92**	**369,56 ± 161,34**	**0,000 ***

+ realizado mediante test no paramétrico* $p < 0,05$.

In healthy individuals, the CD4+ lymphocytes account for 60% (have a general regulatory function of immunity) and CD8+ circulating lymphocytes for 30% (inducing apoptosis). RA are virgins cells because they have never come into contact with the antigen while RO has that condition with the antigen and become effector.



Analysis of CD4+ and CD8+ lymphocyte subpopulations grouped by positive cell:

a) Counts above normal values revealed significantly elevated levels prior to treatment; after 6 months' treatment, values had fallen to levels not significantly different from normal. (Figure 3a)
b) Subpopulations grouped by positive cell counts below normal values also rose to near-normal values after treatment. (Figure 3b)

Figure 3b) Grouping of lymphocyte subpopulation below normal values.

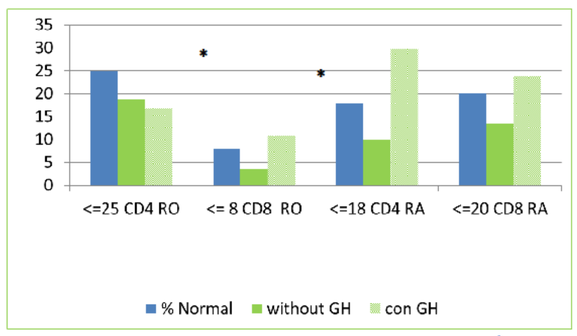
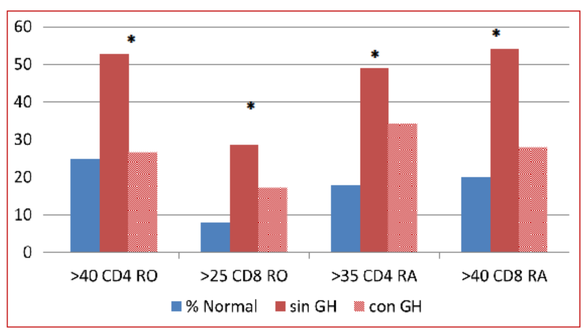
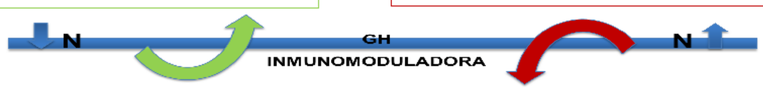


Figure 3a) Grouping of lymphocyte subpopulation above normal values.





CONCLUSIONS

1. **These findings confirm changes in the immune system of GH-deficient children treated with rhGH.**
2. **GH exerts immunomodulatory effects, and plays an important role in homeostasis, affecting the immune system; GH therapy normalises peripheral-blood CD4+ and CD8+ levels.**
3. **The precise mechanism through which GH modulates the immune system remains unknown, and should be addressed in future, broader-based research.**

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GH and IGF Treatment

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