Research on the Concentration of Plasma Testosterone in Silver Foxes (*Vulpes fulva*) and Polar Foxes (*Alopex lagopus*) Raised in Captivity

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Abstract

The plasma testosterone determinations were performed on 19 silver fox males (*Vulpes fulva*) and 19 polar fox males (*Alopex lagopus*) that were coming from the farm. The concentration of testosterone was performed on prepubertal males (0-10 months), during the sexual period and the period of sexual rest. For quantitative determination of the testosterone, some systems were used like the VITROS system ECi/ECi O2, the immunological diagnostic system VITROS 3600 and the integrated system VITROS 5600. In both species, the plasma concentration was maximal at the males in the period of sexual activity (1.56±0.23 ng/ml at the polar fox and 1.46±0.23ng/ml at the silver fox) and minimal in males between the age 0-10 months (0.22±0.01 ng / ml at the polar foxes and 0.20±0.01 ng/ml at the silver foxes).The adult males that were in the sexual rest period showed low testosterone levels (0.25±0.02 ng/ml at the polar foxes and 0.22±0.02 ng/ml at the silver foxes).

Keywords: plasmatic testosterone, polar fox (*Alopex lagopus*), silver fox (*Vulpes fulva*), testosterone levels, vitros system.

1. Introduction

At the mammalian males, testosterone is the main hormone secreted by the adrenal glands and by the Leydig cells that are found in the testicles. At the level of the liver, the testosterone is transformed into a series of metabolites, biological active and with androgenic effects. The androgen hormones secreted by the adrenal cortex have lower androgenic effects. At males, the testosterone stimulates the maturation of genitalia and the secondary sexual characters [1-4].

At the male mammals with cyclic sexual activity testosterone suffers changes in the plasmatic concentration [5]. The determination of testosterone aims to investigate sexual dysfunctions at the prepubertal and adult foxes [6, 7].

The approach of this research was imposed by the lack of information on the concentration of the plasma testosterone at the silver foxes (*Vulpes fulva*) and at the polar foxes (*Alopex lagopus*) of Bura and Patruica, 2014 [4].

2. Materials and methods

The plasma testosterone determinations were performed on 19 silver fox males (Vulpes fulva) and 19 polar fox males (*Alopex lagopus*) that were provided from the Research and Development Station for Fur Animals from Targu Mures. At both of the fox species, the plasma testosterone concentration was performed on three males: pre-

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pubertal (0-10 months), at the intense sexual activity and at the sexual resting period.

For quantitative determination of testosterone in serum and plasma, systems were used like the immunological diagnostic VITROS ECi/ ECi O2 and the VITROS 5600 Integrated System.

The Immuno-competitive analysis technique used by the conception between the testosterone present in the sample and the conjugated testosterone marked as horseradish peroxidase (HRP0 for a limited number of binding sites on a biotinized antibody (mouse anti-testosterone). The antigen-antibody complex was captured by the streptavidin from the wells. Unbound materials were removed by washing.

The reagent pack contains homogeneous liquid reagents that do not require shaking or mixing before they are loaded into the system.

3. Results and discussion

In the postnatal anthogenic period from 0 to 10 months (impubertal and pubertal stage) the concentration of plasma testosterone was on average at 0.20±0.01 ng/ml at the silver fox, as variation limits ranging from 0.16-0.24 ng/ml.

At the young polar foxesthe testosterone level was on average at 0.22±0.01 ng/ml, and the limits recorded external values between 0.19-0.28 ng/ml.

At both of the young fox species the level of testosterone recorded a medium variability (CV between 10 and 20%) among the individuals taken into study.

At the silver fox males (*Vulpes fulva argintata*) and polar fox males (*Alopex lagopus*) that were in sexual activity, the level of plasma testosterone comparative to the young foxes (puber and impuber) shows significant increases. Thus, at the silver foxes, the concentration of the plasma testosterone varied between 0.90-2.40 ng/ml, with an average of 1.46±0.23 ng/ml. At the polar foxes, the plasma testosterone varied between 1.11-2.60 ng/ml, with an average of 1.56±0.23 ng/ml.

This increase in the concentration of the plasma testosterone was evidenced by the histological examination that revealed at this physiological stage the existence of a well-developed interstitial gland. The Leydig cells, with large dimensions, are grouped into islands and cellular loops that disposed near the vessels. The intense positive reaction of interstitial cells to histochemical reactions supports the high secretory activity of these cells.

Between May and September, when the males of both fox species were found to be sexually resting, the plasma levels of testosterone decreased significantly at the basal level, which also affected general metabolic processes.

The plasma concentration of testosterone at males at sexual rest ranged between 0.14-0.30ng/ml at the silver foxes (*Vulpes fulva*), with an average value of 0.22±0.02 ng/ml, and at the Polar fox (*Alopex lagopus*) varied between 0.16-0.31 ng/ml with an average of 0.25±0.02 ng/ml.

During the sexual rest, the histological examination revealed a change in the volume of the interstitial gland. Due to the fact that Leydig's islands are blurred and the volume of interstitial cells decreases, their secretory activity diminishes.

Table 1. The concentration of the plasma testosterone (ng/ml) at the silver and polar fox males which are from the farm

Specification	Silver fox			Polar fox		
	Prebubal period (0–10 month)	Sexual activity period	Period of sexual rest (V-IX)	Prebubal period (0–10 month)	Sexual activity period	Period of sexual rest (V-IX)
n	6	6	7	6	6	7
X	0.20	1.46	0.22	0.22	1.56	0.25
Sx	0.01	0.23	0.02	0.01	0.23	0.02
S	0.03	0.56	0.05	0.03	0.56	0.06
CV	13.13	38.07	23.28	14.94	35.83	22.86
Minim Value	0.16	0.90	0.14	0.19	1.11	0.16
Max Value	0.24	2.40	0.30	0.28	2.60	0.31

4. Conclusions

1. The plasma level of testosterone showed cyclic variations
2. The plasma concentration of testosterone was maximal during the period of sexual activity when it reached an average value of 1.56±0.23 ng/ml at the polar foxes (*Alopex lagopus*) and 1.46±0.23 ng/ml at the silver foxes (*Vulpes fulva*).
3. The lowest level of testosterone was recorded at the males (0-10 months), which averaged 0.22±0.01 ng/ml at the polar foxes and 0.20±0.01 ng/ml at the silver foxes.
4. At the adult males the testosterone concentration was maintained at a low level averaged at 0.25±0.02 ng/ml at the polar foxes and at 0.22±0.02 ng/ml at the silver foxes.

References

1. Boitior, I., Endocrinologia reproducerii la animalele de fermă; Ed. Ceres Bucureşti. 1979, pp. 309.
2. Bud, I., Animale de blană: creştere, întreţinere, reproducere si valorificare. Ed. Academic Pres Cluj–Napoca, 2001, pp. 285.
3. Bura, M., Tehnologia creşterii animalelor de blană carnivore. Ed. Agroprint Timişoara, 2012 pp.160.
4. Bura, M., Pătruică, Silvia, Controlul reproducerii animalelor mici. Ed. Agroprint Timişoara, 2014, pp.246.
5. Sava., I., Cercetări privind ciclicitatea sezonieră a reproducerii şi creşerii tineretului la vulpea argintie (*Vulpes vulpes*) şi polară *Alopex lagopus*): Simpozionul: Creşterea şi valorificarea iepurilor, animalelor de blană şi vânatului, Timişoara, 1998, pp. 118 -124.
6. Nicula, M., Fiziologie animală; Ed. Mirton Timisoara, 2004, pp. 408.
7. Păcală, N., Biologia reproducerii animaleleor. Ed. Mirton Timişoara, 2000.
8. Reuti Dîrlea, A., Citologie şi biologie celulară, Ed. Solnes, Timişoara, 2000.