“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.

Object

“To evaluate the immune profile in GH-deficient children after six months’ GH treatment.”

Subject


Results

Analysis of CD4+ and CD68 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)

CONCLUSIONS

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.

Methods

Blood collection:

Humoral Immunity

• Proteins
• IgG
• IgM
• C1 inhibitor
• C3 and C4

Cellular Immunity

• Count leukocytes
• Lymphocytes
• Monocytes
• Neutrophils
• Lymphocyte subpopulations
• CD4+ (CD4+ or CD8+)
• CD4+ or CD8+ (CD4+/CD8+ or CD8+/CD4+)
• NK

Hormones

• IGF-1
• IGFBP-3

Figure 1 - Relationship between the endocrine and immune system.

Figure 2a) Grouping of lymphocyte subpopulation above normal values.

Figure 2b) Grouping of lymphocyte subpopulation below normal values.

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

<table>
<thead>
<tr>
<th></th>
<th>BEFORE</th>
<th>AFTER TREATMENT</th>
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<tbody>
<tr>
<td>LMW IgG (mg/dL)</td>
<td>310.45 ± 61.31</td>
<td>130.11 ± 44.15</td>
<td>0.047</td>
</tr>
<tr>
<td>HMW IgG (mg/dL)</td>
<td>215.14 ± 60.58</td>
<td>83.76 ± 165.38</td>
<td>0.031</td>
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<tr>
<td>IgG (mg/dL)</td>
<td>125.48 ± 58.32</td>
<td>119.84 ± 32.25</td>
<td>0.065</td>
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<tr>
<td>C1 inhibitor (mg/dL)</td>
<td>31.21 ± 5.29</td>
<td>31.21 ± 5.29</td>
<td>0.129</td>
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<tr>
<td>C1 (mg/dL)</td>
<td>114.9 ± 13.57</td>
<td>112.67 ± 17.58</td>
<td>0.194</td>
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<tr>
<td>C4 (mg/dL)</td>
<td>22.2 ± 7.71</td>
<td>20.67 ± 6.40</td>
<td>0.103</td>
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<tr>
<td>CD8+ (mmol/L)</td>
<td>488.43 ± 225.96</td>
<td>563.68 ± 122.54</td>
<td>0.259</td>
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<tr>
<td>CD8+ (cells/mm³)</td>
<td>815.47 ± 355.29</td>
<td>876.56 ± 244.84</td>
<td>0.427</td>
</tr>
<tr>
<td>CD4+ vs CD8+ (cells/mm³)</td>
<td>1.55 ± 0.43</td>
<td>1.58 ± 0.43</td>
<td>0.451</td>
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<tr>
<td>CD4+ vs CD8+ (cells/mm³)</td>
<td>1521.69 ± 582.33</td>
<td>1514.70 ± 750.96</td>
<td>0.314</td>
</tr>
<tr>
<td>NK (cells/mm³)</td>
<td>342.97 ± 174.71</td>
<td>311.78 ± 122.53</td>
<td>0.505</td>
</tr>
<tr>
<td>CD16+ (cells/mm³)</td>
<td>388.91 ± 106.30</td>
<td>296.86 ± 123.91</td>
<td>0.620</td>
</tr>
<tr>
<td>CD16+ (cells/mm³)</td>
<td>2.46 ± 0.83</td>
<td>3.39 ± 0.78</td>
<td>0.008</td>
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</tbody>
</table>

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.