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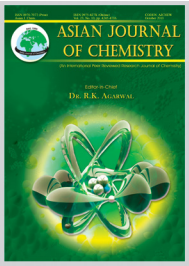

Effect of Hydro-Alcoholic Extract of Nettle on Immune System in Mice

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Nettle is a plant with the scientific name *Urtica dioica* belonging to the Urticacea family. Nettle is considered to be a herb due to its numerous medical effects and a wide-spread and significant use in traditional medicine. In this paper, we have investigated the effects of hydro-alcoholic extract of nettle on the proteins of the blood serum in female mice (Balb/C species). The samples were divided into 5 groups of 8, including the control, placebo and 3 experimental groups. All samples were kept in identical conditions. The hydro-alcoholic extract of nettle was obtained in dosages of 50, 100, 200 mg/kg/2 days and administered as injection to the experimental groups using the inner peritoneum method. Normal saline was administered to the placebo group (zero dosage). The most important parameters considered were levels of α-1, α-2 and γ globulin in the blood serum. Results revealed no perceptible change in the amount of α-1, α-2 and β globulin in the experimental groups and the only significant change was a rise of γ-globulin at the 200 mg/kg dosage level. Present findings demonstrate the positive effects of hydro-alcoholic extract of nettle in a 200 mg/kg dosage which can improve immunity without antigenic presence.

Key Words: Nettle, Blood globulin, Mice.

INTRODUCTION

Nettle is a plant noted by the people from ancient times as a nutritional source and a potent herb, as Galenus, the 2nd century A.D. physician, used it to treat lung and respiratory diseases. Nettle, with the scientific name *Urtica dioica*, is part of the Urticaceae family. The plants belonging to this family are usually wee-like and have a life span of several years. The leaves and stem are covered by an irritant fuzz, the leaves are simple and indented[1]. It should be mentioned that almost all parts of the plant can be used for purposes of treatment. These parts mostly include fresh leaves, roots, the extract produced thereof, the stem, flowers and, to some extent, even the seeds. Fresh nettle stems are of acceptable size and edible. They are used, after being picked and dried, as a substantial component in fowl fodder. Before the fruits of this plant ripen, nettle's flowers are crushed and, combined with eggs, are used to feed young birds. Nettle has a therapeutic effect on blood pressure, blood sugar and heart diseases and also emliminates fungi and microbes. It also plays a significant role in blood generation and in increasing plasma proteins. Furthermore this plant causes platelet production to be kept in check and, moreover, the polysaccharides present in nettle result in an increased generation of blood cells (Lymphocyte T) and through this, the herb has the power to manipulate the immune system. Research has shown that nettle has hypoglasmic effects while other works point to its antioxidant effects on glucose levels in blood. Nettle is useful in treating diabetes, hyperplasia, prostate malfunctions, arthritic inflammation, Rheumatoid arthritis, high blood pressure and allergic rhinitis[2].

This plant also possesses antiseptic, antimicrobial, antiplatelet, antifungal and antibacterial effects and is several times more potent in controlling positive and negative warm bacteria than chemical bactericide. It also restrains viral elements such as AIDS and hepatitis *in vitro*. This herb also induces the human lymphocyte to proliferate and can be used, as an ointment, to treat eczema, cancerous ulcers, infectious wounds, tumors, scabies and baldness. It is generally considered to be a useful skin protection. Nettle is used in traditional medicine all around the world to boost the digestive system. The secretion contained in nettle strengthens the stomach and it secretions and reinforces the smoke-like movements of the bowels. Nettle extract is used to treat the ailments of the digestive system[3].

Moreover, the herb is effective in cases of genital malfunctions. It can act to stop the bleeding in menstruation intervals and help to open up the menstruation. Nettle increases milk production in mothers. Besides the effects already mentioned,

nettle's fresh concentrated juice cures inflated tonsils, inflamed gums and mouth ulcers[4]. Reports indicate antioxidant effects and a potency to accumulate free radicals. Nettle's antioxidant effects are the result of the flavonoid present in it[1].

This paper investigates the effects of inner peritoneum injections of the hydro-alcoholic extract of nettle in doses of 50, 100, 200 mg/kg on mice of Syrian breed. The benefit of this method over oral administration of the said substance is the certainty of the dosages received by the animals.

EXPERIMENTAL

Laboratory conditions: The adult female mice were kept in laboratory conditions for 1 month in order to adapt to the environment. The specimens were held under temperatures between 28-32 ºC and exposed to periods of natural light, they were kept in separate cages and had full access to food and water.

Categorizing the specimen: 70 Mice were studied in this research program. These were randomly put into groups of 8 and were kept in separate cages.

Groups in this experiment

Control: The mice in this group were kept in similar conditions to the care groups without being injected to ascertain the amount of basic blood proteins.

Placebo: The specimens in this group received 10 injections of the physiology serum (normal saline) of 0.5 ccs in 20 days, *i.e.*, every other day and by inner peritoneum method. This was done to ensure the non-effectiveness of injection on the results.

Experimental group 1: the specimens in this group were administered hydro-alcoholic nettle extract in doses of 50 mg/kg in 0.5 cc shots by inner peritoneum injection 10 times in 20 days (*i.e.*, every other day).

Experimental group 2: The specimens in this group were administered hydro-alcoholic extract of nettle in doses of 100 mg/kg in 0.5 cc shots by inner peritoneum injection 10 times in 20 days (*i.e.*, every other day).

Experimental group 3: The specimens in this group were administered hydro-alcoholic nettle extract in doses of 200 mg/kg in 0.5 cc shots by inner peritoneum injection 10 times in 20 days (*i.e.*, every other day).

After the 20-days injection period was over, blood samples were taken from all specimens and afterwards the amount of blood proteins, especially immune-globulins, were measured using electrophoresis.

Statistical analysis: The comparison of the mean data collected from this experiment was conducted using the unilateral variance analysis test and the Duncan test with a certainty rate of more than 95 %. The variance (difference) was considered significant in case of $p < 0.05$. SPSS was used as the statistical software.

RESULTS AND DISCUSSION

Analysis of the density of the α-1 globulin protean: The comparison between the density of α-1 globulin using the Duncan test at a $p < 0.05$ level indicates a decrease in this protein's density in experimental groups 2 and 3 (treated with 100 and 200 mg/kg dosages, respectively) as compared to the control group. However, this change was not significant. Fig. 1 demonstrates the result of this comparison.

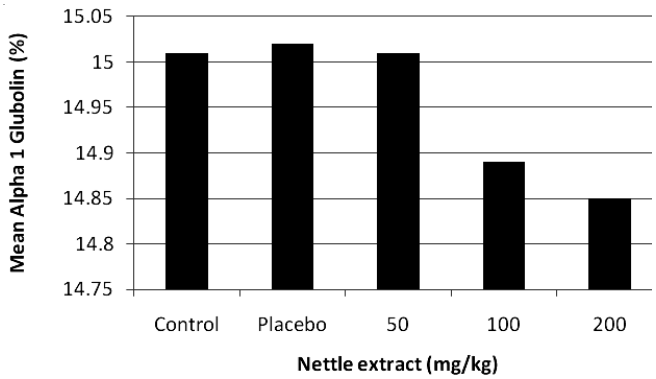

Fig. 1. Comparing the percentage of α-1 globulin in experimental, control and placebo groups

Analysis of the density of the α-2 globulin protean: A comparison between the average density of α-2 globulin levels between the control and experimental groups 1, 2 and 3 at a $p < 0.05$ level shows an increase in experimental group 1 and a decrease in care groups 2 and 3. Yet again none of these changes are significant. Fig. 2 demonstrates the result of this comparison.

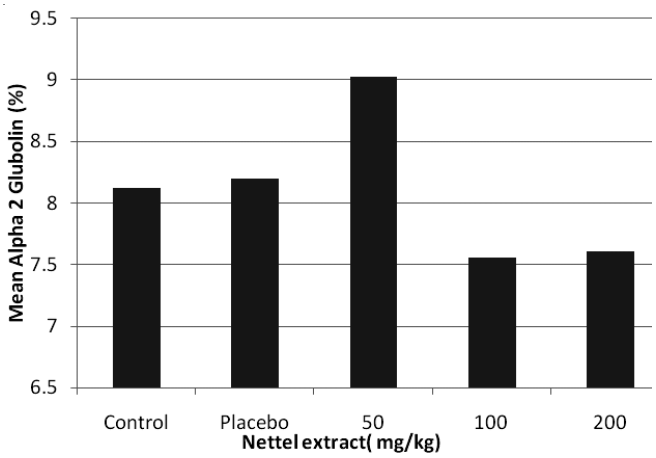

Fig. 2. Comparing the percentage of α-2 globulin in experimental, control and placebo groups

Analysis of the density of the β-globulin protean: Observing and comparing the beta globulin levels of the control group, experimental group 1, 2 and 3 at a level of $p < 0.05$, we found no significant difference compared with the control group. Fig. 3 demonstrates the result of this comparison.

Analysis of the density of the γ-globulin protean: Comparing the density of γ globulin in the blood serum of the control group's mice with the experimental groups at a $p < 0.05$ level, it became clear that this protean decreased insignificantly in experimental group 1. γ-Globulin levels rose in experimental groups 2 and 3, but only the rise observed in care group 3 (treated with a 200 mg/kg dosage) was of any significance. Fig. 4 demonstrates the result of this comparison.

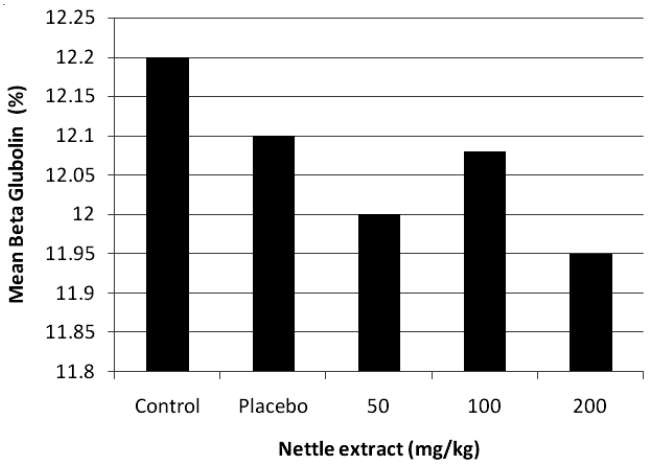

Fig. 3. Comparing the percentage of β-globulin in experimental, control and placebo groups

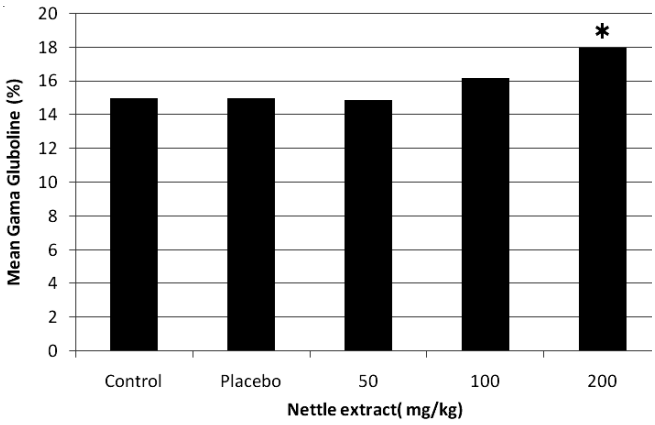

Fig. 4. Comparing the percentage of γ-globulin in experimental, control and placebo groups

Conclusion

Considering the results indication the lack of any significant change in α-1, α-2 globulin levels and an increase of albumin in experimental group 2 (treated with a 100 mg/kg dosage) and 3 (treated with a 200 mg/kg dosage), we propose that the exceeding amounts of nettle do not alter the penetrability (porosity) of glomerular capillary since in the nephrotic syndrome, proteins having low molecular weight, like albumin, are filtered and discharged along with urine which is to be found in the electrophoretical pattern of albumin and α-1 globulin, however, the amount of proteins with the higher molecular weight such as α-2 macroglobulin increases to ten times its normal amount[5]. Hence we can deduce that it is possible that nettle does not affect the level of glomerular capillary's penetrability. The amount of γ-globulin increased in experimental group 2 and 3 as compared to the control group. However, this growth is only significant in experimental group 3. The reason for this might be the presence of flavonoid compounds in nettle. Biro-Sandor[6] reported that the flavonoid compounds such kaempferol found in the aerial parts of the nettle are, *in vitro*, effective on the immunity system. These results further prove that flavonoid compounds have inductive powers over the immune system because of their antioxidant tendencies and being able to accumulate free radicals. Moreover, the research conducted by Kelly[7] shows that the nettle to be highly rich in lectin, a polysaccharide able to induce the immune system and of affecting the restricting of different viruses[8]. It is probable that lectin can be effective on the immune system through affecting the interleukins. Also, lectin can, by clinging to cancerous cells or their receptors, destroy or restrain those cells. It does this by activating caspases, regulating the activity of telomerase and restraining Angiogenesis (when cells become cancerous, the body increases angiogenesis). Moreover, by entering cancerous cells, lectin causes them to aggregate. As was mentioned before, nettle can cause lymphocyte T to proliferate because containing lectin. Lymphocyte T is the most important factor in antitumor response[7,8]. In conclusion we could state that it is probable that nettle effects the immune system by virtue of its antitumor features.

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