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The Effect of Aqueous Extract Cinnamon Zeylanicum Bark on the Structure and Function of the Ovary in Female Rats

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الخلاصة:

تم دراسة تأثير الخلاصة المائية لقلف نبات الدارسين Cinnamon Zeylanicum على نمو وتطور المبايض Ovaries لدى اناث الجرذان من الناحية النسيجية والوظيفية.

أستخدم لهذه الدارسة 20 جرذ أبيض من الاناث قسمت الى مجموعتين وعوملت على النحو التالي:

المجموعة الاولى مجموعة السيطرة والتي تناولت الماء المعقم والغذاء الاعتيادي، والمجموعة الثانية عوملت بالخلاصة المائية لقلف نبات الدارسين بتركيز 5 ملغم/مل عن طريق ماء المعقم ولمدة 15 يوم.

بينت نتائج الدراسة النسيجية في المجاميع المعاملة بالخلاصة المائية لقلف نبات الدارسين وجود الجريبات الابتدائية والنامية Primary follicles and Preantral follicles وعدد من الاجسام الصفر Corpora lutea التي تدل على حدوث الاباضة، مقارنة بمجموعة السيطرة التي لم تظهر سوى الجريبات الاولية وهذا يعكس تأثير مادة الدارسين في فعالية المبيض.

كذلك اظهرت الدراسة الهرمونية زيادة معنوية ($P<0.01$) بمستويات الهرمون الوتيني LH، والهرمون المحفز للجريب FSH، والاستراديول، والبروجستيرون في المجموعة المعاملة بالخلاصة المائية لقلف نبات الدارسين ومقارنة بمجموعة السيطرة، اشارت نتائج الدراسة الى امكانية نبات الدارسين على تحفيز افراز الهرمونات المحرضة للقند وبالتالي تحفيز فعالية المبيض.

Abstract:

The effect of aqueous extract cinnamon zeylanicum bark on the structure and function of ovary was studied for the females of rats physiologically and histological.

Number of (20) white rats were used for this study, divided into two groups that treated as follows:

The first group is the control group that have got the regular water and food, while the second group has have been treated with the aqueous extract cinnamon bark of concentration 5 mg/ml for a period of 15 days.

The histological study for the aqueous cinnamon bark extract treated group showed that the existence of the Primary follicles, Preantral follicles and in addition to a number of Corpora lutea that indicates the occurring of ovulation

comparing with the control group that showed only the Primoridail follicles which reflects the effect of the cinnamon on the ovary activity.

The hormonal study shows also a significant increment ($P<0.01$) in the levels of Progesterone, Estridiol, LH, and FSH in the treated groups comparing with the control group.

The results of this study indicates the ability of the cinnamon plant to stimulate secretion of the gonadotropin and hence the activity of the ovary.

Introduction:

The ovary is an ovoid structure that can be divided into the outer cortex and the inner medulla [1]. Medulla consists of connective tissue and a large number of blood vessels, lymphangitis and nerves while the cortex consists of ovarian follicles and corpora lutea in various stages of development these structures are embedded in a loose connective tissue stroma [2]. A follicle is a structure containing an oöcyte surrounded by specialized epithelial cells. The follicular growth and maturation is dependent on FSH from the adenohypophysisa and LH is important for estrogen synthesis and ovulation [3].

Primordial follicles are found in the outer portion of the cortex, and it's appear in stage of pre-puberty and the stage of sexual maturation at day (50^{th}) in the ovary are characterized by the presence of primary follicles and growing follicles [4], the ovary considered as a gland of internal secretion (endocrine function) for its production of sex steroids hormones Estrogen and Progesterone [5]. The secretion of these two hormones by the ovaries is in response to hormones of anterior pituitary which are Follicle Stimulation Hormone (FSH) and Luteinizing Hormone (LH) and both are secreted in response to the under hypothalamus hormone (GnRH) , all of these hormones represent the female hormone system [5,6].

Cinnamon is one of the oldest herbal medicines known, having been mentioned in Chinese texts as long as 4,000 years ago, and is considered one of good medicinal plants where it is used in cases of colds, flu, abdominal cramps and against bacteria and fungi [7], many of the studies confirmed the using of kinds of cinnamon in the treatment of illness cases that affect the female reproductive system where the Cinnamomum zeylanicum was used for the treatment of Uterine Hemorrhage that occurs after birth and cause anemia which may led to the death of many of the mothers. It is also used in the treatment of fertility and infertility in women and men, inflammation and fibrosis of the uterus, cysts the ovary, the delay and pain menstrual cycle [9] ,where revealed the Japanese researches that the cinnamon stimulus for menstruation since it calls the uterus and urges bleeding menstrual and taken in India after childbirth as a contraceptive [10], the bark of cinnamon used to treat menstrual disorders and organization [11]. The medicinal effects of cinnamon oil are very powerful, and there are many uses for it [13]. A study showed that the medical influence of cinnamon because of the turbines in its essential oil, and the most important

compound of the oil is a complex compound known as the cinnamaldehyde which is reason of many pharmacologic effects [10]. The case of irregular hormones is a common in these days and have a lot of effects, especially on the ovulation and the menstrual cycle so that the use of many herbs trying to regulators of these hormones in the body, particularly Estrogen and Progesterone, which regulate the function of the ovaries and pituitary gland [12], from here came the idea of this study due to the importance of medical cinnamomum and its impact on stimulating the body's physiological activity.

Materials and Methods:

Experiment was conducted on 20 white rat Rattus norvegicus (females) aged two months and weights ranging between (100-150) gm were taken from the animal house at the college of Medicine in Baghdad University and then animals were divided into two equal groups, as follows:

A: Control Group: Animals of this group continued to eat regular drinking water freely throughout the experiment.

B: Treatment Group: Animals of this group has been dosing daily for 15 days by the aqueous extract cinnamon bark with concentration of (5mg/ml) through the prepared tube oral.

- (Blood collection) the blood samples have been taken in the sixteenth day from each rat by puncture heart.
- (Hormonal assay) the hormonal study was made on the blood serum by using the method Radioimmunoassay [14].
- (Anesthesia) the animals were anesthetized and their ovaries removed after absolved from the surrounding tissue and tissues samples were fixed to preserve the structure of the tissue, the fixatives used was formaldehyde (10%formalin).
- (Staining by Hematoxyelin and Eosin stain) the samples passed to different concentrations of alcohols and then painted stained Hematoxyelin and Eosin to color the nuclei dark blue (Hematoxyelin) and the remaining cell components pink (Eosin) for the purpose of the Histological study and photography [15].
- Statistical analysis was used by using analysis of variance (One analysis of variance) when there are differences of moral and high moral conduct comparisons using the test T (T-test).

Results and Discussion:

Hormonal Assay:

The levels of the four hormones (Luteinizing hormone (LH), follicle stimulating hormone (FSH), Estradiol, Progesterone) has increased significantly ($p < 0.01$) in the treated group of an aqueous extract cinnamon bark with a

concentration (5mg/ml) compared with a control as in (Table -1) and measured in a radioimmunoassay(Radio Immune Assay) (RIA).

The measured hormones in the serum.	Control Group (mean± SD)	Treated Group (mean± SD)
FSH (Int. Unit/ml)	0.26±15.00	0.31±17.43**
LH (Int. Unit /ml)	0.15± 3.17	0.09±3.83**
Estradiol (pg/ml)	0.43 ± 10.59	0.63 ± 18.75**
Progesterone (ngm/ml)	0.26 ± 10.30	0.54±18.99**

Table-1: The influence of aqueous extract cinnamon bark with concentration (5 mg/ml) in the hormones FSH, LH, Estradiol, Progesterone in the serum of control animals and treatment.

** Significant difference <0.01

Histological Study:

The study of tissue sections stained with Hematoxyelin - Eosin (HE) shows clear histological changes as follows:

1- For the control group a presence inactive Primordial follicle within the cortex as shown figure-1.
2- Treated group with aqueous extract cinnamon bark with concentration (5 mg/ml), the growth and development of prenatal follicles and Antral follicles was clearly appeared in addition to the appearance of vesicle Mature Graafian and forming corpus luteum as shown in figure-2 comparing with a control group.

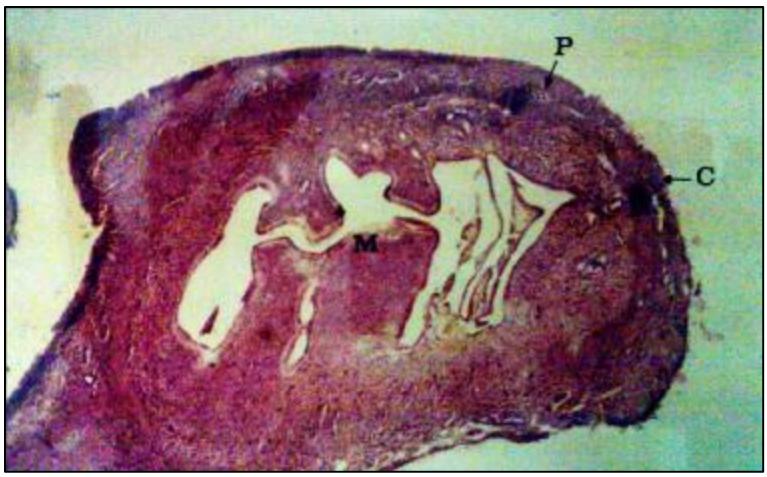

Figure-1: A section of ovarian tissue in female non-treated control rat shows the cortex (C), containing Primoridail follicles (P) and the pulp Medulla (M) (200x) (H & E)

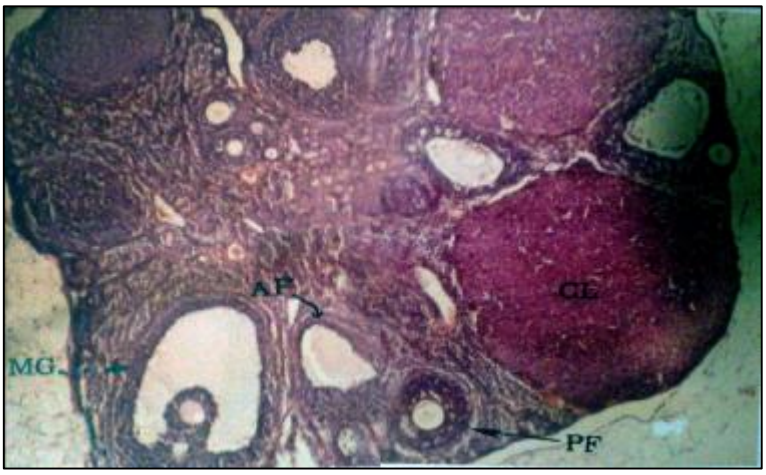

Figure-2: Section of tissue of the female rat treated of aqueous extract cinnamon bark oncentration (5 mg / ml) for a period of 15 days, the appearance of Preantral follicles (PF), Antral follicles (AF) and vesicle Mature Graafian follicle (MG) and Corpus luteum (CL) (200x) (H & E)

The results showed that the aqueous extract cinnamon bark led to an increase in the activity of ovarian, as the high level of hormones LH, FSH due to the presence of compound within the cinnamon led to increase and improve the secretion of these two hormones [18] since its stimulate pituitary gland to increase secretion of the follicle stimulating hormone and therefore the events of growth follicular (16), where the hormone FSH stimulates the growth of follicles, as well as increasing the level of Estradiol [6], and this agrees with the study showed that cinnamon working to increase the level of both FSH and Estradiol hormones among women and hence the occurrence of ovulation [24], it has been observed an increasing in the level of the Estradiol hormone in this study, which represent the occurrence of ovulation. As the studies have been shown that compounds within the cinnamon affect in the growth of follicular and improve the secretion of LH from the pituitary gland before ovulation [17], where this hormone is also working on the maturation of the egg and the occurrence of ovulation too [4], since Wechler the essential oil in the cinnamon cause the occurrence of ovulation [25].

This is matches with the histological study, where the appearance of follicles reflecting the cinnamon effect in stimulating the secretion of hormones FSH, LH, Estradiol, the start of growth and development of follicles in the ovary is under the influence of these hormones [24], while the growing follicle itself secretes estrogen which requires both FSH & LH so that the increase production of FSH & LH requires an increase in their receptors in granular and thecal cell layers which makes more sensitivity of FSH to the increased proliferation and increased secretion of estrogen hormone[21], so that the appearance of preantral and antral follicles is due to the increase in the levels of hormones FSH and LH that secreted from of pituitary-front[20] and the appearance of corpus luteum in

the treatment group of a aqueous extract cinnamon bark and continues its absence in the control group indicates the occurrence of the ovarian activity in the treatment group and the occurrence of ovulation and the liberalization of the egg through it, the primary function of the corpus luteum is the secretion of large quantities of the progesterone hormone[26], and this explains the high level of hormone in the treatment group with a aqueous extract cinnamon bark and this reflects the effective of cinnamon in the ovarian activity [22].

Conclusions:

We conclude from this study that the aqueous extract cinnamoum bark have the ability to raise the level of hormones LH, FSH that secreted from the pituitary as well as the raise of the level of both Estrogen and Progesterone hormones, and the occurrence of ovulation in addition to the appearance of clear histological changes on the ovary, which reflects its impact on the effectiveness of the ovary hence we advise to conduct this experience on other laboratory animals and longer times.

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