Baseline serum concentration of gonadotrophin hormones in jennies

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Abstract

The study was conducted to determine the baseline serum concentration of gonadotrophin hormones in Jennies. Nine mature Jennies aged between 3 and 5 years and weighing 150-180 kg were used in this study. Blood samples were collected weekly from all Jennies, starting at the first week of November till the last week of January. The serum concentration of FSH and LH were determined by ELISA methods using FSH and LH kits. The results showed that the mean of baseline serum concentration of FSH and LH are 2.90 ± 0.23 and 2.08 ± 0.25 ng/ml, respectively. The higher concentration of FSH was 3.36 ± 0.27 ng/ml which observed at the third week of January and the lower concentration was 2.54 ± 0.24 ng/ml that recorded at the third week of November. While the higher concentration of LH was 2.39 ± 0.48 ng/ml which observed at the third week of December and the lower concentration was 1.56 ± 0.46 ng/ml that recorded at the second week of January. There were no significance differences in serum concentrations of FSH and LH between the weeks, also there was no correlation between the concentrations of both hormones at the duration of the study. Further studies are required to determine the level of FSH and LH at different phases of Jennie’s estrus cycle.

Keywords: FSH, LH, Donkey, Jenny.
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المستوى الاساس لهرمونات القدن في اناث الحمير

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فرع الجراحة وعلم تناقل الحيوان، كلية الطب البيطري، جامعة الموصل، الموصل، العراق

الخلاصة

اجريت الدراسة لابعاد المستوى الاساس لهرمونات القدن في اثاث الحمير، حيث استخدمت سعة من اثاث الحمير البالغة (اعمارها 3-5 سنوات وأوزانها 150-180 كغ). جمعت عينات الدم من الاثاث الأسبوعياً ابتداءً من الأسبوع الأول من شهر تشرين الثاني ولغاية الأسبوع الأخير من شهر كانون الثاني. تم قياس كل من تركيز الهرمون محفز الجريبات والهرمون اللوتنسي باستخدام طريقة الالز Ни ونظام عدد الفحص الخاص لكل هرمون. بنيت النتائج ان المستوى الاساس لكل من الهرمون محفز الجريبات والهرمون اللوتنسي لفترة الدراسة 2.90 ± 0.23 و 2.08 ± 0.25 نانوغرام/مل، على التوالي. لوحظ ان مستوى الهرمون محفز الجريبات في الأسبوع الثالث من شهر كانون الثاني، واقل مستوى كان 2.54 ± 0.24 نانوغرام/مل والذي سجل في الأسبوع الثالث من شهر كانون الأول واقل مستوى كان 1.56 ± 0.46 نانوغرام/مل وذلك لوحظ في الاسبوع الثاني من شهر كانون الثاني، واقل مستوى كان 1.06 ± 0.24 نانوغرام/مل. لوحظ أن هناك ارتباط بين تركيز كلا الهرمونين على طول مدة الدراسة، المزدج من الدراسات مطلوبة لابعاد مستوى كل من الهرمون محفز الجريبات والهرمون اللوتنسي خلال الفترات المختلفة من دوره الشبق في اثاث الحمير.
Introduction

The donkey (Equus asinus) has been associated with mankind throughout recorded history. It is still widely used in many parts of the world as guard animals for protecting small ruminants (sheep, goats and llamas), as companion animals (for people, foals, etc.), halter training (calves, foals), work (pack, pulling wagons, plowing, etc.), riding, and shows (1).

The oestrus cycle of animals is regulated by reproductive hormones which include gonadotrophin releasing hormone (GnRH), follicle stimulating hormone (FSH), luteinizing hormone (LH), estrogen, progesterone, oxytocin, inhibin and prostaglandin F$_2$α (2).

Both FSH and LH, that also called gonadotrophin hormones, are secreted from the anterior pituitary gland under the stimulating effect of GnRH that secreted from the hypothalamus (3). Secretion of FSH and LH is also regulated by the positive and negative feedback mechanisms of other hormones such as estrogen, progesterone and inhibin (2).

In female animals, the function of FSH is stimulate the follicular growth to produce the mature follicle (4), while the functions of LH are ovulation, formation and maintain the corpus luteum (5).

The baseline concentrations of FSH and LH have been measured in female animals such as cows (6,7), ewes (8), bitches (9) and mares (10), but there is no information about the baseline level of these two hormones in Jennies. Therefore, the objective of this study was to determine the baseline concentration of FSH and LH in Jennies.

Materials and methods

Nine mature Jennies (aged 3-5 years and weighing 150-180 kg) were used in this study. Blood samples were collected from the jugular vein weekly from all Jennies, starting at the first week of November till the last week of January. Serum samples were isolated from blood samples and stored at -20°C until the time of hormone analysis.

The serum concentration of FSH and LH were determined by ELISA methods using FSH and LH kits (FSH ELISA Kit, 425-300, LH ELISA Kit, 425-300, Monobind Inc, USA). The optical density of samples was obtained using the microplate reader (Universal Microplate Reader-ELx 800, Bio-Tec. Instruments Inc, USA).

One way analysis of variance and Pearson correlation coefficients were applied for statistical analysis of data using SigmaStat (Jandel scientific software V3.1), and P<0.05 was considered as statistically significant.

Results

The standard curves of FSH and LH are presented in Figure 1 and 2, respectively. The regression equation of FSH and LH were $Y=0.0378x-4.2655$ and $Y=0.085x-14.171$, and the correlation coefficients ($r^2$) were 0.9912 and 0.9479, respectively. These curves were applied later as standards to calculate the serum concentration of FSH and LH.

![Figure 1: The standard curves of FSH.](image1)

The mean of baseline serum concentrations of FSH and LH are 2.90 ± 0.23 and 2.08 ± 0.25 ng/ml, respectively (Table 1). The higher concentration of FSH was 3.36 ± 0.27 ng/ml which observed at the third week of January and the lower concentration was 2.54 ± 0.24 ng/ml that recorded at the third week of November. While the higher concentration of LH was 2.39 ± 0.48 ng/ml which observed at the third week of December and the lower concentration was 1.56 ± 0.46 ng/ml that recorded at the second week of January. Statistical analysis shows no significance differences in serum concentrations of FSH and LH between the weeks, also there was no correlation between
the concentrations of both hormones at the duration of the study.

Table 1: Serum concentration (mean ± SD) of FSH and LH in Jennies (n=9), at the period between first week of November and last week of January.

<table>
<thead>
<tr>
<th>Months</th>
<th>Weeks</th>
<th>FSH Concentration ng/ml</th>
<th>LH Concentration ng/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>November</td>
<td>1</td>
<td>2.73 ± 0.26</td>
<td>2.06 ± 0.55</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2.87 ± 0.51</td>
<td>1.97 ± 0.36</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2.54 ± 0.24</td>
<td>2.16 ± 0.58</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>3.01 ± 0.99</td>
<td>2.06 ± 0.68</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>2.79 ± 0.73</td>
<td>2.12 ± 0.36</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>3.04 ± 1.15</td>
<td>2.27 ± 0.78</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>3.03 ± 1.48</td>
<td>2.39 ± 0.48</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>2.77 ± 0.73</td>
<td>2.20 ± 1.13</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>2.73 ± 0.51</td>
<td>2.23 ± 0.85</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>2.81 ± 0.50</td>
<td>1.71 ± 0.30</td>
</tr>
<tr>
<td>December</td>
<td>11</td>
<td>2.75 ± 0.56</td>
<td>1.56 ± 0.46</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>3.36 ± 0.27</td>
<td>2.44 ± 0.85</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>3.25 ± 1.60</td>
<td>1.91 ± 0.11</td>
</tr>
<tr>
<td>January</td>
<td>Mean</td>
<td>2.90 ± 0.23</td>
<td>2.08 ± 0.25</td>
</tr>
</tbody>
</table>

Discussion

The baseline serum concentrations of Jennie’s gonadotrophin hormones were determined between November and January; this period was selected because it located on the anoestrus season of equines (11), and in this period the FSH and LH remain at low concentration (baseline) (12).

In this study the baseline serum concentration of FSH was 2.90 ± 0.23 ng/ml, this level of hormone is lower than the baseline concentration of FSH that recorded in mares (4.5-6.5 ng/ml) (10), ponies (8.34 ng/ml) (13), ewes (6.1 ng/ml) (8) and bitches (4.4 ng/ml) (9). While the concentration of FSH which observed in this study was higher than those that reported in cows (0.72 ng/ml) (6) and rabbits (0.36 ng/ml) (14).

The baseline level of LH that recorded in this study (2.08 ± 0.25 ng/ml) was higher than LH baseline concentration that observed in mares (0.1-0.3 ng/ml) (10), also higher than shown in cows and bitches (0.6-0.7 ng/ml) (7,9,15), but the baseline level of LH which recorded in ponies (5.09 ng/ml) (13) was higher than the level of LH that determined in this study.

There was no significance variation in serum concentration of FSH and LH among the period of study, this indicate that the Jennies have an anoestrus period because the level of these hormones remain at the same level during the anoestrus season (12). Further studies are required to determine the level of FSH and LH at different phases of Jennie’s estrus cycle.

Acknowledgments

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References