

INFLUENCE OF INULIN-NUTRIMED UPON IMMUNOLOGIC STATUS, LEVEL OF CHOLESTEROL AND TRIGLYCERIDES IN BLOOD SERUM OF PATIENTS WITH AUTOIMMUNE THYROIDITIS

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Since the time when phytogetic nutritional agents of foreign origin entered the Ukrainian market, interest to such preparations has noticeably increased. Suffice it to say that for the last decade a new impulse there has been gained by phytotherapy, the scientists have already developed and proposed the phytogetic preparations that are analogous to foreign nutritional preparations. Preliminary tests of these preparations at various clinics testify their significant efficiency not only as prophylactic agents but as medicinal preparations.

Since ancient times the phytogetic preparations have been used as medicinal agents in Ukraine. Suffice it to name such preparations as cholagogic and diuretic teas, hawthorn (*Crataegus L.*), peony tincture, Aphrositin, Immunal, etc. At the same time, facing the ecological situation in Ukraine, the need for such preparations is growing, since, in most cases of their application, they have positively influenced metabolic processes in the body, regulated the body immune status and removed residues from the body, including the radio nuclides.

With this aim in mind, the **Nutrimed Company** has offered its new preparation **Inulin-Nutrimed**. Preliminary research has shown that this preparation has a positive influence upon the carbohydrate metabolism, improves the immunologic status and lipid metabolism. The active agent of the **Inulin-Nutrimed** is polysaccharide inulin extracted from the plants growing on the territory of Ukraine. Hence, we have set the aim to study in detail the influence of inulin upon the state of immunity and lipid metabolism in patients with autoimmune thyroiditis. The choice of the patients for examination was determined by the fact that the autoimmune thyroiditis relates to the category of illnesses wherein the development of the pathologic process is conditioned by the weakening of the immune system under the impact of negative factors of the environment.

Materials and Methods

12 patients with autoimmune thyroiditis at the stage of the illness remission have been examined. With the aim of studying the influence of **Inulin-Nutrimed** on the state of immunity, both before and after the course of treatment, we determined the absolute number of immunocompetent lymphocytes in the blood, percentage of T-helpers and T-suppressors, as well as the number of B-lymphocytes. The condition of humoral immunity was estimated by the level of gamma- globulins A, M, G in the blood serum.

To study the influence of **Inulin-Nutrimed** on the lipid metabolism, we determined the amount of cholesterol and triglycerides in the blood serum within the above said period.

Same examinations were carried out also for 20 practically healthy persons. The obtained data were

treated statistically.

We have also studied the preparation efficiency in relation to the dosage. With that end in view, a group of patients (6 persons) was prescribed **Inulin-Nutrimed** on the basis of 5 capsules per day, and the remaining six persons received the dosage increase up to 10 capsules per day.

Results and their Interpretations

The data we have obtained supports the opinion that for the patients with autoimmune thyroiditis the number of immunocompetent T- lymphocytes does not differ from that of the control group and it does not change under the influence of Inulin. Both before and after the applied course of treatment, irrespective of the preparation dosage, the number of T-lymphocytes remains within the normal limits (see the Table below).

The characteristic feature of changes in the immunogramme in the presence of autoimmune thyroiditis is the increase in number of helpers against a background of decrease in T-suppressors. Such a shift in the immunogramme promotes intensification of destruction processes in the thyroid gland tissues, increase of antigen titer in the blood. Decline of the lymphocytes T-suppressor function does not allow to restrain this process at some concrete level as it is observed in healthy persons, so the process gains its chronic flow. The increased number of auto antigens contributes to increase in activity of B-lymphocytes that are responsible for production of antibodies to the thyroid gland tissues. Thus, the process gets into an exclusive circle which is practically impossible to break without applying the agents that would suppress the autoantibody formation or would block functioning of the target organ, which in our case is the thyroid gland.

The data we have obtained also proves the fact that the patients with autoimmune thyroiditis, those we have examined, are noted to have the function of their T-helper lymphocytes intensified and the function of their T-suppressor lymphocytes decrease. So, before administrations of **Inulin-Nutrimed**, the average number of T-helpers in these patients was 36.7 ± 3.72 %, which practically did not differ from that of the control (37.8 ± 1.16 %, $P > 0.1$), whereas the number of T-suppressors in these patients turned out to be significantly decreased and amounted only to average 14.2 ± 2.28 % ($P < 0.01$ as compared to the control). But, though there took place in our patients some re-distribution of T-lymphocytes in favor of T -helpers, their correlation (ratio) turned out to be within the limits of feasible fluctuations (1.77 ± 0.61 for the patients and 1.98 ± 0.52 for the control, $P > 0.1$).

It should be noted that due to of high T-helper concentration significant increase in the number of B-lymphocytes responsible for reaction as to the antigen takes place. So, the patients had the average number of their B-lymphocytes equal to 28 ± 2.12 , whereas those of the control did not exceed 23 ± 1.12 ($P < 0.05$)

Upon application of the treatment course, the immunogramme of the patients substantially changed. It turned out that under the influence of **Inulin-Nutrimed** the total amount of T-active cells gets increased in number (see the Table). So, if before the treatment percentage of the latter was about 49.5 ± 2.25 %, then after the treatment this number increases up to 55.3 ± 2.68 % ($P < 0.05$ in both cases).

Indices of immunity, cholesterol and triglycerides in the blood serum of the patients with autoimmune thyroiditis before and after applied course of treatment with Inulin-Nutrimed during 30 days (n=12)

Indices	Before treatment: M ± m	After treatment: M ± m	Control M ± m	P	P ₁	P ₂
Blood lymphocytes						
Absolute number	1608 ± 231	1816 ± 88	1620 ± 257	0.1	0.1	0.1
T-lymphocytes, %	49.5 ± 2.25	55.3 ± 2.68	48.7 ± 1.42	0.1	<0.05	<0.05
T-helpers, %	36.7 ± 3.72	24.4 ± 3.48	37.8 ± 1.16	0.1	<0.01	<0.05
T-suppressors, %	14.6 ± 2.28	29.2 ± 2.33	20.9 ± 1.05	<0.01	<0.05	<0.01
T-h /T-s ratio	1.77 ± 0.61	1.34 ± 0.37	1.98 ± 0.52	0.1	0.1	0.1
B-lymphocytes, %	28 ± 2.12	22 ± 2.04	23 ± 1.18	<0.05	0.1	<0.05
Immunoglobulins						
A, g / l	2.83 ± 0.38	2.77 ± 0.29	2.52 ± 0.22	0.05	0.1	0.1
M, g / l	1.56 ± 0.38	1.57 ± 0.17	1.28 ± 0.09	0.05	0.05	0.1
G, g / l	19.63 ± 1.84	14.69 ± 1.15	11.42 ± 0.52	<0.01	<0.01	<0.05
Cholesterol, (mmole / l)	6.6 ± 0.92	5.73 ± 1.25	4.19 ± 0.57	<0.05	<0.05	0.1
Triglycerides, (mmole / l)	1.41 ± 0.33	1.27 ± 0.25	1.16 ± 0.19	0.1	0.1	0.1

P - difference adequacy as to the control, before treatment;

*P*₁ - difference adequacy as to the control after the course of treatment;

*P*₂ - difference adequacy for patients with autoimmune thyroiditis before and after the course of treatment.

Under the influence of **Inulin-Nutrimed**, the re-distribution of the lymphocytes according to their functional features takes place. A noticeable decrease in number of T-helpers, destroyer-cells of thyrocytes (up to 24.4 ± 3.48 % as compared to 36.7 ± 3.72 % before the treatment and 37.8 ± 1.16% in the control (P < 0.05 and P < 0.01 respectively)) has been observed. Along with this, there was a notable increase in percentage of T-suppressors that are inhibitory to destructive impact of T-helpers. So, before the **Inulin-Nutrimed** treatment, T-suppressors made up only 14.6 ± 2.28 %, whereas after the treatment this percentage increased up to 29.2 ± 2.33 %, which is reliably higher as compared both to the that of the initial (P < 0.01) and of the control (P < 0.05).

After the **Inulin-Nutrimed** treatment, a decrease of B-lymphocytes amount has been also observed. So, if before the treatment their number did not differ from that of the control, then after the treatment their number dropped to 22.2 ± 2.04 (P < 0.05 as compared to the control and that of before treatment).

Thus, the data we have obtained testify to the fact that **Inulin-Nutrimed** exerts positive influence on the condition of cellular immunity.

As to the preparation dosage, we have not noticed any better effect with its dose increased up to 10 capsules. The cellular immunity indices remained the same, irrespective of the dosage increase.

As confirmation to the above said, the data of humoral immunity condition can be cited. Along with the normal indices of the amount of immunoglobulins A and M, the percentage of immunoglobulins G for patients with autoimmune thyroiditis turned out to be increased, which proves the high activity

of antibody formation indirectly. So, before the course of **Inulin-Nutrimed** treatment the amount of globulin G was on average 19.63 ± 1.84 g / l, whereas for the healthy persons it reached 11.42 ± 0.52 g / l ($P < 0.01$) in average. After the course of treatment, the amount of globulin G noticeably decreases (to 14.69 ± 1.15 g / l) though it continues to remain higher as compared to that of the control ($P < 0.01$).

Thus, the humoral immunity data confirm presence of positive effect upon the immunological mechanisms of the response, which can also be traced in the cellular immunity research.

As to the data obtained in research regarding the lipid metabolism, it has been revealed that the patients with autoimmune thyroiditis appeared to have the cholesterol level in their blood increased both before and after the treatment.

Absence of **Inulin-Nutrimed** effect on the lipid metabolism can be explained by the fact that along with this disease the latent hypothyreosis can often occur defined by the increase of cholesterol level in the blood. In such cases, the decrease of cholesterol level can be expected only in case of application of substitutive therapy with thyroid hormones. Amount of triglycerides in the blood serum of these patients did not differ from that of the control both before and after the applied course of **Inulin-Nutrimed** treatment.

Summary

1. **Inulin-Nutrimed** exerts regulating influence upon both cellular and humoral immunity due to:
 - increasing the number of T-active lymphocytes;
 - decreasing the amount of T-helpers in percentage;
 - increasing the number of T-suppressors;
 - decreasing the activity of B-lymphocytes;
 - decreasing in quota of gamma-globulins G which include the antibodies to foreign tissues.
2. The optimal dose for **Inulin-Nutrimed** is 5-6 capsules per day. Dosage increase, as to our data, has no effect neither upon the state of the immune mechanisms, nor on the lipid metabolism.

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