



## Uropygialectomy Effects on Chicken Prostaglandin and Growth Hormone

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Due to the nature of the oily secretions of the bird uropygial gland (UG), it is not surprising that the section of these exudates is essential fatty acids, and according to a study was conducted by Al-Mahdawy [1] on broiler chickens, more than 45% of the total fatty acids entering in the UG secretion component were essential fatty acids. It is well recognized that the only known functions of essential fatty acids are being an evolutionary predecessor of prostaglandins and the rest of the Eicosanoids group, which includes Prostaglandins, Thromboxanes and Leukotrienes.

Prostaglandins are classified among a group of fatty acids which derivative from Arachidonic acid. This group is called Eicosanoids. It took its name from the Greek word "Eikosi" which means twenty to be derived from Arachidonic fatty acid, which contains twenty carbon atom and four unsaturated bonds. Eicosanoids group includes as well as Prostaglandins, Thromboxanes, Leukotrienes and Lipoxins. Prostaglandins and the rest of Eicosanoids group have a wide range and variety of influence in all the organs of the body. The Prostaglandin considers as local hormones and conversely to the endocrine hormones. It is not excreted by glands or specialized tissue, and transmitted through blood vessels to the organs or tissues or target cells. Nevertheless, it results from plasma membrane of the many body's cells to secrete to the area outside the cells (extracellular space), and its impacts will move directly to the neighboring cells, so it considers as paracrine hormone. Sometimes, it is classified as non-real hormones, semi-hormones, fatty acids modified, chemical correspondence and finally expressed as hormone's mediators, because, Prostaglandins organize the work of many hormones more of his work as hormones itself and this is one of the most vital activities of the Prostaglandins. Prostaglandins are regulating the secondary reporter manufacturing which composite by cyclic adenosine monophosphate (camp). Because of this reporter is adapting or regulating or mediating the work of a lot of hormones, so the Prostaglandins will have a wide range of impact inside the body [2-4].

The hormones are divided by the chemotherapy origin to steroid hormones and peptide hormones. Steroid hormones such as sex hormones, adrenal cortex hormones and others are lipid hormones, which have an ability to enter the target cell by crossing its plasma membrane. Through the diffusion, it can reach to the nucleus cell and do its vital function. Regarding the non-steroidal hormones such as insulin, growth hormone, adrenaline, LH, FSH and other hormones that have protein origin, they cannot be entered into the target cell by crossing its plasma membrane because they are polar molecules. That mean, each of them has a positive end and a negative end as well as high molecular weight. So, these hormones have to send messages via the outside of the plasma membrane to the target cell. Usually, there are two correspondence systems existence to do that function. Peptide hormone will linked with a receptor on plasma membrane (the first reporter). Thus, it carries the message of endocrine gland or the secreting tissue of hormone to the surface of the target cell. First reporter will pass the message to another part within the cytoplasm (second reporter). In many cases, the complex of hormone-receptor will activate indirectly enzymatic system called acetylate cycles. This system converts the ATP molecule to camp inside the target cell. Camp works as a second correspondent by indirectly activating enzymes and other

proteins in the target cell. So, camp will cause series of biochemical events, which will lead to many functional changes within the target cells. Because of the prostaglandins organize the manufacturing this reporter, they are controlling the effectiveness of a lot of hormones. For instance, the secondary reporter camp mediates the mechanism of action of the Parathyroid Hormone PTH, Adrenal Hormone ACTH, Luteal Hormone LH, Follicle Stimulating Hormone FSH, Thyrotropic Hormone TSH and Calcitonin Hormone CT [5]. Furthermore, Growth Hormone GH secretion affected the levels of secondary reporter camp as well as Prostaglandins [6].

Prostaglandins sometimes called as a defense hormone. It is classified as fatty acid's hormones and its mechanism of action is similar to the mechanism of peptide hormones. It is worthy to mention that the known functions of the prostaglandins and other Eicosanoids in general are regulating the body's response to infections, regulating the tissues' response to some hormones, playing a role in reproduction, contributing in produce fever and pain associated with injuries and illnesses, contributing in the blood clot process, regulating blood pressure, secreting gastric acids, contributing in the sleep-wake cycle, controlling the contraction of smooth muscle in the uterus and ureters [2].

The uropygial gland removal and destruction of its cells will retain the important enzymes in the metabolism of lipids and fatty acids important for making prostaglandins within the blood circulation as well as preventing their concentration and attracted inside the gland [7,8]. Based on Al-Hayani [9] and Al-Shamire [10], the subsequent of UP on the production, carcass characteristics, hormonal and general morphological changes in the body can be justified by the following points:

1. Losing essential enzymes for steroid hormones' synthesis and basic enzymes for lipid and carbohydrates' metabolism within uropygial gland secretion.
2. Losing precursor vitamin D3 (7-dehydrocholesterol) within uropygial gland secretion which leads to low vitamin D3 in the blood serum. That causes adversely affects the absorption of calcium, which affects the activity of reproductive hormones because calcium and estrogen are required for the synthesis and secretion of LH and progesterone. Calcium is important in biological and metabolic processes' activation in the body [11].
3. Losing essential fatty acids (EFA) with uropygial gland secretion causes adversely affects the biological Eicosanoid compounds

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[12]. Which include biological active substances (Thromboxanes, Prostaglandins, Leukotrienes and Lipoxins). Low synthesis of Leukotrienes and Lipoxins influences the work of many hormones, including luteinizing hormone (LH), follicle stimulating hormone (FSH), growth hormone (GH) and thyroid-stimulating hormone (TSH) levels. Low synthesis of thromboxanes affects the blood coagulation function [13].

All these points cause adversely affects development of live body weight, vitality, ovary and oviduct, which led to delayed sexual maturity.

#### References

1. Al-Mahdawy RS (2003). The effect of uropygialectomy (Iraqi method) on the productive and physiological performance of broilers. MSc thesis Department of Animal Production Collage of Agriculture University of Baghdad.
2. Tsafiri A, Lindner HR, Zor U, Lamprecht SA (1972). Physiological role of prostaglandins in the induction of ovulation. *Prostaglandins* 2: 1-10.
3. Flower RJ, Cheung HS, Cushman DW (1973) Quantitative determination of prostaglandins and malondialdehyde formed by the arachidonate oxygenase prostaglandin synthetase system of bovine seminal vesicle. *Prostaglandins* 4: 325-341.
4. Starling MB, Elliott RB (1974). The effects of prostaglandins prostaglandin inhibitors and oxygen on the closure of the ducts arteriosus pulmonary arteries and umbilical vessels in vitro. *Prostaglandins* 8: 187-203.
5. Bacon WL, Vizcarra JA, Morgan JLM, Yang J, Liu HK, et al. (2002). Changes in plasma concentrations of luteinizing hormone progesterone and estradiol-17 $\beta$  in peripubertal turkey hens under constant or diurnal lighting *Biology Reproduction* 67: 591-598.
6. Girouard H, Savard R (1998). The lack of bimodality in the effects of endogenous and exogenous prostaglandins on fat cell lipolysis in rats. *Prostaglandins* 56: 43-52.
7. Jawad HS, Idris LHB, Bakar MB, Kassim AB (2015). Anatomical Changes of Akar Putra Chicken Digestive System after Partial Ablation of Uropygial Gland. *American Journal of Animal and Veterinary Sciences* 10: 217-229.
8. Jawad HS, Lokman IH, Zuki ABZ, Kassim AB (2016). Partial ablation of uropygial gland effects on growth hormone concentration and digestive system histometrical aspect of akar putra chicken *Poultry Science* 95: 966-973.
9. Al-Hayani WKA (2005). The use of Iraqi method represented with surgical removal of the uropygial gland to improve productive physiological performance and immunological responses to broiler Ross strain. Thesis MSc College of Agriculture University of Al-Anbar Iraq.
10. Al-Shamire JSH (2009). The effect of uropygialectomy and diet supplementation with probiotics on productive and physiological Performance of Japanese quails. Thesis MSc College of Agriculture University of Baghdad Iraq.
11. Brush AH (1993). The evolution of feathers A novel approach *Avian Biology* 9: 121-162.
12. Jawad HS, Lokman IH, Zuki ABZ, Kassim AB (2016). Partial ablation of uropygial gland effects on carcass characteristics of Akar Putra chicken *Poultry Science* 1-7.
13. Jawad HS, Idris LHB, Naji SA, Bakar MB, Kassim AB (2015). Partial Ablation of Uropygial Gland Effect on Production Performance of Akar Putra Chicken. *International Journal of Poultry Science* 14: 213-221.