Immune Power for Kids!

The human immune system

- Palatine and pharyngeal tonsils
- Thymus
- Phagocytes and killer cells in the tissue
- Bone marrow
- Lymph nodes
- Lymphatic system
- Spleen and intestines
- Antibodies in the blood (complement)
Unspecific Defense

Neutrophil granulocytes
- phagocytizing cells
- are eliminated during immune defense (pus)

Macrophages (called monocytes in the blood)
- phagocytosis and lysosomal digestion
- involved in specific defence (antigen presentation)

Natural killer cells
- specific large lymphocytes
- produce perforins
- defense against viruses, bacteria and tumor cells
Defence against infection

- epithelial integrity (mucous membranes, skin)
- activity of immune cells
- production of immune cells
- antioxidant protection

Specific Defense by B-lymphocytes

- B lymphocytes produce antibodies
- Antibodies cling specifically to germs
- Marked germs are identified more easily by phagocytes and subsequently destroyed
Specific defense

T Lymphocytes:

Helper T Cells ("Cellular managers of the immune system")
- recognize foreign substances at the MHC receptor of antigen-presenting cells
- produce interleukins
- give the starting signal for natural killer T cells and the production of the majority of antibodies

Natural Killer T Cells
- cytotoxic cells
- destroy body’s own cells and dedifferentiated tumor cells

Specific defense

B Lymphocytes:
- precursors of antibody-producing plasma cells
- antigen specificity → production of specific antibodies

Antibodies
- IgA, IgD, IgE, IgG, IgM
- released into plasma and surrounding body fluid
- labeling of target cells for nonspecific defense (so-called opsonization)
- activation of the complement system

T and B memory cells
- responsible for acquired immunity
**Complement System**
- consists of more than 20 different plasma proteins
- effects → lysis of bacteria
  → triggering of local inflammatory response

**Cytokines:** "transmitters and regulators"
- interferons
- interleukins
- tumor necrosis factors
- colony-stimulating factors
- chemokines
- transforming growth factors

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**Antioxidants: collaboration at molecular level**

**Non-enzymatic**
Micronutrients:
- vitamin C
- vitamin E
- carotenoids
- polyphenol
- coenzyme Q10

**Enzymatic**
Trace elements involved:
- selenium
- copper
- manganese
- zinc
When do children need micronutrients?

In certain circumstances, the increased need for micronutrients cannot be met by a normal diet.

For example, this is the case with frequently recurrent infections such as common colds and middle ear infections.

Therapeutic objectives:

Nutritional medicine showing the way out of the infection spiral

- Recurrent infectious diseases
- Impaired immune system
- Balanced immunospecific micronutrients

Orthomol Immun junior
Kids' nutrition – a big problem today

Average amounts of dietary fruit and vegetables compared to the recommended amount

KiGGS Survey 2007
Micronutrients and the immune system (1/3)

Vitamins E and C, mixed carotenoids
• Scavenge and neutralize “free radicals”
• Assist immune cells in their function as natural antioxidants
• Contribute to cell protection
• Promote the immune defenses

Bioflavonoids
• Support the effects of vitamin C as natural antioxidants
• Scavenge “free radicals”, and thus protect cells against damage

Micronutrients and the immune system (2/3)

Zinc, selenium, manganese, copper and iron
• Influence the activity of the immune cells as important components of antioxidant enzymes

Calcium and magnesium
• Important for the build-up of bones
• Important for muscle and nerve functions
Micronutrients and the immune system (3/3)

**B vitamins**
- Support the energy metabolism

**Vitamin A**
- Contributes to the integrity of the skin and mucous membranes

**Vitamin D**
- Important for the immune system

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**Features and characteristics of the micronutrients**

<table>
<thead>
<tr>
<th>The most important micronutrients in each daily serving</th>
<th>Features and characteristics of the micronutrients they:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin E, Vitamin C, Mixzel, Camomillaids</td>
<td>scavenge and neutralize free radicals</td>
</tr>
<tr>
<td></td>
<td>enhance cell protection</td>
</tr>
<tr>
<td></td>
<td>support the immune defence</td>
</tr>
<tr>
<td>Brilliavoids</td>
<td>as natural antioxidants support the effect of vitamin C</td>
</tr>
<tr>
<td></td>
<td>capture free radicals</td>
</tr>
<tr>
<td>Zinc</td>
<td>as important components of enzymes with an antioxidant effect</td>
</tr>
<tr>
<td></td>
<td>they have a beneficial influence on the immune cell activity</td>
</tr>
<tr>
<td>Selenium</td>
<td>protect the integrity of mucous membranes and cell division as well as cell differentiation</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>are important for the immune system</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>are important for building bones and teeth</td>
</tr>
<tr>
<td>Calcium</td>
<td>are important for the function of muscles and nerves</td>
</tr>
</tbody>
</table>
Micronutrients in children with acute pneumonia


Significantly reduced micronutrient concentrations in the serum of sick children (chronic rhinosinusitis) compared to healthy children


Frequently recurrent infectious diseases stress the immune system and increase the need of micronutrients
Orthomol immun junior can help to

By means of nutritional support, Orthomol® Immun junior can help to:

• Neutralize an increased number of free radicals
• Fight infections more effectively
• Shorten the duration of disease

Orthomol immun junior®

The micronutrient combination for children suffering from frequently recurrent infectious diseases

• immunospecific combination
• balanced dosage
• in a form of administration convenient for children
Composition

Daily serving of 3 chewable tablets (4 g)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Daily Serving</th>
<th>per 100 g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A</td>
<td>300 µg (10,000 IU)</td>
<td>10 µg</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>200 mg</td>
<td>100 mg</td>
</tr>
<tr>
<td>Vitamin D3</td>
<td>5 µg (500 IU)</td>
<td>10 µg</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>10 mg</td>
<td>2.5 mg</td>
</tr>
<tr>
<td>Minerals and Trace Elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>120 mg</td>
<td>7.5 mg</td>
</tr>
<tr>
<td>Magnesium</td>
<td>38 mg</td>
<td>0.14 mg</td>
</tr>
<tr>
<td>Selenium</td>
<td>15 µg</td>
<td>0.75 µg</td>
</tr>
<tr>
<td>Iron</td>
<td>1 mg</td>
<td>0.5 mg</td>
</tr>
<tr>
<td>Zinc</td>
<td>5 mg</td>
<td>0.25 mg</td>
</tr>
<tr>
<td>Copper</td>
<td>0.5 mg</td>
<td>0.025 mg</td>
</tr>
</tbody>
</table>

Medical Claim

Orthomol® Immun junior is a dietary food for special medical purposes. Orthomol® Immun junior is suitable for the dietary management of frequently recurrent infections (such as middle ear infections, common colds) in children from the age of four.