

Investigations on the Chronic Effect of Talbina (Barly Water) on Hormone (Cortisol and Testosterone), Reproductive System and Some Neurotransmitter Contents in Different Brain Areas of Male Albino Rats

A.E. Bawazir

Department of Zoology, Faculty of Girls Education, Scientific Departments, Saudi Arabia

Abstract: The present work was carried out to study the impact of talbina on cortisol, testosterone hormone, testicular and some neurotransmitter contents in different brain areas of male albino rats. Results showed that the chronic daily oral administration of talbina caused non significant changes in norepinephrine (NE) content in all of tested areas after 1, 2, 3 and 4 weeks. Also, this treatment caused significant increase in, dopamine (DA), serotonin (5-HT) and gamm-aminobutyric acid (GABA) contents in different brain areas (Cerebellum, striatum, cerebral cortex, hypothalamus, brain steam and hippocampus) of male albino rats. Moreover, it caused the maximal increase in GABA content in the cerebral cortex after 4 weeks (+41.51%) and the maximal increase in DA, GABA, 5-HT and 5-HIAA content in the cerebral cortex after 3 weeks ((+62.85, +41.51, +72.73 and (+71.98%, respectively). Significant increases in cortisol (+20.09 %) and testosterone (46.8%) levels were found in blood after 4 weeks. The tubules of testis showed an increased active spermatogenesis with significant rise of number of mature sperms. In conclusion, talbina is potentially safe for sedation as the content of neurotransmitters is increased after daily oral administration of talbina (barley water). Talbina increased the plasma levels of testosterone, increased active spermatogenesis with significant rise of number of mature sperms. Results confirmed that talbina had beneficial effects on male reproductive activity.

Key words: Talbina Cortisol • Testosterone • Reproductive System • Neurotransmitter • Brain • Albino Rats

INTRODUCTION

Barley (*Hordeum vulgare*) is an annual cereal grain, which serves as a major animal feed crop, The plant barley wild is of the Panaceas or Gramineae family, This family is the most important of all plant families to human economies and it grows wild in Turkey and south-west America and small amount of it is used for malting and in health food [1].

In 2005, barley ranked fourth in quantity produced and in area of cultivation of cereal crops in the world. Barly is rich in vitamins A, C, B1, B2, folic acid and B12; calcium; iron; potassium and chlorophyll [1]. Unlike most plants, barley grass provides all nine essential amino acids. It contains a wide spectrum of amino acids, enzymes, vitamins, minerals and phytochemicals. It promotes cell metabolism, providing cellular energy and for antioxidant effects, it has beneficial effect in asthma, obesity, skin rejuvenation and it's good for the health improvement to the digestive and respiratory systems.

Barley grass is a powerful antioxidant that is believed to help the body to kill cancer cells and overcome a variety of ailments, including acne and ulcers. Islam had defined talbina (Barley) which is a special diet made from fresh barley grains. The description of talbina in Sunbath may show its benefits in preventing several diseases as well as helping during the treatment of diseases by the conventional procedures such as cancers, asthma, allergies hypertension and obesity [2].

Consumption of whole-grain foods is associated with a decreased risk of several chronic diseases, including cancer, type 2 diabetes and cardiovascular disease [1, 3] with benefits attributed to their content of vitamins, minerals, essential fatty acids, fiber and phytochemicals, including several phenolic compounds [4, 5].

Saudi Arabia is the world's largest feed barley importer. As a food, barley's long list of benefits include: 18 amino acids of which eight are the essential amino acids that the human body can not produce, sodium, potassium, calcium, magnesium antioxidants, iron, copper, phosphorus, manganese, zinc, beta carotene,

vitamins B1, B2, B6, C, folic acid and pantothenic acid [4]. It also contains amylase, dextrin, phospholipids, maltose, glucose, sulfur, niacin and protein [3].

Medicinally, the Barley is used to treat high cholesterol, to help control blood sugar, diarrhea and constipation [6]. Supplementation with barley can decrease plasma lipids and inhibit LDL oxidation [2].

Cortisol is a hormone made by the two adrenal glands (located one on each kidney) and is essential for life. Cortisol helps to maintain blood pressure, immune function and the body's anti-inflammatory processes. The amount of cortisol released by the adrenal glands is regulated by the pituitary gland inside the brain. When cortisol levels are low, the pituitary secretes the stimulating hormone adrenocorticotropin (ACTH) to prompt the adrenal glands to make more cortisol [7].

Testosterone is a steroid hormone from the androgen group. In mammals, testosterone is primarily secreted in the testes of males and the ovaries of females, although small amounts are also secreted by the adrenal glands. It is the principal male sex hormone and an anabolic steroid. Testosterone is evolutionarily conserved through most vertebrates, although fish make a slightly different form called 11-ketotestosterone [8]. Bahmanpouret *et al.* [9] indicated that date palm pollen seems to cure male infertility by improving the quality of sperm parameters.

The aim of this study was to investigate the chronic effect of talbina (barly water) on reproductive system, some neurotransmitter contents in different brain areas and cortisol and testosterone levels in the blood of male albino rats.

MATERIALS AND METHODS

Materials

Talbina: Barley (*Hordeum vulgare*) is an annual cereal grain, which serves as a major animal feed crop. The plant *barly* Wild is of the Poaceae or Gramineae family. The barly were collected from trees growing in al-Quassim (Saudi Arabi).

Animals: The experimental animals used in this study were adult male albino rats, *Rattus rattus* (90-100 g). They were supplied with food and water *ad libitum* under standard conditions of light, humidity and temperature (22-25°C).

Methods

Preparation of the the Talbina: It is prepared from fresh green barley grains which are first burned directly in fire

to remove the straw parts. The talbina is a meal made by mixing 2 spoons of barley and a cup of water, cooked for 5 min.

Animal Treatment: The animals were randomly divided into two groups. The first group (n=6) was treated with saline vehicle and killed at the beginning of the experiment and served as a control. The second group (n=24) was normal rats orally administered with talbina through gastric tube for 4 week, and six rats were decapitated after 1, 2, 3 and 4 week post treated.

The rat was killed by sudden decapitation at the designed times. The brain was rapidly and carefully excised and then dissected on dry ice glass plate according to the method of Glowinski and Iversen [10] into the following regions: Cerebellum, striatum, cerebral cortex, hypothalamus, brain steam and hippocampus. The brain tissues were wiped dry with a filter paper, weighed, wrapped in plastic films and then in aluminum foil and quickly frozen in dry ice pending analysis.

NE, DA, 5-HT and GABA were extracted and estimated according to the method of Chang [11] modified by Ciarlone [12]. 5-HIAA was estimated according to the method described by Sutton and Simmodes [13] GABA was estimated according to the method of Sutton and Simmodes [13]. The fluorescence was measured in Jenway 6200 fluorometer.

Blood Sampling: The portion of blood samples were collected and allowed to coagulate at room temperature; EDTA (ethylene diamine tetracetic acid) was added to the other portion of blood and centrifuged at 3000 r.p.m. for 30 minutes. The clear, non-haemolysed supernatant sera and plasma were quickly removed divided into four portions for each individual and stored at -20°C for subsequent analysis. For the measurement of testosterone and cortisol, using immunoassay technique and Spectra testosterone and cortisol I kits were used according to their manufacturer's instruction (Orion Diagnostica; Finland and DRG Instruments GmbH; Germany).

Histological Studies: After sacrifice of animals, part of the testicles from each animal from treated and control was removed and immersed in 10% buffered formalin solution. Testicles were kept in separate numbered small glass bottles, histologically processed, embedded in paraffin and sectioned. Four sections (5 microns in thickness) were taken from each testicles, each section being at a distance of at least 500u from the proceeding one sections

were stained with haematoxylin and eosin [14]. Scoring system was used to determine tubular affection (mean no. of dysfunctioning tubules per 5 fields x100). 0-1 represented to All tubules show active spermatogenesis 1-2 represented to a portion of tubules show arrest or hypospermatogenesis 2-3 represented to All tubules show arrest or hypospermatogenesis, but germ cells are intact. 3 represented to All tubules show arrest or hypospermatogenesis, but germ cells are partially or completely replaced.

Statistical Analysis: The data are presented as mean + S.E. Statistical analyses between control and treated animals were performed using paired student 't'[15].

RESULTS

The oral administration of talbina caused non significant changes in NE content in all of tested areas after 1, 2, 3 and 4 week (Tab. 1 and Fig.1). While, it caused a significant increase in DA content starting from the third week in cerebral cortex. And from the four week in cerebellum and cerebral cortex. duration the maximal (P< 0.001) increase in DA content was found in the Cerebral cortex after 4 weeks (+62.85%) (Tab. 2 and Fig.2). Moreover, it caused a significant increase in GABA content starting from the two week in cerebral cortex and from the third week in cerebellum, striatum and cerebral cortex And from the four week in cerebellum, striatum cerebral cortex, brain steam and hippocampus duration (P< 0.01). The maximal increase in GABA content was found in the cerebral cortex after 4 weeks (+41.51%) (Table 3 and Fig.3).

Also, it caused a significant increase in 5-HT content starting from the third week in cerebral cortex. And from the four week in Cerebellum, striatum, cerebral cortex, hypothalamus, brain steam and hippocampus duration the maximal (P< 0.001) increase in 5-HT content was found in the cerebral cortex after 3 weeks (+72.73%) (Tab. 4 and Fig.4). The duration the maximal increase in DA content was found in the cerebellum after 4 weeks (+62.85%). The maximal increase in GABA content was found in the cerebral cortex after 4 weeks (+41.51%) and the maximal(P< 0.001) increase in 5-HT content was found in the cerebral cortex after 3 weeks (+72.73%). The duration the maximal increase in 5-HIAA content was found in the cerebral cortex after 3 weeks (+71.98%).

The daily oral administration of talbina caused a significant increase in cortisol level in the 2, 5, 6 and 7 week in blood. Duration the maximal (P< 0.05) increase in cortisol level was found in after 6 weeks (+20.09 %) (Tab. 5 and Fig. 6).

The daily oral administration of talbina caused a significant increase in testosterone level in the 4, 5, 6, 7 and 8 week in blood. The maximal (P< 0.01) increase in testosterone level was found in after 4 weeks (46.8%) (Tab. 6 and Fig. 7).

The present hitological results are shown in Plate 1. The normal testicular architecture, interstitial cells and tubules show active spermatogenesis with normal central luminal mature sperms. Tubular dysfunction (ie hypospermatogenesis and germ cell maturation arrest) are within the normal range. No organic pathological lesions (ie. absent interstitial fibrosis, congestion, vascular injury or inflammation with no tubular necrodegenerative changes or atrophy).

Table 1: Effect of chronic oral administration of talbina on norepinephrine (NE) content in the different brain areas of male albino rat

Time of decapitation		Cerebellum mean ± S.E.	Striatum mean ± S.E.	Cerebral cortex mean ± S.E.	Hypothalamus mean ± S.E.	Brain stem mean ± S.E.	Hippocampus mean ± S.E.
1 week	C	95.382±0.845	511.473±1.803	56.443±0.216	596.997±3.242	390.490±0.484	292.540±1.536
	T	96.096±0.683	513.617±1.026	56.543±0.755	604.942±1.580	386.165±1.882	292.647±0.544
	%	0.75	0.42	0.18	1.33	-1.11	0.04
2 weeks	C	95.358±0.857	511.118±1.648	54.443±1.898	605.330±9.48	390.490±0.484	292.527±1.531
	T	94.407±0.617	512.148±1.281	52.5000.764*	599.442±2.51	389.818±0.388	292.920±1.354
	%	-1.00	0.20	-3.57	-0.97	-0.17	0.13
3 weeks	C	98.688±0.274	495.653±1.445	55.493±0.105	604.906±2.337	394.485±0.942	283.178±0.817
	T	101.167±0.654*	496.763±0.830	56.878±0.767*	606.338±2.16	394.908±0.745	283.773±0.840
	%	2.51	0.22	2.50	0.24	0.11	0.21
4 weeks	C	98.485±0.271	495.780±1.443	55.525±0.127	604.623±2.261	394.618±0.944	282.998±0.841
	T	98.348±0.363	496.893±0.943	56.362±0.311	606.123±2.12	396.023±1.055	284.318±1.076
	%	-0.14	0.22	1.51	0.25	0.36	0.47

Statistical analyses were performed between control (C=6) and treated (T=6) animals %: Percentage of change from control *p< 0.05

Table 2: Effect of chronic oral administration of talbina on dopamine (DA) content in the different brain areas of male albino rat.

Time of decapitation		Cerebellum mean ± S.E.	Striatum mean ± S.E.	Cerebral cortex mean ± S.E.	Hypothalamus mean ± S.E.	Brain stem mean ± S.E.	Hippocampus mean ± S.E.
1 week	C	146.755±0.818	473.948±0.856	60.488±0.044	734.223±2.111	451.288±0.633	243.147±0.863
	T	145.631±0.541	476.248±1.273	60.578±0.736	726.235±3.554	453.979±1.850	241.425±0.658
	%	-0.77	0.49	0.15	-1.09	0.60	-0.71
2 weeks	C	145.648±0.914	486.988±0.834	61.240±0.214	739.237±4.314	451.541±1.947	244.597±1.448
	T	146.821±0.296	488.833±0.477	63.512±0.639*	741.167±0.477	460.167±1.138	244.333±0.422
	%	0.81	0.38	3.71	0.26	1.91	-0.11
3 weeks	C	146.977±0.942	474.115±0.911	60.715±0.259	734.057±2.258	451.606±0.591	242.968±0.843
	T	154.167±0.910*	497.333±0.558*	73.333±0.667*	746.667±0.667*	467.333±0.667*	255.167±0.307*
	%	4.89	4.90	20.78	1.72	3.48	5.02
4 weeks	C	146.100±1.156	482.780±3.194	62.328±0.946	738.215±4.439	451.637±1.987	244.905±1.544
	T	171.333±0.803*	503.167±0.910*	101.500±0.563***	755.667±0.558*	472.667±0.843*	264.667±0.211*
	%	17.27	4.22	62.85	2.36	4.66	8.07

-Statistical analyses were performed between control (C=6) and treated (T=6) animals %: Percentage of change from control *p< 0.05, **p< 0.01 and ***p< 0.001

Table 3: Effect of chronic oral administration of talbina on gamma-butyric acid (GABA) content in the different brain areas of male albino rat.

Time of decapitation		Cerebellum mean ± S.E.	Striatum mean ± S.E.	Cerebral cortex mean ± S.E.	Hypothalamus mean ± S.E.	Brain stem mean ± S.E.	Hippocampus mean ± S.E.
1 week	C	192.457±0.799	171.652±0.450	57.247±0.385	432.828±0.319	118.155±0.197	214.787±1.321
	T	192.349±0.538	171.688±1.024	57.919±0.149	431.393±2.515	116.809±0.958	215.267±0.938
	%	-0.06	0.02	1.17	-0.33	-1.14	0.22
2 weeks	C	192.544±0.759	171.662±0.447	57.374±0.463	432.939±0.370	117.868±0.237	214.933±1.269
	T	194.667±0.615	177.333±0.919*	66.667±0.667*	435.000±0.683	122.000±0.447*	214.167±0.477
	%	1.10	3.30	16.20	0.48	3.51	-0.36
3 weeks	C	193.611±0.781	175.423±1.783	57.849±0.675	437.968±1.007	118.436±0.231	216.865±0.870
	T	213.167±0.47*7	201.500±0.563*	76.000±0.365**	441.167±0.477	124.833±0.307*	218.167±0.477
	%	10.10	14.87	31.38	0.73	5.40	0.60
4 weeks	C	193.379±0.440	171.744±1.615	57.713±0.935	437.849±0.198	118.118±1.398	215.234±1.053
	T	221.667±0.667*	209.000±0.516*	81.667±0.667**	447.500±0.764	134.333±0.919*	245.000±0.258*
	%	14.63	21.69	41.51	2.20	13.73	13.83

-Statistical analyses were performed between control (C=6) and treated (T=6) animals %: Percentage of change from control *p< 0.05, **p< 0.01 and ***p< 0.001

Table 4: Effect of chronic oral administration oral of talbina on serotonin (5-HT) content in the different brain areas of male albino rat

Time of decapitation		Cerebellum mean ± S.E.	Striatum mean ± S.E.	Cerebral cortex mean ± S.E.	Hypothalamus mean ± S.E.	Brain stem mean ± S.E.	Hippocampus mean ± S.E.
1 week	C	192.457±0.799	171.652±0.450	57.247±0.385	432.828±0.319	118.155±0.197	214.787±1.321
	T	192.801±0.684	172.833±0.872	59.833±0.543*	437.306±0.859	123.500±0.847*	219.585±0.201*
	%	0.18	0.69	4.52	1.03	4.52	2.23
2 weeks	C	191.029±0.352	170.315±1.639	56.594±1.008	433.014±1.290	118.123±0.223	213.653±0.436
	T	191.333±0.333	171.000±0.632	57.500±0.619	435.833±0.401	122.204±0.542*	215.833±0.401
	%	0.16	0.40	1.60	0.65	3.45	1.02
3 weeks	C	191.972±0.481	173.099±1.479	57.604±0.246	433.014±0.404	117.983±0.607	214.949±0.886
	T	200.667±0.333*	179.333±0.333*	99.500±0.224***	442.667±0.843*	120.500±0.342*	217.500±0.719
	%	4.53	3.60	72.73	2.23	2.13	1.19
4 weeks	C	192.856±0.299	173.099±1.479	58.055±0.382	431.432±1.369	117.865±0.257	217.158±0.610
	T	218.000±0.931*	221.167±0.792*	99.500±0.224***	483.833±0.833*	153.500±0.764**	247.500±0.764*
	%	13.04	27.77	71.39	12.15 *	30.23	13.97

-Statistical analyses were performed between control (C=6) and treated (T=6) animals %: Percentage of change from control *p< 0.05, **p< 0.01 and ***p< 0.001

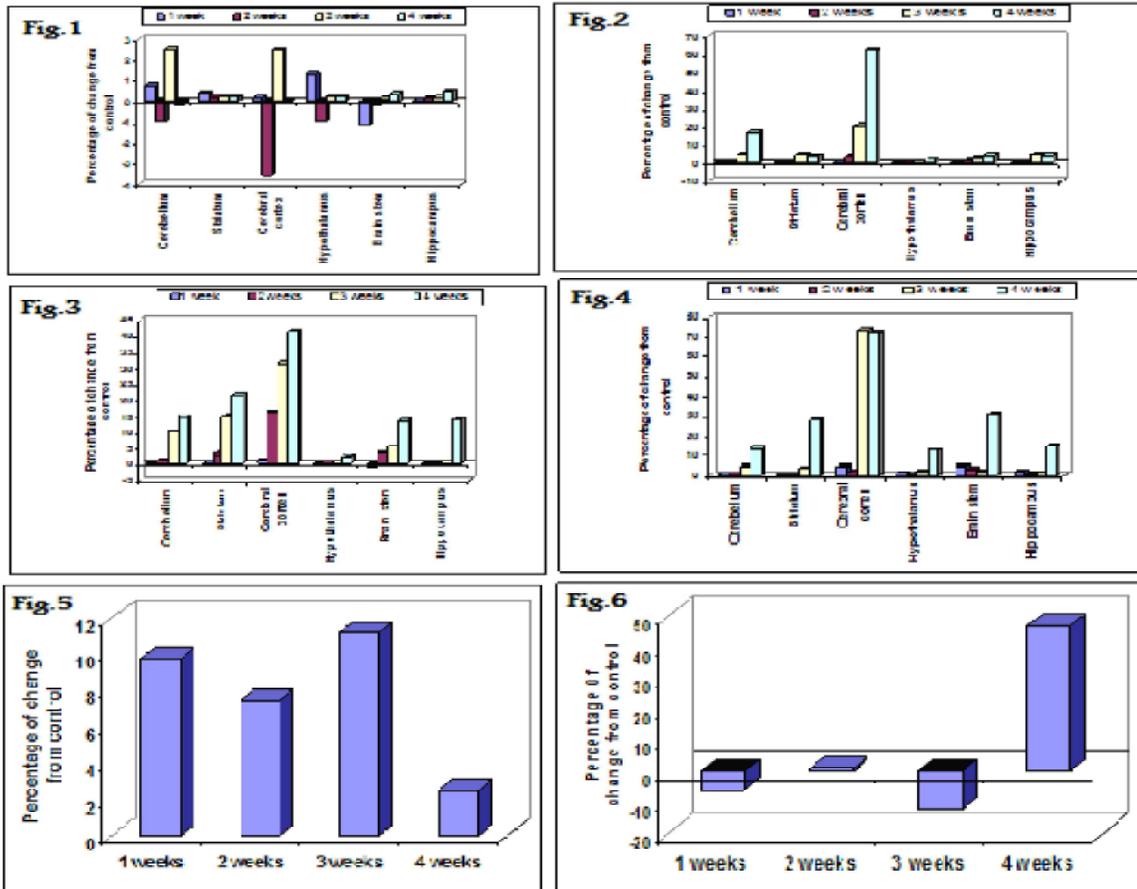


Fig. 1: Effect of chronic oral administration of talbina on norepinephrine (NE) content represented by the % difference between control and treated values in the different brain areas of male albino rat.
 Fig. 2: Effect of chronic oral administration of talbina on dopamine (DA) content represented by the % difference between control and treated values in the different brain areas of male albino rat.
 Fig. 3: Effect of chronic oral administration of talbina on gamma-butyric acid (GABA) content represented by the % difference between control and treated values in the different brain areas of male albino rat.
 Fig. 4: Effect of chronic oral administration of talbina on serotonin (5-HT) content represented by the % difference between control and treated values in the different brain areas of male albino rat.
 Fig. 5: Effect of chronic oral administration of talbina on cortisol level in serum of male albino rat represented by the % difference between control and treated of male albino rat.
 Fig. 6: Effect of chronic oral administration of talbina on testosterone level in serum of male albino rat represented by the % difference between control and treated of male albino rat.

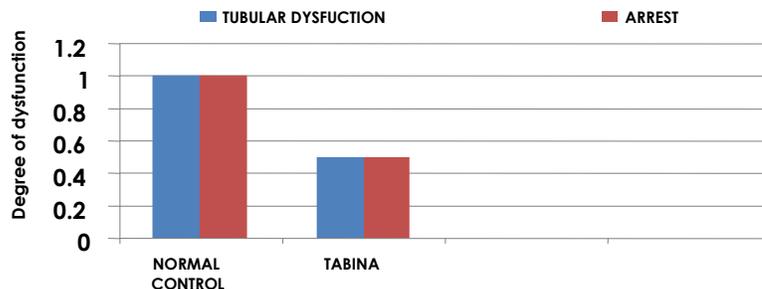


Fig. 7: The effect of tabina enhanced spermatogenesis, versus normal control. Notice a significant enhanced spermatogenesis induced by Tabina when compared by normal

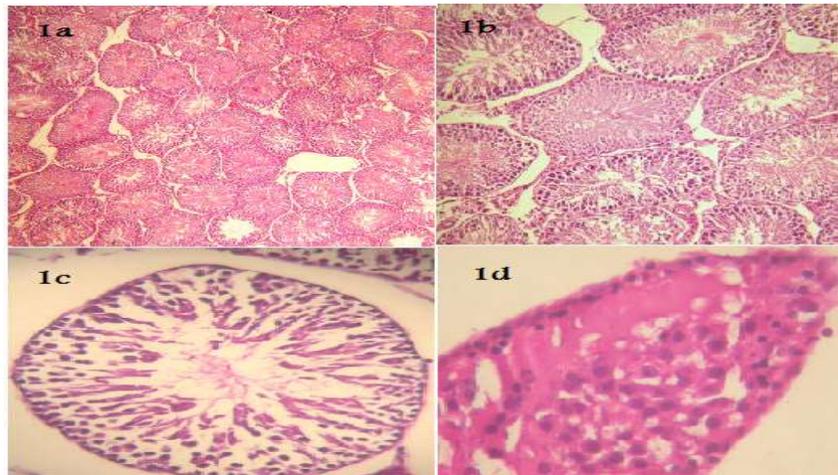


Plate 1: The normal control testicular of male albino rat: 1a. Intact normal testicular architecture & interstitial cells (Lt. x100 H&E). 1b. The tubules show active spermatogenesis with normal central luminal mature sperms (x300 H&E). 1c. Lt. high power (x400 H&E) of intact interstitial cells, composed of islands of polygonal cells having a dense esinophilic cytoplasm & oval nuclei. 1d. Rt. High power (x600 H&E) of intact tubule with normal spermatogenesis & central luminal mature sperms

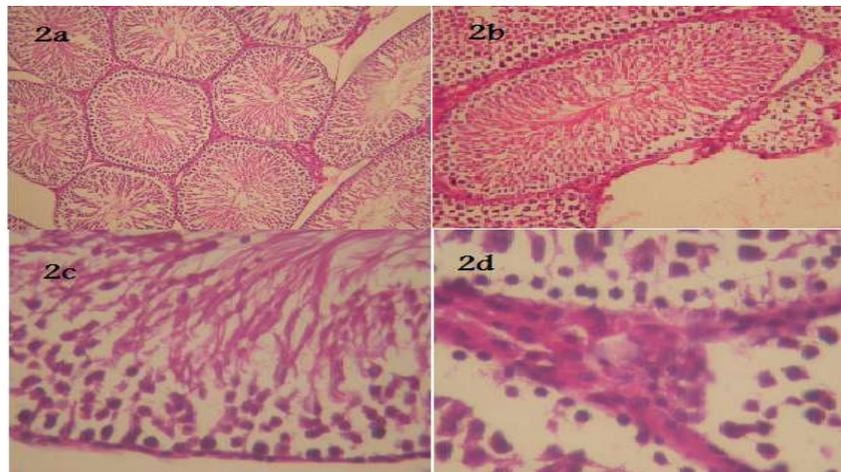


Plate 2: Effect of chronic oral administration of talbina on testicular of male albino rat. 2a. The tubules show an increased active spermatogenesis with significant rise of number of mature sperms (x200 H&E). 2 b. A distended tubule showing an increased active spermatogenesis with significant rise of number of mature sperms (x400 H&E). 2c. spermatogenesis, free of early or late arrest. (x500 H&E). 2d The interstitial cells are hyperplastic (x600, H&E)

Table 5: Effect of chronic oral administration of talbina on cortisol level in serum of male albino rat

		1 weeks	2 weeks	3 weeks	4 weeks
Cortisol ($\mu\text{g}/\text{dl}$) mean \pm S.E.	C	0.040 \pm 0.001	0.214 \pm 0.001	0.214 \pm 0.001	0.214 \pm 0.001
	T	0.041 \pm 0.004	0.238 \pm 0.004*	0.230 \pm 0.012	0.235 \pm 0.022*
	%	2.50	11.21 *	7.48	9.81

-Statistical analyses were performed between control (C=6) and treated (T=6) animals by using paired *t* test. **p*< 0.05

Table 6: Effect of chronic oral administration of talbina on testosterone level in serum of male albino rat

		1 weeks	2 weeks	3 weeks	4 weeks
Cortisol ($\mu\text{g}/\text{dl}$) mean \pm S.E.	C	1.83 \pm 0.03	1.78 \pm 0.054	1.65 \pm 0.067	1.88 \pm 0.016
	T	1.72 \pm 0.09	1.8 \pm 0.05	1.45 \pm 0.042*	1.0 \pm 0.0**
	%	-6.01%	1.12%	-12.12%	46.8%

-Statistical analyses were performed between control (C=6) and treated (T=6) animals by using paired *t* test. **p*< 0.05,***p*< 0.01

The results obtained from Plate 2 showed that effect of chronic oral administration of talbina on testicular of male albino rat, The tubules of testicular showing an increased active spermatogenesis with significant rise of number of mature sperms. A notable decrease of tubular dysfunction is encountered. No organic pathological lesions (i.e. absent interstitial fibrosis, congestion, vascular injury or inflammation with no tubular necro-degenerative changes or atrophy. As shown plate 2c and D Normal spermatogenesis, free of early or late arrest and the interstitial cells are hyperplastic.

The results showed that the daily oral administration of talbina caused a significant decrease tubular dysfunction and arrest in testicular of male albino rat (Fig. 8).

DISCUSSION

The present results showed that the oral administration of talbina caused non significant in NE content in all of tested areas after 1, 2, 3 and 4 week. While, it caused a significant increase in DA, GABA and 5-HT, 5-HIAA starting from the third week in cerebral cortex and from the 4th week in cerebellum and cerebral cortex., This result agrees with many authors investigated the effects of various sedative from barley (*Hordeum vulgare*) species on calmodulin-dependent Ca²⁺-ATPase, protein kinase II and phosphodiesterase [16-19].

The present results showed that chronic administration of barley water (talbina) caused a significant increase in dopamine (DA), gamma-aminobutyric acid (GABA) and serotonin (5-HT) content in different brain areas at different time intervals. The increase observed may be due to the important role of GABA that inhibits the release of these neurotransmitters. Previous studies indicated that administration of the barley water has an effects on calmodulin-dependent Ca²⁺. The role of Ca²⁺ / calmodulin in regulating neurotransmitter-mediated inhibition and stimulation brain areas [20-22]. So, barley water could act as a competitive inhibitor of the link between calcium and calmodulin. which plays an important role in the release of these neurotransmitters. Calcium regulation of ion channel activity is mediated by the ubiquitous calcium sensor protein, calmodulin. Calmodulin is tethered constitutively to the intracellular carboxyl-terminal tail domain of this channel in a calcium-independent manner. When the channel is opened by membrane depolarization, calcium ions rush in through the open channel and bind to the tethered calmodulin. The Ca²⁺, by binding

with calmodulin, causes the vesicles filled with neurotransmitters to migrate towards the presynaptic membrane, the neurotransmitter is released into the synaptic cleft and binds with receptor channel membranes that are located in both presynaptic and postsynaptic membranes [23, 24].

From the present results, it is clear that the chronic administration of talbina caused a significant increase in neurotransmitter contents in most of the tested brain areas at different time intervals; cerebellum which is responsible for the voluntary movement; pons + medulla oblongata which is responsible of essential reflexive acts; striatum which is a brain region responsible for motor activity; cerebral cortex which is responsible for motor; hypothalamus which is responsible for appetite, body temperature, water balance, sleep and blood pressure; midbrain which is responsible for the regulation of sleep, wakefulness and level of arousal as well as for the coordination of eye movements; and hippocampus which is responsible for memory [25].

Fujisawa *et al.* [20] demonstrated that calmodulin-dependent protein kinase may play a number of roles in the functioning of the cerebral cortex, brainstem and cerebellum. The previous studies suggested that barley water has inhibitory effects on hippocampus and probably acts through its anti-calmodulin action [19]. The increase in 5-HIAA content may be due to the increase in 5-HT content.

The present results showed that the oral administration of talbina caused significant increase in cortisol level was found in blood after 4 weeks(+20.09 %) and significant increase in testosterone level was found in blood after 4 weeks (46.8%). This finding was supported by Brian and Gladue [26].

The present results showed that the chronic oral administration of talbina had a positive effect on testicular function of male albino rat whereas, tubules of testicular showed an increased active spermatogenesis with significant rise of number of mature sperms. This is may be due to talbina caused significant increase in testosterone in blood of rats. This agree with Nelson and Randy [8]. Testosterone Our data showed that using talbina suspension increases the plasma levels of testosterone caused an increased active spermatogenesis with significant rise of number of mature sperms. This hormone are found at high concentrations in rat testis and seminal fluids [27].It has also been shown that estrogen is synthesized in male reproductive system by at least three different cell types, Sertoli, Leydig and germ cells.15 Estrogen regulates the reabsorption of luminal fluid in the

head of the epididymis. Also, Hess *et al.* [28] found no obvious changes in its histological sections under light microscopy. The weight gains observed in epididymis, testes and seminal vesicles might have been due to fluid resorption effects of estradiol, which improved fertility. This might be due to the presence of phytoestrogen, as a steroidal component of DPP, which may have influenced sperm parameters.

As a conclusion, talbina may potentially be safe for use as sedative drug as the content of neurotransmitters is increased as a result of daily oral administration of talbina (barley water) this may be due to the presence of peptide and cyclopeptide alkaloids. Talbina increases the plasma levels of testosterone caused an increased active spermatogenesis with significant rise of number of mature sperms. results confirmed that talbina had beneficial effects on male reproductive activity.

It was concluded that talbina is potentially safe for sedation as the content of neurotransmitters is increased after daily oral administration of talbina (barley water). Talbina increased the plasma levels of testosterone, increased active spermatogenesis with significant rise of number of mature sperms. Results confirmed that talbina had beneficial effects on male reproductive activity.

REFERENCES

1. Jensen, M.K., P. Koh-Banerjee, M. Franz, L. Sampson, M. Gronbaek and E.B. Rimm., 2006. Whole grains, bran and germ in relation to homocysteine and markers of glycemic control, lipids and inflammation. *Am. J. Clin. Nutr.*, 83: 275-83.
2. Ya-Mei, Y.U., C. Weng-Cheng, L. Chu-Sun and E. Chingmin, 2005. Effect of young barley leaf extract and adlay on plasma lipids and LDL oxidation in hyperlipidemic smokers. *Nutr. Cancer*, 52: 102-108.
3. Jacobs, D.R., L. Marquart, J. Slavin and L.H. Kushi, 1998. Whole-grain intake and cancer: an expanded review and meta-analysis. *Nutr. Cancer*, 30: 85-96
4. Anderson, J.W. and T.J. Hanna, 1999. Whole grains and protection against coronary heart disease: what are the active components and mechanisms. *Am. J. Clin. Nutr.*, 70: 307-308.
5. Slavin, J., 2003. Why whole grains are protective: biological mechanisms. *Proc. Nutr. Soc.*, 62: 129-34.
6. McIntosh, G., J. Whyte, R. McArthur and P. Nestel, 1991. Barley and wheat foods: influence on plasma cholesterol concentrations in hypercholesterolemic men. *Am. J. Clin. Nutr.*, 53: 1205-1209.
7. de Weerth, C., R. Zijl and J. Buitelaar, 2003. "Development of cortisol circadian rhythm in infancy". *Early Hum. Dev.*, 73: 39-52.
8. Nelson, A. and F. Randy, 2005. An introduction to behavioral endocrinology. Sunderland, Mass: Sinauer Associates, 143: 617-620.
9. Bahmanpouret, S., T. Talaei, Z. Vojdani, M.R. Panjehshahin, L.A. Poostpasand and S. Zareei, 2006. Effect of *Phoenix Dactylifera* pollen on sperm parameters and reproductive system of adult male rats *Ind. J. Med. Sci.*, 31: 208-212.
10. Glowinski, J. and L.L. Iversen, 1966. Regional studies of catecholamines in the rat brain. I. The disposition of [3H] dopamine and [3H] dopa in various regions of the brain. *J. Neurochem.*, 13: 655-669.
11. Chang, C.C., 1964. A sensitive method for spectrofluorometric assay of catecholamines. *Int. J. Neuropharmacol.*, 4: 643-649.
12. Ciarlone, A.E., 1978. Further modification of a fluoremetric method for analyzing brain amines *Microchem. J.*, 23: 9-12.
13. Sutton, I. and M.A. Simmodes, 1973. Effect of acute and chronic pentobarbitone on the gamma aminobutyric acid system in rat brain. *Biochem. Pharmacol.*, 23: 1801-1808.
14. Harris, H.F., 1900. on the rapid conversion of haematoxylin into haematin staining reactions. *J. Appl. Microscopic. Lab. Methods*, 3: 777.
15. Hill, H.B., 1971. Principles of medical statistic, 9TH Oxford Univ.
16. Chang, E.E., P.C. Chiang, Y.W. Ko and W.H. Lan, 2001. Characteristics of organic precursors and their relationship with disinfect ion by-products, *Chemosphere*, 44: 1231-1236.
17. Hawang, U., E. Andrew, R. Szymkowiak and S. Stephen, 2001. Bulk X-Ray Doppler Velocities in the Supernova Remnant Cassiopeia A. *The Astrophysical J.*, 560: 175-179.
18. El-Shahat, M.F., S.H. Abdel-Halim and G.A. Hassan, 2001. Factors Influencing the Formation of Trihalomethanes in Drinking Water Treatment Plants, *Bull. Environ. Contam. Toxicol.*, 67: 549-553
19. Zhang, X. and S.K. Joseph, 2001. Effect of mutation of a calmodulin binding site on Ca²⁺ regulation of inositol trisphosphate receptors. *Biochem. J.*, 360: 395-400.
20. Fujisawa, T.T., J. Shirassaka Watabe and T. Mitsuoka, 1984. *Lactobacillus aviarius* sp nov. anew species isolated from the intestine of chickens. *Systematic Appl. Microbiol.*, 5: 414-420.

21. Haeseleer, F., Y. Imanishi, I. Sokal, S. Ffilipek and K. Palczewski, 2002. Calcium-binding proteins: intracellular sensors from the calmodulin superfamily. *Biochem. Biophys. Res. Commun.*, 290: 615-623.
22. Nadif Kasri, N., I. Sienaert, J.B. Parys, G. Callewaert, L. Missiaen, A. Jeromin and H. De Smedt, 2003. A novel Ca^{2+} -induced Ca^{2+} -release mechanism in A7r5 cells regulated by calmodulin-like proteins. *J. Biol. Chem.*, 278: 27548-27555.
23. Nadif Kasri, N., A.M. Holmes, G. Bultynck, J.B. Parys, M.D. Bootman, K. Rietdorf, M. Missiaen, F. Donald, H. de Smedt, S.J. Conway, A.B. Holmes, M.J. Berridge and H.L. Roderick, 2004. Regulation of InsP_3 receptor activity by neuronal Ca^{2+} -binding proteins. *Embo. J.*, 23: 312-321.
24. Nadif Kasri, N., G. Bultynck, J. Smyth, K. Szlufcik, J.B. Parys, G. Callewaert, L. Missiaen, R.A. Fissore, K. Mikoshiba and H. DE Smedt, 2004b. The N-terminal Ca^{2+} -independent calmodulin-binding site on the inositol 1, 4, 5-trisphosphate receptor is responsible for calmodulin inhibition, even though this inhibition requires Ca^{2+} . *Mol. Pharmacol.*, 66: 276-284.
25. Bloom, F.E., 2001. Neurotransmission and the central nervous system. In: *The pharmacological basis of therapeutics* (edit by: Hardmann, J.G., Limbird, L.E.
26. Brian, A. and A. Gladue, 1989. Hormonal response to competition in human males. *Aggressive Behavior*. 15: 409-422.
27. Kostyuk, V.A., A.I. Potapovich and E.N. Strigunova, *et al.*, 2004. Experimental evidence that flavonoid metal complexes may act as mimics of superoxide dismutase. *Arch. Biochem. Biophys.*, 428: 204-8.
28. Hess, R.A., D. Bunick, K.H. Lee, *et al.*, 1997. A role for oestrogens in the male reproductive system. *Nature*, 390: 509-12.