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JIF = 1.500	SJIF (Morocco) = 2.031	

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2018 Issue: 05 Volume: 61

Published: 30.05.2018 <http://T-Science.org>

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THE EFFECT OF PHYTOECDYSTEROIDS TO THE TOTAL NUMBER OF CELLS IN SOME CENTRAL AND PERIPHERAL ORGANS OF MICE IMMUNITY

Abstract: The phytoecdysteroids studied by us (their total preparations) have aptitude (capability) to increase the number of cells in the central (thymus, bone marrow) and peripheral (spleen, lymph nodes) organs of immunity.

Key words: individual phytoecdysteroids, total phytoecdysteroids, immunal, T-activin, thymus, bone marrow, lymph node, immunity, mice.

Language: English

Citation: Shakhmurova GA (2018) THE EFFECT OF PHYTOECDYSTEROIDS TO THE TOTAL NUMBER OF CELLS IN SOME CENTRAL AND PERIPHERAL ORGANS OF MICE IMMUNITY. *ISJ Theoretical & Applied Science*, 05 (61): 376-378.

Soi: <http://s-o-i.org/1.1/TAS-05-61-63> **Doi:**  <https://dx.doi.org/10.15863/TAS.2018.05.61.63>

Introduction

It is well known that many plant extracts, tinctures and individual compounds that have a general strengthening effect on the body (extract of eleutherococcus, ginseng, echinacea, cyclobaran glycosides, pectins, flavonoids, etc.) also manifest themselves as effective immunostimulating agents [2, p. 19; 3, p.371; 9, p.134; 10, p. 289].

We examined the effect of phytoecdysteroids to the total quantity of cells as an individual and summary in the central and peripheral organs of mice immunity.

The experiment was performed on white mongrel mice; their weight is 18-22 grams. Each test group consisted of 10 animals. The animals were kept on a standard ration of the vivarium.

We used the thymus-dependent antigen of erythrocyte of ram (sheep) (ER) in the experiments. Before immunization the ER was centrifuged twice at 1000 turnover for 10 minutes in medium of 199 or in physiological solution. ER was introduced once time to inside peritoneum at a dose of 2×10^8 cells per mouse.

Materials and Methods

Individual phytoecdysteroids were used in the work: 2-deoxy- α -ecdysone, α -ecdysone, sileneozides A and B, integristeron A, ecdysterone, turkesteron, isolated respectively from *Silene praemixta* M.Pop., *Silene brahuica* Boiss., *Rhaponticum carthamioles*

(Willd) Iljin, *Ajuga turkestanica* (Rgl.) Brig [1, p.893; 8, p. 3; 11, p.466], as well as, the total ecdysteroid-containing preparation (TEP) from *Silene viridiflora* (containing ecdysterone, sileneozides A, D, polypodin B and others) [4, p.150] – TEP-1, from *Silene brahuica* Boiss (contains ecdysterone, sileneozides A, B, C, D, E, α -ecdysone-2,2-sulfate and others) [8, p. 3] – TEP-2 and from *Ajuga turkestanica* (Rgl.) Brig (contains ecdysterone, turkesteron, cyasterone, 22-acetylcyasterone and others) [11, p.466] – TEP-3. All ecdysteroid-containing substances were input to animals by means of a special probe into the stomach. The reference preparations were served as immune stimulating agents of T-activin (input by intraperitoneally) and immunal (input orally) in the determination of the immunotropic action of phytoecdysteroids [5, p.990; 7, p.449]. By counting of the total quantity of cells in the central and peripheral organs of immunity, the quantity of erythrocytes and leukocytes in peripheral blood, we determined the titer of antibody in the reaction of hemagglutination [6, p.104].

Statistical processing of the received data was carried out on a personal computer by using t-test of Student's.

As installed in our experiments (Figure – 1), the number of cells in the thymus of the mice of the control group is about $28,4 \pm 2,8 \times 10^6$. Under the action of 2-deoxy- α -ecdysone, the number of



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thymocytes is unreliably increased by 1.17 times. The four subsequent compounds increase the number of thymocytes approximately in the same range (IS=1,25-1,34). The IS (Index of Stimulation) corresponds to 1,50-1,60 for ecdysterone and turkesterone.

The total ecdysteroid-containing preparations were more effective in this case, as and in the evaluation of their immunotropic effecting on the number of AFC (Antibody forming cells) in the

spleen. TEP-1, TEP-2 and TEP-3 increase the cellularity of the thymus by 1,63, 1,69 and 1,81 times. T-activin increases the number of thymus cells by 1,32 and only 2-deoxy- α -ecdysone, α -ecdysone, integristeron A and sileneozide A will surpass by activity in this plan. Immunal somewhat increases the number of thymus cells, and in addition to the abovementioned compounds surpass else and sileneozide B.

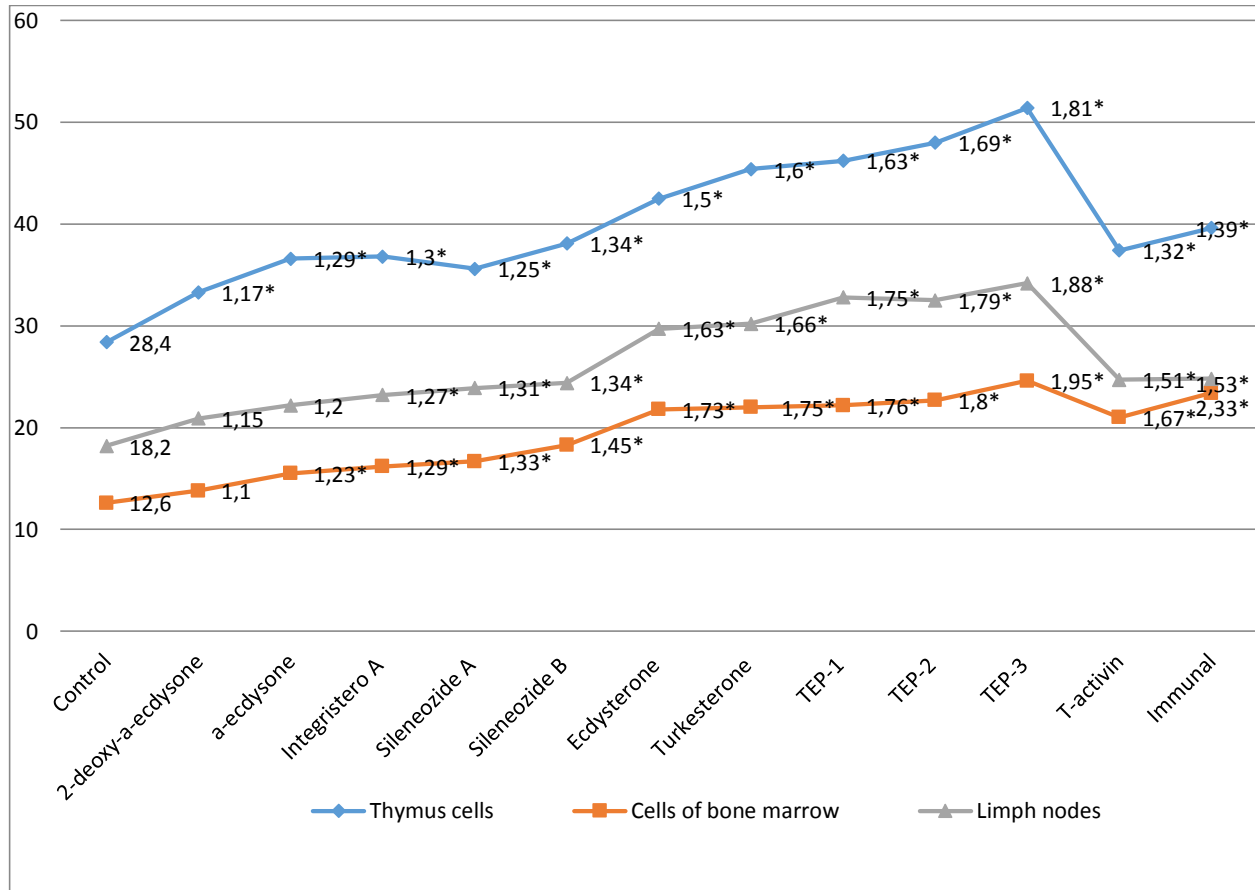


Figure – 1. Influence of phytoecdysteroids to the number of cells in the central and peripheral organs of immunity in mice.

* - authentically in relation to the control ($p < 0,05$)

Ecdysterone, turkesteron and three of the researching total ecdyster-containing preparations excel on its effect of both reference - preparations.

On the figure in the control group of mice the number of cells in the bone marrow is equal to $12,6 \pm 1,1 \times 10^6$. 2-deoxy- α -ecdysone and α -ecdysone are unreliably by 1,10 and 1,23 times increase the number of bone marrow cells.

Integristerone A increases the number of cells of the bone marrow by 1,29 times ($p < 0,05$). Sileneozide A by 1,33, and sileneozide B increases the number of bone marrow cells by 1,45 times. A more pronounced immunostimulating effect was observed in ecdysterone: the number of bone marrow

cells in mice is about $21,8 \pm 1,1 \times 10^6$, which is higher than control by 1,73 times.

Turkesteron increases the number of bone marrow cells by 1,75 times ($22,0 \pm 1,2 \times 10^6$). The effect of TEP-1 is similar to turkesterone, increasing the index of stimulation by 1,76 times. TEP-2 increases the number of cells in the bone marrow by 1,80, and the TEP-3 increases by 1,95 times. Under the influence of the T-activin, the number of bone marrow cells increases by 1,67 times, and the immunal – by 2,33 times. The received results indicate that the TEP-2 and TEP-3 are closest to the stimulating effect of the immunal (in relation to the cellular composition of the bone marrow).

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On the influence of phytoecdysteroids to the peripheral organs of immunity, it should be noted that earlier, in the course of the presentation of the material concerning the effect of phytoecdysteroids to the number of antibody-forming cells in the spleen, the relevant data were cited. Now only changes will be considered in the content of mesenteric lymph nodes in mice. These data are presented in the figure

It was installed that the number of cells in the lymph nodes of the control groups was about $18,2 \pm 1,6 \times 10^6$. Preparations of 2-deoxy- α -ecdysone and α -ecdysone increase the number of cells in the lymph nodes by 1,15 and 1,22 times unreliable. *Integristerone A* – by 1,27, *sileneozide A* – by 1,31, and *sileneozid B* – by 1,34 times increase the number of cells in the lymph nodes. A greater stimulating effect was observed in ecdysterone and turkesteron: the number of cells in the lymph nodes increases, respectively, by 1,63 and 1,66 times.

It was described; there was a sufficiently high stimulating activity in the total phytoecdysteroids. TEP-1 increases the number of cells in the lymph nodes by 1,75, TEP-2 – by 1,79 and TEP-3 – by 1,88 times. T-activin increases the number of cells in the lymph nodes by 1,51, and the immunal – by 1,53 times.

Thus, individual phytoecdysteroids and total ecdysteroid-containing preparations have capability to increase the number of cells in the peripheral organs of immunity – the lymph nodes.

Conclusion

In general, it can be concluded that the studied phytoecdysteroids (their total preparations) have capability to increase the number of cells in the central (thymus, bone marrow) and peripheral (spleen, lymph nodes) organs of immunity.

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