# Response of Golden Brown Bovans Layers to GnRH (Cystorelin) through I.M. Injection Indicated by the Reproductive Traits

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## Abstract

The study was conducted on 84 layer hens (golden brown bovans) at age of 34 weeks old, suffered from inactive ovaries, and they were brought from Kanakawa project farms. The research was done from 16 February 2010 to 16 March 2010 at the University of Sulaimani\ College of Agriculture.

In this research injection of cystorelin hormone which contain 50 µg of GnRH in each ml. Postmortem examination of 4 chickens randomly chosen were done before treatment and samples from the ovaries were taken for gross and histopathological examination. A dose of 0.02ml (1 µg) of hormone was used to treat the condition of inactive ovaries, chickens in the experiment were divided as following; 1- Control group (n= 21) injected by 0.02 ml of distal water, 2- First treatment group (T1) (n=21) injected by 1 µg (0.02ml) of hormone in 4 days intervals, 3- Second treatment group (T2) (n= 21) injected by 1 µg (0.02ml) of hormone in 7 days intervals, 4- Third treatment group (T3) (n= 21) injected by 1 µg of hormone (0.02ml) in 10 days intervals. Different positive responses had been shown in treated groups. The results showed that the second group (T2) had a higher positive response (20.38±1.45) eggs/week and recorded higher significant differences at $P<0.05$, while first group (T1) showed response (11.44 ±1.45) eggs/week. Poor response was observed in the third group (T3) (8.12±1.45) eggs/week. It was concluded from this study that treatment of inactive ovaries in layer hens by injection of (10 µg Cystorelin) in seven days intervals gave the best result.

# استجابة الدجاج البياض (كولدن براون بوفانس) لتأثير هرمون GnRH (سيستوريلين) بالحقن العضلي باستخدام مؤشر الكفاءة الانتاجية

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## الخلاصة

أجريت الدراسة على 84 دجاجة بياض نوع (كولدن براون بوفانس) وبعمر 34 اسبوع غيرمنتجة بسبب قلة نشاط المبابيض، جلبت من حقول الدواجن في منطقة كنكاوة التابعة لمحافظة السليمانية خلال الفترة من 16 شباط 2010 ولغاية 16 نيسان 2010.

تم علاج الدجاج البياض في الدراسة بحقن هرمون سستوريلين والذي يحتوي كل مليليتر منه على 50 مايكروغرام (GnRH)، وبجرعة 0.02 ملم (1 مايكروغرام). تم الفحص العياني بعد الذبح لاربعة دجاجات قبل وبعد عملية الحقن الهرموني وذلك بأخذ دجاجة من كل مجموعة بصورة عشوائية ثم اخذت نماذج من المبايض

لغرض درراسة الفحص المرضي والنسيجي، حيث تم تقسيم الدجاج على اربعة مجاميع متساوية ووضعت في اقفاص تربية على النحو التالي:

1. مجموعة السيطرة (العدد= 21 دجاجة) وحقنت بالماء المقطر 0.02 ملم كل 4 ايام بالعضل.
2. المجموعة الاولى T1 (العدد= 21 دجاجة)، حقنت بجرعة 0.02 مل سستوريلين (1 مايكروغرام) كل 4 ايام بالعضل.
3. المجموعة االثانية T2 (العدد= 21 دجاجة)، حقنت بجرعة 0.02 مل سستوريلين (1 مايكروغرام) كل 7 أيام بالعضل.
4. المجموعة الثالثة T3 (العدد= 21 دجاجة)، حقنت بجرعة 0.02 مل سستوريلين (1 مايكروغرام) كل 10 أيام بالعضل.

أظهرت نتائج الدراسة انه هنالك اختلاف في درجة استجابة المبايض للعلاج الهرموني المستخدم في التجربة، حيث ان المجموعة الثانية سجلت فارق معنوي ($P< 0.05$) وبمعدل إنتاج بيض/ أسبوع (20.38±1.45)، وإنتاج البيض للمجموعة الأولى كانت (11.44 ±1.45)، بينما اقل إنتاج بيض سجلت للمجموعة الثالثة والتي كانت (8.12±1.45). وقد نستنتج من الدراسة ان افضل الطرق العلاجية كان باستخدام حقن هرمون السسترولين (GnRH) وبجرعة 0.02 مل كل سبعة ايام وعلى طول فترة التجربة.

## Introduction

Poultry and eggs are a significant source of animal protein consumed by humans. Several avian species have been domesticated and farmed for their meat and eggs production. Chicken almost exclusively lays eggs for human consumption (1,8). Inactive ovaries are characterized by atrophied, smooth without functional structures. The reasons for the failure of normal ovarian activity may be due to nutritional, anatomical, and management factors, insufficient release or production of gonadotropin to cause folliculogenesis (2, 3, 5, 3). The aims of this investigation are histopathological study and treatment of inactive ovaries by administration of GnRH in layer hens.

## Materials and Methods

This research has been conducted on (Golden brown bovans) chicken, They were brought from Kanakawa project located in Sulaimani region, started from 16 February 2010 to 16 April 2010; The total 84 selected chickens at 34 weeks old were suffering from inactive ovaries were involved in this study. The inactive ovaries were diagnosed depending on the case history through cessation of egg production although chickens were reared under the same environmental condition, histopathological and postmortem examination (3, 5, 7, and 11). All chickens were put in a battery cages and left for twelve days for inspection in order to confirm there is no eggs production. Chickens were divided in four groups, three treated groups and control one, each group contains (21) chickens.

During the period of the study the chicken were kept in the same environmental condition. Before injection of GnRH hormone (Cystorelin, Ceva, UK, 10 ml, each ml contain 50 µg of GnRH), postmortem examination were done on 4 chickens which were selected randomly from treated and control group, samples from the ovary were taken for histopathological study in both pretreated and post treated period. The samples were fixed in 10 % formalin and processed for paraffin embedding. The histopathological section (5-6 µm) was stained with haematoxylin and eosin (6). Each chicken in treated

group ($T_1$, $T_2$ and $T_3$) was injected by 0.02 ml of GnRH (using insulin syringe) intramuscularly in the thigh region at different intervals; 4 days, 7 and 10 days respectively. The data were collected and processed using statistical analysis system SAS (17).

## Results and Discussion

Eighty four chickens (34 week old) suffered from inactive ovaries were investigated, diagnosis depends upon the case history and postmortem examination. Chickens were divided into 4 groups, the treated groups were injected by GnRH intramuscularly at different intervals periods for 8 weeks, the control group was injected with distilled water at the same time of (T1) group. The statistical analysis showed that there is a significant difference between the different treated groups throughout the period of experiment, Table (1). Decreased eggs production in layer hens is considered the common cause of economic losses especially in countries which are principally depending on the poultry industry in their economic resources. There are many causes of decreased eggs production in layer hens such as nutritional, management, microbial infections, hereditary and endocrinal disturbances (4, 10 – 14). The study showed that treated hens which suffered from inactive ovaries that used in the experiment responded with different levels to the GnRH administration, this result corresponded to that reported by Steadman (8) and Fur *et al* (10). Gonadotropin releasing hormone (GnRH) is the drug of choice for treatment of inactive ovaries resulting from hormonal disturbance (4, 7, 12 and 15).

Gonadotropin releasing hormone is responsible for the release of gonadotropins (LH and FSH) from the anterior pituitary gland. These hormones stimulate the ovary to secret oestradiol which exert a positive feedback on the neurons of the hypothalamic surge center, leading to the pre ovulatory LH surge, these findings are the same to that observed by several workers (4, 10, 15, 16).

Our results showed that there is a high significant difference at ($P< 0.05$) between the treated group ($T_2$) and the treated groups ($T_1$, $T_3$), according to the categories of eggs/week production 20.38±1.45, 11.44 ±1.45 and 8.12±1.45 respectively, (Table 2) and (Fig. 1). The results demonstrate that there is a high significant difference at ($P<0.05$) between the treated group ($T_2$, seven days injection intervals) and the treated groups ($T_1$, $T_3$), when the eggs/week production is 20.38±1.45. The differences between the different treated groups might be due to the pulstile of GnRH injection, resulting in pulstile secretion of LH and FSH which are most important signal controlling the activity of reproductive system, this is similar to that reported by others ( 2,9, 14, 16).

This study investigates the histological changes and treatment of inactive ovaries after administration of mammalian GnRH at various intervals with constant dose to layer chicks in Sulaimani region. The results of the grossly investigated chicken before treatment with GnRH revealed that the left ovary is small, smooth and situated in limited area in the abdominal cavity, (Fig. 2). Histological examination of the ovary showed a large numbers of immature follicles or oocystes, (Fig. 3).

In this study during postmortem examination after treatment with GnRH, there are a large numbers of egg yolks and mature follicles in the left ovary as well as complete egg formation in the uterus, (Fig. 4). The microscopic examination of the left ovary after treatment with GnRH showed a huge number of mature follicles or oocystes filled with the developmental material, (Fig. 5). It was concluded from this study that treatment of inactive ovaries in layer hens by injection of GnRH, seven days intervals are successful procedures used to increase in eggs production. However, four and ten

days intervals by injection of hormone also lead to increased eggs production but less significance.

**Table (1) Effect of interaction between (T + W) on egg production**

| Treatment / Week | Control M ± S.E | $T_1$ M ± S.E | $T_2$ M ± S.E | $T_3$ M ± S.E |
|---|---|---|---|---|
| 1 | 0.00 ± 1.89 $^{H}$ | 0.50 ± 1.89 $^{H}$ | 2.50 ± 1.89 $^{GH}$ | 0.00 ± 1.89 $^{H}$ |
| 2 | 0.00 ± 1.89 $^{H}$ | 8.50 ± 1.89 $^{FG}$ | 15.50 ± 1.89 $^{CDE}$ | 7.50 ± 1.89 $^{FG}$ |
| 3 | 0.00 ± 1.89 $^{H}$ | 8.50 ± 1.89 $^{FG}$ | 17.00 ± 1.89 $^{CD}$ | 8.00 ± 1.89 $^{FG}$ |
| 4 | 0.00 ± 1.89 $^{H}$ | 13.00 ± 1.89 $^{DEF}$ | 21.50 ± 1.89 $^{BC}$ | 8.00 ± 1.89 $^{FG}$ |
| 5 | 0.00 ± 1.89 $^{H}$ | 11.50 ± 1.89 $^{DEF}$ | 21.50 ± 1.89 $^{BC}$ | 10.50 ± 1.89 $^{EF}$ |
| 6 | 0.00 ± 1.89 $^{H}$ | 17.00 ± 1.89 $^{CD}$ | 26.50 ± 1.89 $^{AB}$ | 11.50 ± 1.89 $^{DEF}$ |
| 7 | 0.00 ± 1.89 $^{H}$ | 13.00 ± 1.89 $^{DEF}$ | 26.50 ± 1.89 $^{AB}$ | 9.50 ± 1.89 $^{EF}$ |
| 8 | 0.00 ± 1.89 $^{H}$ | 19.50 ± 1.89 $^{C}$ | 32.00 ± 1.89 $^{A}$ | 10.00 ± 1.89 $^{EF}$ |

- **Means with difference letters are significant by probability at P< 0.0.5.**
- **T = treatment. W = week**

**Table (2) Effect of treatment on egg production**

| Treatment / Trait | Control | $T_1$ | $T_2$ | $T_3$ |
|---|---|---|---|---|
| **Egg production** M ± S.E | 0.00 ± 1.45$^{C}$ | 11.44± 1.45$^{B}$ | 20.38 ± 1.45$^{A}$ | 8.12 ± 1.45$^{B}$ |

- **Means with difference letters are significant by probability at P < 0.05.**

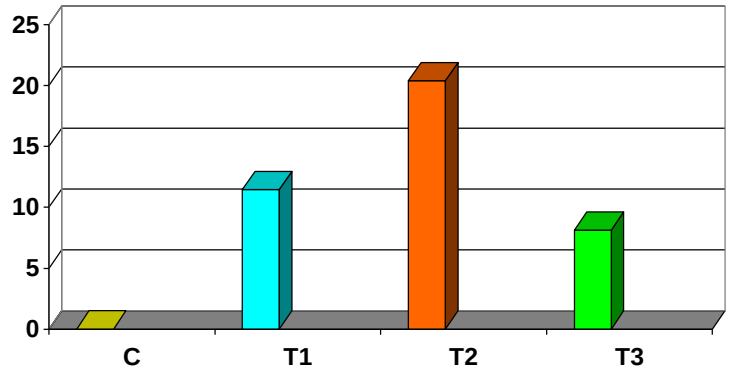


**Fig. (1) Egg production during the period of the study (Mean ± SE)**

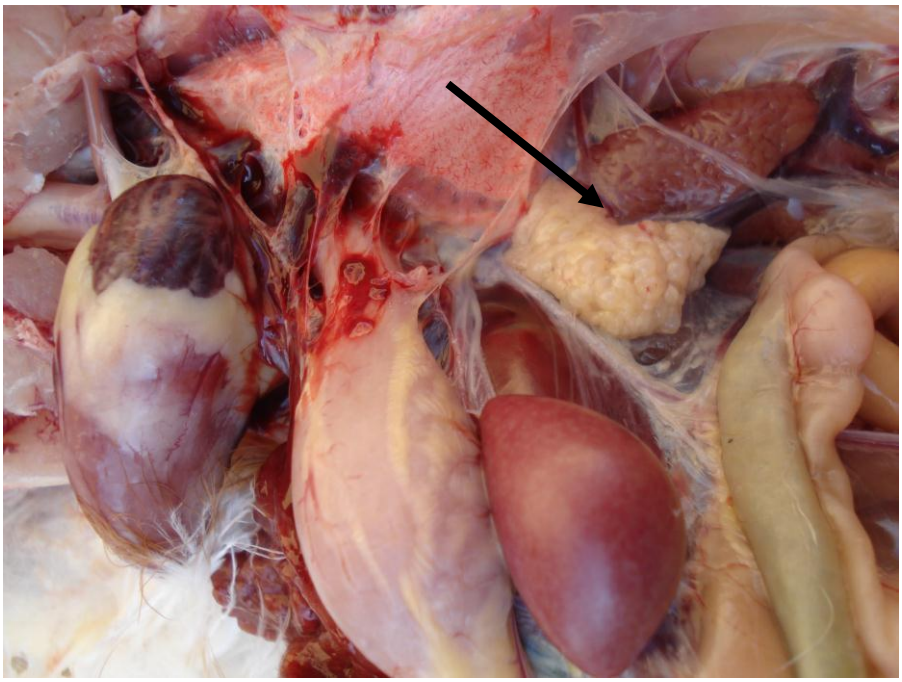

**Fig. (2) Small and smooth follicles in the ovary of no treated chicken**

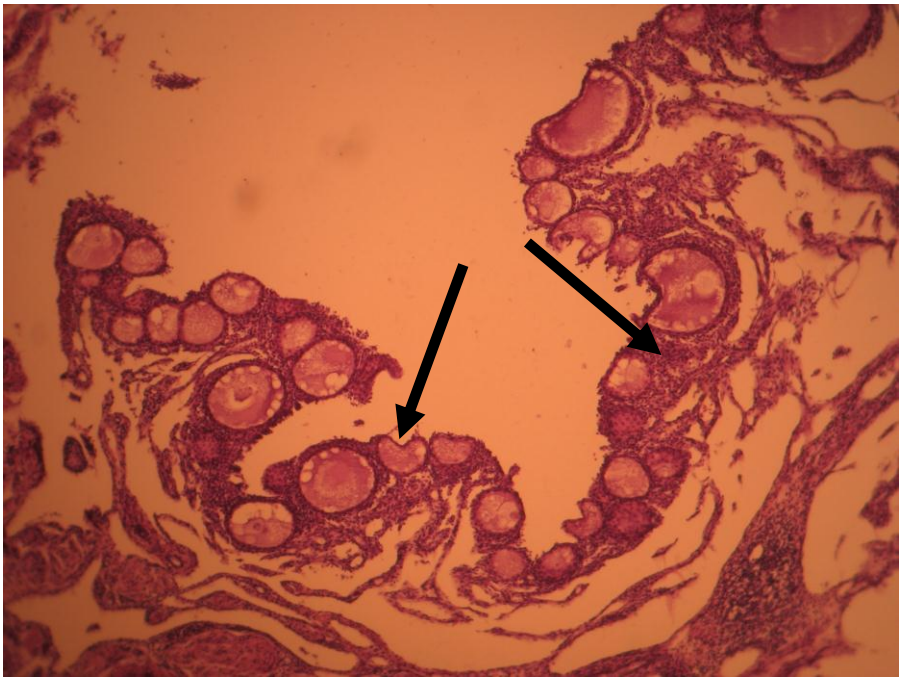

**Fig. (3) Histomicrograph of the ovary showing immature follicles or oocystes embedded within the cortex of the ovary (H&E 100X)**

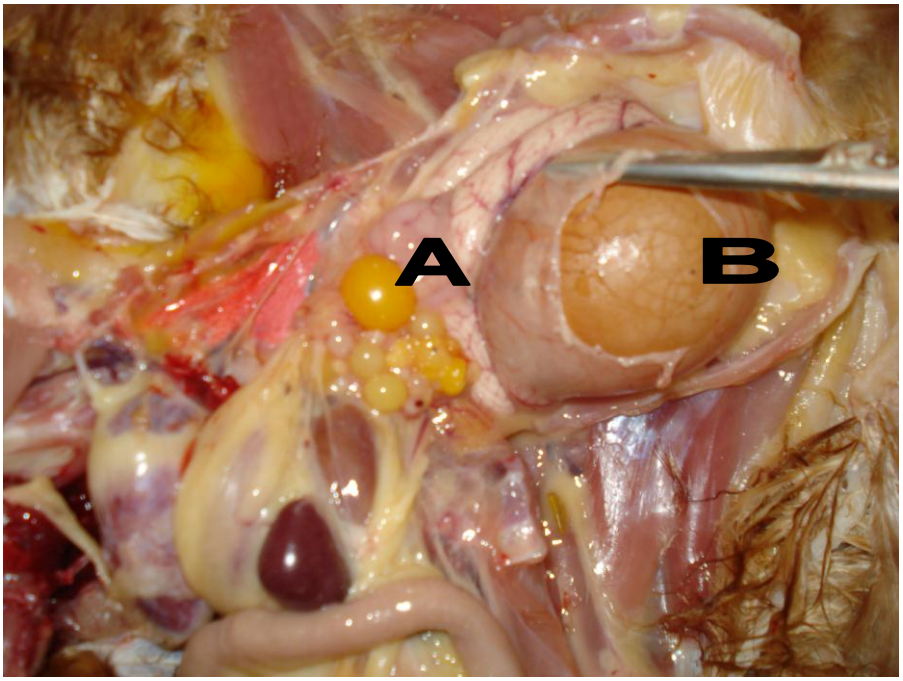


**Fig. (4) Mature follicles and egg yolk (A), complete egg in the shell gland (B) of treated group (T2)**

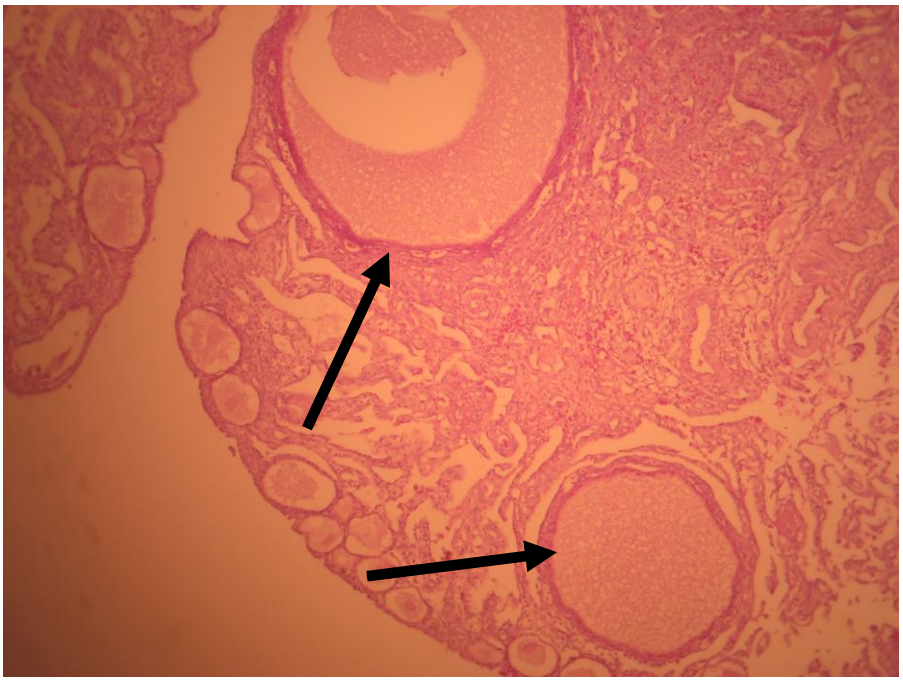

**Fig. (5) Histomicorgraph of the ovary of T1 group showing mature follicles or oocystes within the cortex of the ovary (H&E 100X)**

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