# Use of GnRH-agonists for Medical Management of Reproductive Disorders in Birds

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**KEYWORDS**

• GnRH agonist • Leuprolide acetate • Lupron • Deslorelin • Reproductive disorders

**KEY POINTS**

- Gonadotropin-releasing hormone (GnRH) is a peptide hormone that acts as the main link between the neural and endocrine system, controlling reproduction in birds and mammals.
- The physiologic GnRH release from the hypothalamus occurs in a pulsatile fashion and GnRH receptors are predominately found on the anterior pituitary, regulating the synthesis and release of gonadotropins in birds.
- Administration of long-acting formulations of synthetic GnRH super-agonists (eg Leuprolide, Deslorelin) leads to a reduction of gonadal hormone secretion by overriding the physiologic pulsatile GnRH release from the hypothalamus.
- Deslorelin acetate implants are effective in suppressing gonadal activity in birds. The average duration of action of the 4.7-mg implant is approximately 3 months.
- The 9.5-mg deslorelin implants may achieve a longer duration of action. Significant species differences exist.
- Leuprolide acetate is effective in suppressing gonadal activity in birds. The duration of action is about 2 to 3 weeks.

## INTRODUCTION

Disorders of the reproductive tract in captive birds are amongst the most common reasons for seeking veterinary care. Although reproductive disorders, such as chronic egg laying, oviductal disease, ovarian disease, and testicular tumors, are relatively easy to diagnose in avian patients, the treatment of these disorders remains challenging. In contrast to many diseases seen in dogs and cats, no scientific studies are available that compare outcome and survival times of medical versus surgical

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treatments in birds suffering from reproductive disorders. Therefore, it remains challenging to make scientifically sound recommendations to clients who are seeking to make an informed decision about the best treatment options available.

Surgical treatment options as the sole therapy for reproductive disorders in birds carry a guarded to poor prognosis in most cases. Although surgical correction is curative for certain disease presentations, such as oviductal prolapse or oviductal impaction, the inability to completely remove the ovary surgically can predispose birds to secondary complications, such as egg-yolk coelomitis due to persistent ovarian activity. Therefore, significant environmental adjustments to minimize triggering of reproductive activity, as well as medical treatments, may be required to prevent continued ovarian activity and ovulation. In other reproductive diseases, such as ovarian neoplasia or ovarian cysts, surgical intervention will not achieve cure, but may lead to only temporary improvement of the clinical signs. Considering the significant surgical and anesthetic risks of coelomic surgery, particularly in small avian patients, medical treatment options are often more feasible, less expensive, and therefore more frequently considered by veterinarians and clients. Over the past years, clinical use of gonadotropin-releasing hormone (GnRH) agonists for treatment of avian reproductive disorders has been increasingly reported, and several prospective research studies evaluating the efficacy of long-acting GnRH agonists in birds have been published.[1–6]

Neither medical nor surgical treatments alone or combined are likely to completely resolve disorders due to chronic gonadal activity in psittacines and passerines. Identifying and correcting the environmental factors that may trigger continued reproductive activity, such as the availability of nesting sites, shredding of paper, feeding warm and soft foods (eg, hand-feeding formula, oatmeal, cooked vegetables), excessive availability of food, foods of high energy density (seeds, corn, grains, table food), excessive daylight exposure, and inappropriate petting, is critical in helping manage these challenging cases.

### *Neuroendocrine Control of Reproduction and the Hypothalamic-Pituitary-Gonadal Axis*

The reproductive physiology in birds, as in mammals, is under the control of the hypothalamic-pituitary-gonadal (HPG) axis.[7,8] A range of hormones, including GnRH, gonadotropin-inhibiting hormone (GnIH), vasoactive intestinal peptide, prolactin, luteinizing hormone (LH), and follicle-stimulating hormone (FSH), are responsible for the neuroendocrine regulation of reproduction in birds.[7]

In birds, as in other vertebrates, the hypothalamic decapeptide GnRH is the primary factor responsible for the hypothalamic control of gonadotropin secretion.[9] GnRH plays a key role in the control of sexual maturity, ovulation rate, semen production, incubation, photorefractoriness, and reproductive aging, which all appear to be related to alterations in GnRH regulation.[10] GnRH acts as the main link of the central nervous system, which receives environmental visual and tactile input (eg, daylight exposure, food availability, tactile stimulation, courtship display) with the endocrine system represented by the anterior pituitary and the gonads. These environmental cues lead to increased release of short-lived GnRH (half-life of 3 to 4 minutes) in a pulsatile fashion from the hypothalamus into the hypophyseal portal vasculature and reaches the anterior pituitary gland, where GnRH receptors are expressed. GnRH receptors on the anterior pituitary gland control synthesis and release of gonadotropins and, therefore, gonadal function and hormone production.

Three different forms of GnRH have been identified in birds: avian GnRH-1 (aGnRH-1),[11] avian GnRH-2 (aGnRH-2),[12] and avian GnRH-3 (aGnRH-3).[13] Avian