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The Effects of Ginseng on Spermatogenesis Multiplications (Tissue Division Initiation, Replication Initiation, and Shock Induction) in Rats

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ABSTRACT

The herb ginseng includes the active ingredient ginsenosides, which have a profound effect on the tissue of the testicles. The goal of this research is to develop ways to improve germ cell survival and speed up the recovery of injured testicular tissues after heat shock.
What We Used and How Sixty Vistar rats weighing between 180 and 220 g are utilized in this research, all of which are housed in the identical circumstances (12 hours of light, 12 hours of darkness, and a temperature of 22 degrees Celsius) and fed the same diet. The rodents were split into four equal groups at random. Each group (with the exception of the 23°C/normal-saline group) was further subdivided into three subgroups (ginseng, Vitamin E, and 43°C). All groups, excluding the usual group, were held for a full 60 days, with autopsies performed on days 15, 30, and 60. The testicles were extracted and preserved in 10% Formalin. Samples were used to create Lam in 48 to 72 hours.

The effects of Ginseng were seen in this investigation on testicular tissues that had experienced heat stress. Ginseng's role in the repair of heat-damaged tissues was superior to that of Vitamin E, and this difference was significant across all comparison groups.

Keywords: Ginseng; Spermatogenesis multiplications (Tubular differentiation index (TDI);Spermiogenesis index (SI) and Repopulation index (RI); heat shock; vitamin E.

1. INTRODUCTION

It's known that if testicles receive heat even in a short process and only once, spermatogenesis may be damaged and restoration proceeding heat shock will be 40-60 days after the incident [1]. Of course, the nature of heat can be different for inducing damage, for example in temperature of 43c and duration of 15 minutes, the damage to testicle tissue will be limited and to the point of damaging spermatocytes. But in the 45c temperature and duration of 15 minutes generalized unlimited and vast damage which will include most of the germ tissues of the testicle will happen. [2] previous studies showed that heat will induce cell death in the testicle, in such a way that death in initial Mitotic spermatocytes and Mitotic spermatogons will be possible [3] and also temporal reduction of testicle weight with temporal or permanent infertility may be caused.

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started this research to determine whether Ginseng can treat the oxidative stress (heat shock) in the testicle or not and we used vitamin E in this study as an antioxidant factor, to compare Ginseng and vitamin E side by side.

2. METHODS AND MATERIALS

60 vistar rats with the weight of 180-220 were prepared. All rats were placed in a standard environment with 12 hours of light and 12 hours of darkness and the temperature of 22±2. Rats were randomly divided into 10 groups of 6. Then all rats were made unconscious by 12 mg Xylazine per kilo and 80 mg Ketamine per kilo [5] and then their scrotum and posterior movement limbs were immersed in Benmurry with the temperature of 43c. [6] Immediately after immersion and induction of heat shock in first, second and third group (n=6) normal saline into peritoneal was prescribed for 60 days and in day 15-30-60 animals went under autopsy and samples were taken. In forth, fifth and sixth group (n=6) Ginseng (Isfahan's Goldarou Pharmaceutical Factory) with the dose of 500mg per kilo [7] was prescribed for 60 days and in day 15-30-60 animals went under autopsy and samples were taken. In seventh, eighth and ninth group vitamin E with the dose of 100 mg was prescribed for 60 days and in day 15-30-60 animals went under autopsy and samples were taken. The tenth group was injected with normal Saline, with the difference that, the temperature for this group was 23c for 15 minutes. After removing the animals' heads the testicles were removed and put into Formalin 10% for 72 hours to be fixed and in the end with H&E coloring Spermatogenesis Multiplications were studied by Light microscope. Statistical studies of this research were done by Tukey and ANOVA software. The study was approved by the local ethic commission. To evaluate the spermatogenesis in seminal tubes, three index tubular differentiation index (TDI) spermiogenesis index (SI) and repopulation index (RI) were used.

To compute the tube differentiation term, abbriviated as TDI, the percentage of seminal tubes containing 3 and more than 3 differentiated spermatogenesis cells from the A spermatogonial cell were calculated. These cells were composed of intermediate spermatogonial, type B spermatogonia, spermatocyte and spermatid cells. This is the life index and the differentiation of stem cells of seminal tubes namely as Aspermatogonia.

To calculate TDI index for each testicle, at least 200 cross sections of seminal tubes were examined and counted. To calculate repopulation index (RI), the ratio of active spermatogonial cells to inactive spermatogonial cells in seminal tubes was calculated. To do this, more than 200 counts of seminal tubes were counted. To calculate spermiogenesis index (SI), the ratio of sperm semeners containing sperm to tubes without sperm was counted. In 200 sections, seminal tubes were counted.

3. RESULTS

3.1 Statistical Results

Maximum effects of heat shock and Ginseng treatment starts from day 30 and for this reason spermatogenesis multiplications in all groups were studied in day 30 and at the end of day 60 testicle's tissue automatically starts the restoration progress to some level. In this part, we study the items from day 30. Spermatogenesis multiplications of all groups in day 30 are shown in Table 1. TDI index on day 30 among ginseng groups and group 43 C had a meaningful difference (p=0/000) but between Ginseng group and vitamin E, there was no such a difference (p=0/471). RI and SI multiplication in day 30 among Ginseng groups and group 43 degree had a meaningful difference (p=0/000) and also SI multiplication among Ginseng groups and vitamin E there was a meaningful difference (p=0/004).

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Table 1. Comparing groups according to spermatogenesis multiplications in day 30,multiplications unit %

Items groups	23C	43C	Ginseng	Vitamin E
TDI	74.3	*59.47	*86.72	85.1
RI	47.8	47.9*	*85.5	81
SI	74.7	54.1*	*80.5	*71

(TDI) themeaningful difference between ginseng group and 43C. p<0.001. also, RI and SI multiplication in day30 among Ginseng groups and group 43 degree had a meaningful difference.p<0/001. SI meaningful differencebetween ginseng group and Vitamin E**

3.2 Histology Results

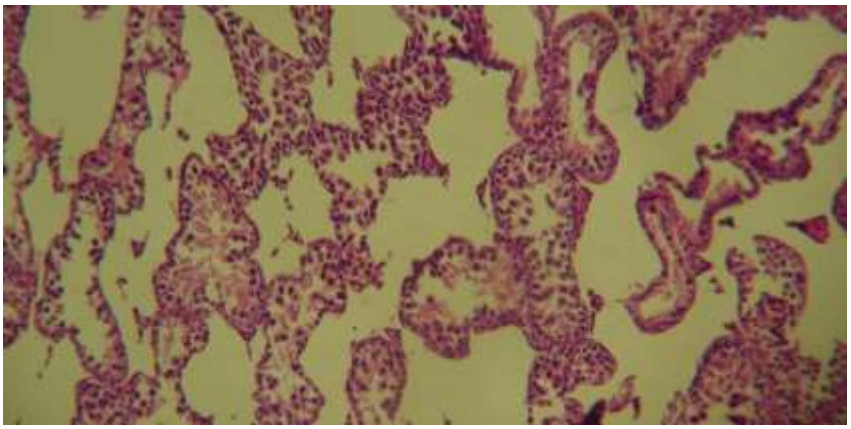

Fig. 1. Testicle's tissue group 43c in day 30: decrease in spermatogenesis cell levels hashappened. Development of connective intermediate tissue is high. Magnification X100, coloring H&E

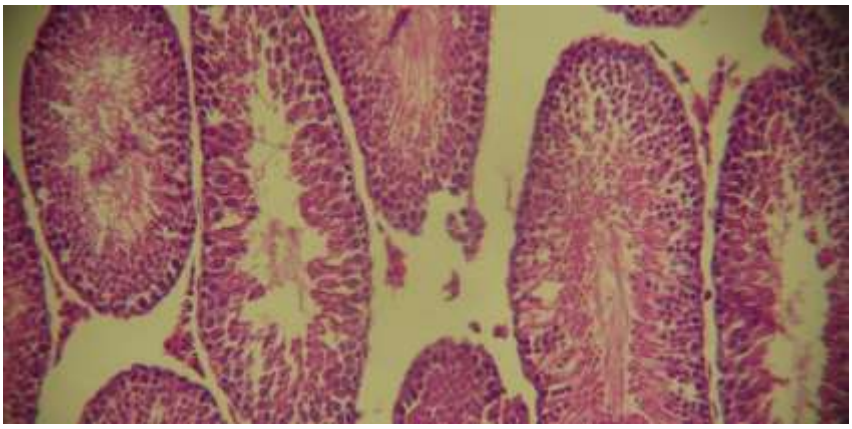

Fig. 2. Testicle's tissue of Ginseng group on day 30. Most pipes contain sperm and different levels of spermatogenesis cells are clearly visible in pipes walls. Magnification X100, coloringH&E

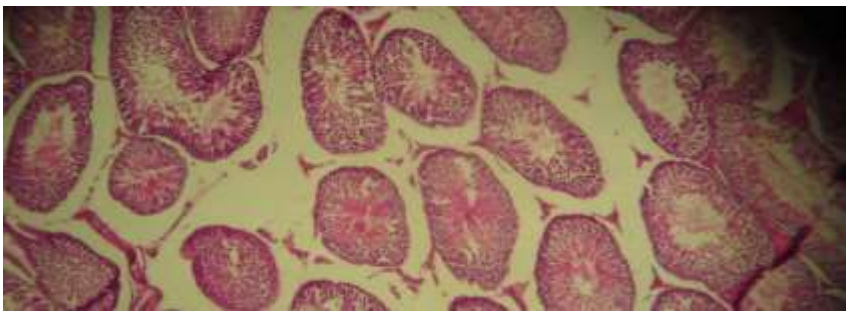

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Fig. 3. Testicle's tissue of vitamin E group in day 30: spermatogenesis' generating cells arevisible in pipes walls. In the central cavity of some pipes masses of sperm can be seen. Magnification X100, coloring H&E

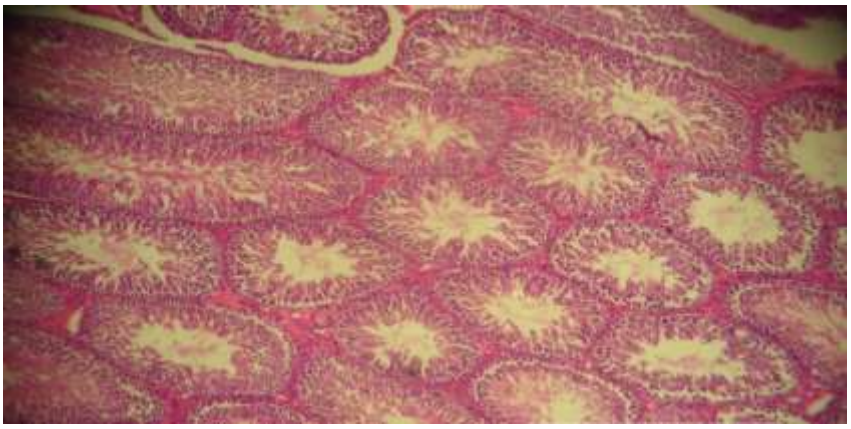

Fig. 4. Testicle's tissue of Ginseng group day 60: Pipes walls thickened completely, the intermediate tissue is low and diagonal of semen generator pipes is high and increase in anumber of breeding cells is visible. Magnification X100, coloring H&E

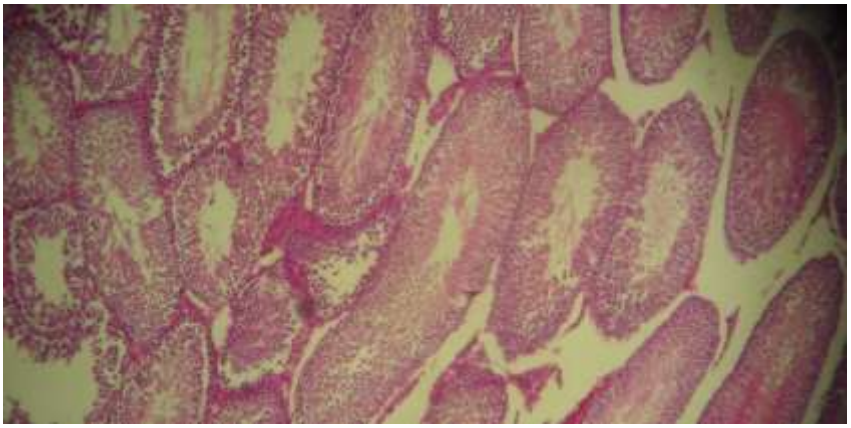

Fig. 5. Testicle's tissue of vitamin E group on day 60. There is a clear difference with Ginsengand Ginseng had a better performance in decreasing the thickness of intermediate tissue. Magnification X100, coloring H&E

4. DISCUSSION

Ginseng is a medicinal plant which is being used for centuries as an anti-stress, booster of sexual power, etc. it is also one of the oldest and well known medicinal plants which prevent sexual disorders. It has several medical, antioxidant features and protects the organs from free radicals and environmental stresses [8].

In this study, it became clear that heat shock affects the testicle's tissue and Ginseng can treatthe effects of it at some point and recovers the testicle's tissue. In fact, ginseng acts as a phagocyte free radical and causes such changes. According to histological findings, the difference was significant in all cases, however; the RI index was not significant on day 30 in the comparison between vitamin E and ginseng groups, On day 30, the TDI index between ginseng and vitamin E was not significant. On day 15 The diameter of the conjugated capsule was not significant in both ginseng and vitamin E groups. There was no significant difference between the two groups of interstitial tissue gravidity on day 30 in both vitamin E and control groups. Eventually epithelium diameter on day 60 was not significant between control and vitamin E groups. p>0/05.

On the Contrary to the remarkable results in the histology section in which ginseng showed better

CONCLUSION

According to the studies Ginseng has a key role in the restoration of testicle's tissue and vitamin E showed less effectiveness compared to Ginseng. Based on this we can point to the Ginsenosides function in the restoration of testicle's tissue in addition to the antioxidant role,Whereas vitamin E is considered as an indicator of antioxidants, these changes can be explained with the existence of Ginsenosides in Ginseng and also anti oxidant role of Ginseng.

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