

Effect of a GnRH agonist (deslorelin) on ovarian activity in leopard geckos (*Eublepharis macularius*)

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Abstract: The aim of this study was to evaluate the effectiveness of deslorelin acetate in the regulation of reproductive activity in captive leopard geckos (*Eublepharis macularius*). Fourteen healthy adult females were separated into two groups. Under general anaesthesia, deslorelin acetate implants (4.7 mg) or placebo implants were administered into the coelom of ten female geckos and four female geckos, respectively. One healthy adult male Leopard gecko was added to each group of females (five females with GnRH implants and two females with placebo implants). The geckos were regularly monitored over two breeding seasons (visual examination, weight control). Nesting sites were checked daily. There were no postoperative complications or any other health problems during the study. Implant administration did not result in long-term suppression of reproductive function. No significant differences were found in the number of clutches between the female groups (deslorelin implants versus placebo implants) or in the number of clutches between the two breeding seasons. Deslorelin acetate implants did not interfere with ovarian activity in captive female leopard geckos. The use of GnRH agonist implants is not an appropriate method for control of reproductive function in female leopard geckos.

Keywords: reptile reproduction; chemical contraception; female lizards

Reproductive diseases are important causes of morbidity in captive female reptiles. Female lizards (veiled chameleons, bearded dragons and green iguanas) kept under low quality husbandry practices (e.g. sub-optimal temperatures, limited exposure to UVB ultraviolet radiation, small terraria with crowding and stress and an insufficient feeding regime) suffer from retained ovarian follicles (or pre-ovulatory follicular stasis) and dystocia (or egg binding, post-ovulatory egg stasis) (Dorresteijn et al. 2007; Kneidinger 2009; Knotek et al. 2009; Kummrow et al. 2010; Knotek et al. 2017).

During the breeding season, female leopard geckos can lay between one and two eggs almost every two weeks, a physiologically demanding pro-

cess often leading to severe reproductive and metabolic disorders (Dorresteijn et al. 2007; Kneidinger 2009; Knotek et al. 2009; Kummrow et al. 2010; Knotek 2013; Knotek et al. 2017). Current methods of treatment of pre-ovulatory follicular stasis involve surgical treatment (ovariectomy, ovariectomy) or conservative treatment (ovulation induction by the presence of a male leopard gecko) (Knotek et al. 2013). The effectiveness of leuprolide acetate and deslorelin acetate in the regulation of reproductive activity in captive green iguanas has been already studied (Dorresteijn et al. 2007; Kirchgesser et al. 2009; Kneidinger 2009; Knotek et al. 2009; Knotek et al. 2013). Similar information dealing with deslorelin acetate in geckos is

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Table 1. Body weights of female leopard geckos with GnRH agonist implants ($n = 10$) or placebo implants ($n = 4$)

| | Mean body weight before implant administration (g) | | Mean body weight at end of breeding season (g) | |
|------------------------|--|------------|--|-------------|
| | GnRH | placebo | GnRH | placebo |
| 1 st season | 40.2 ± 13.0 | 41.0 ± 8.0 | 40.3 ± 10.0 | 41.6 ± 12.0 |
| 2 nd season | 50.2 ± 11.7 | 51.4 ± 6.3 | 51.1 ± 7.9 | 51.8 ± 6.1 |

missing. This research study was focused on the effectiveness of deslorelin acetate in regulation of reproductive activity in captive female leopard geckos (*Eublepharis macularius*).

MATERIAL AND METHODS

Animals. Fourteen adult female leopard geckos (*Eublepharis macularius*) were housed and handled with the agreement of the Branch Commission for Animal Welfare of the Ministry of Agriculture of the Czech Republic (accreditation no. 45620/2008-17210, 45620/10001). The geckos were kept in three groups of five, five and four animals, respectively, under standard husbandry conditions in three terraria (75 cm × 88 cm × 75 cm each) with a 12-hour/12-hour day/night cycle provided by 60 W incandescent bulbs, and basking provided by UV lamps (Repti-Glo 10.0, Hagen). Temperatures in the terraria ranged from 24 °C to 35 °C, and air humidity from 60% to 80%. Prior to the procedure each animal was given a complete physical examination, including recording of the body weight, and checked for the presence of intestinal parasites.

Implant administration. Female leopard geckos were fasted for 24 hours before the anaesthesia. Meloxicam (1 mg/kg, Metacam (2 mg/ml, Boehringer Ingelheim Vetmedica GmbH, Germany) was administered intramuscularly in the left front leg. Tramadol (10 mg/kg, Tramal 50 mg/ml Grünenthal GmbH, Germany) was administered intramuscularly in the right front leg. Alfaxalone (15 mg/kg, Alfaxon 10 mg/ml, Vétoquinol, France) was administered intramuscularly 45 minutes later in the left front leg. After 5–10 minutes animals were anaesthetised with isoflurane (Forane, Baxter,

USA) and oxygen (0.2–0.4 l/min) with the use of mask made from rubber gloves. Geckos were placed on an electric heating pad (Bosch PFP 1031; Bosch, Czech Republic) at a temperature of 35.5 °C and placed in dorsal recumbency for the implantation.

Heart rate and respiratory rate were recorded during the procedure and until full recovery. Heart rate was recorded with the use of a Doppler ultrasonic flow detector (UltraTec PD1v, United Kingdom). Respiratory rate was recorded by direct visual observation. Loss and full recovery of the following reflexes were recorded from alfaxalone administration onwards: righting reflex, palpebral reflex, toe-pinch reflex on the pelvic limb and skin sensitivity.

Commercial implants with the GnRH agonist deslorelin acetate (4.7 mg, Suprelorin[®], Virbac, France) were administered into the coelom in ten females, while commercial placebo implants (Virbac France) were administered in four females of the control group. The small wound in the skin was closed with one to two sutures using Caprolon 4-0 (Resorba, Germany). Three weeks later, two groups were established (each group consisted of seven females: five females with GnRH implants and two females with placebo implants). One healthy adult male leopard gecko was added to each of the groups. A box filled with vermiculite was placed in both of the terraria to stimulate egg laying. The female leopard geckos were regularly monitored over two breeding seasons. Nesting sites were checked daily for the presence of eggs.

Data analysis. For statistical evaluation, Microsoft Excel 2010 was used (Microsoft[®], USA). All reproductive results were recorded and evaluated. Means and standard deviations were calculated for the body weight of females, the number of clutches, number of eggs and weight of eggs (Tables 1 and 2).

Table 2. Reproductive indicators in female leopard geckos with GnRH agonist implants ($n = 10$) and females with placebo implants ($n = 4$)

| Type of implant | Number of clutches/female | | Number of eggs/female | | Mean weight of eggs/clutch (g) | |
|------------------------|---------------------------|-------------|-----------------------|------------|--------------------------------|-------------|
| | GnRH | placebo | GnRH | placebo | GnRH | placebo |
| 1 st season | 3.8 ± 0.42 | 3.75 ± 0.50 | 7.6 ± 0.84 | 7.5 ± 1.24 | 6.50 ± 1.24 | 6.48 ± 1.33 |
| 2 nd season | 4.7 ± 0.48 | 4.7 ± 0.50 | 9.2 ± 1.4 | 9.5 ± 1.00 | 6.84 ± 1.00 | 6.86 ± 1.07 |

RESULTS

Implant administration was not followed by any postoperative complications or health problems at any point in the study (Table 1). Females were monitored for two breeding seasons and no significant differences were observed with respect to the number of eggs/female, number of clutches/female and weight of eggs (Table 2). In the second breeding season, mean body weight of females was increased in comparison with their body weight in the first season (Table 1).

DISCUSSION

The general anaesthesia of female leopard geckos using the combination of meloxicam with tramadol, alfaxalone and isoflurane was uneventful; which is in accordance with our previous experiences with alfaxalone anaesthesia in reptiles, including lizards (Knotek 2017). Our previous studies were focused on the clinical use of GnRH implants (deslorelin) in young female green iguanas and veiled chameleons. In the experimental groups, subcutaneous implants did effectively suppress the reproductive activity of female green iguanas, but did not suppress the reproductive activity of female veiled chameleons kept in groups (Knotek 2014). In comparison with those studies with subcutaneous implant administration, implants with deslorelin or with placebo were administered deeply into the coelom in the present study. No significant differences in the number of clutches between the female groups (deslorelin implants versus placebo implants) were found. No differences were found in the number of clutches between the two breeding seasons. Deslorelin acetate implants did not interfere with ovarian activity in captive female leopard geckos. The use of GnRH agonist implants did not prove to be an appropriate method for control of reproductive function in captive female leopard geckos.

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