PRELIMINARY RESULTS OF THE STUDY ON SOME HEMATOLOGICAL AND BIOCHEMICAL VALUES OF TAKHI

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ABSTRACT

Some hematological values, blood total protein, protein fractions, and minerals such as calcium and phosphorus of takhi, which are now being reintroduced in Khustain natural park, were measured. There were 8.3 million red blood cells and 8000 white blood cells in 1 mm^3 whole blood of takhi reintroduced in Khustain natural park, and hemoglobin was 179.6±3.2 g/l. As well, total proteins, calcium and phosphorus of takhi were 67± 0.6 g/l, 2.1±0.31 mmol/l, and 1.1±0.2 mmol/l respectively and they were similar to those in Mongolian horses. It has been necessary to investigate further adaptability of takhi in asscoation with both internal and external environments of its body.

KEY WORDS: Takhi, red blood cells, white blood cells, hemoglobin, total protein

BACKGROUND

Study of biological and physiological features of reintroducing takhi, and improvement of the viability and reproductive capacity based on such study is of special significance for their normal growth.

Size of minimal population with greater viability differs with features of the species. Scientists inform that presence of 500-5000 individuals are optimal for vertebrates (Primak et al, 2003). In order to create an independent population capable of freely raising and reproducing in the nature without direct human supervision, it has been essential to increase number of takhi population, which are being reintroduced, to 500 at least.

If any animals could adapt to the ecological conditions, they can multiply, leave their next generations and become an element of living entities. Besides such, metabolism suited to the animal body is initiated in order to adapt to certain areas, and internal body environment changes as a result.

Therefore, there are essential necessity of studying the features of metabolism takhi populations reintroduced in their own native land.

OVERALL GOALS AND OBJECTIVES

To investigate some hematological and biochemical values of takhi, which are being reintroduced in Khustain natural park, the following objectives were put forward:

1.To measure some hematological values of takhi;
2.To investigate some biochemical values in blood of takhi.

MATERIALS AND METHODS

Some issues of takhi reproduction have been studied on takhi reintroduced in Khustain natural park since 2009, both hematological and biochemical values were determined by using below described methods.

After the capture of takhi by nature rangers, 10 ml blood samples were taken from jugular vein of each animal by using vacuum tubes. As well whole blood samples for hematological measurements were taken by using tubes with anticoagulants (heparin).

Both red and white blood cells of takhi were counted by use of Goryaev chamber and hemoglobin was measured by Sahli's hemometer.

Blood samples taken in tubes without anticoagulant were placed in incubator at 37^0C and serum was separated to measure the following parameters. Blood total protein, albumin, globulin and its fractions were measured by refractometry, total calcium by method of D.Y.Lutskii, and inorganic phosphorus by using vanadate molybdate reagent (GOST 26657-85).

RESULTS OF THE STUDY

Arrival of the first takhi herd in our country from Holland in 1992 was the start of reintroduction of this animal in their native land. Then 84 takhi were reintroduced by 5 fold shipments between 1992 and 2000, and nowdays they have been reacclimatized and are being multiplied. At present a total of 257 takhi are kept in Khustain natural park.

Table 1

Structure of takhi herds reintroduced in Khustai nuruu

	Foals	Yearling	Immature		Mature		Total
			Male	Female	Male	Female	
2009	39	9	33	38	59	79	**257**
Live takhi after reintroduction					2	19	21

From the table, immature and mature takhi account for 46.3% and 53.7% respectively. Since reintroduction of takhi, 63 or 75.0% of them have been dead and nowadays 236 or 91.9% of all animals were born in their native land and only 8.1% are those, which were reintroduced from overseas. Blood samples were taken from 5 takhi captured randomly by us, and below hematological parameters were determined.

Table 2

Hematological values of takhi

	Our study (n-5)	Kuttner C et al	Mongolian horse
RBC (mln)	8.3 ±0,4	8.9	6.0-9.0
WBC (thousand)	8.0± 0.2	8.3	8.0-12.0
Hemaglobin (g/l)	179.6±3.2	155	90-149

The table shows RBC, WBC and hemoglobin values of takhi are similar to takhi bred abroad and slightly higher than those in Mongolian horse.

As well, the following values were measured in blood serum of takhi.

Table 3

Some biochemical values in the blood of takhi

	Our study (n-5)	Kuttner C et al	Mongolian horse
Total protein (g/l)	67± 0.6	69	70-78
Albumin (g/l)	36.2± 0.5	39.6	41.3
Globulin (g/l)	28.1± 0.5	28.4	33.7
Calcium (mmol/l)	2.1±0.3	1.58	2.5-3.5
Phosphorus (mmol/l)	1.1±0.2	1.52	1.4-1.8

Total protein of blood of takhi in Khustain nuruu is similar to takhi bred abroad and slightly less than Mongolian horse, while inorganic phosphorus is slightly less than those reported by others.

DISCUSSION

Despite reintroduction of takhi, which were becoming extinct in our country, started 20 years ago, studies on values of internal body environment are relatively less than those prevailing research on biology and ecology of takhi.

Main indicators of internal environment of animal body are both hematological and biochemical values. Besides they become main indicators for level of animal body metabolism, and its variations become play major role in detection of both normal and pathologic conditions of animal body.

The present study aimed to investigate hematological and biochemical values of takhi reintroduced in Khustain natural park.

Because takhi is wild animal, capture of the animal and blood sampling are difficult, and therefore detailed study of them with seasons and age groups was relatively limited.

Results of our study are basically in agreement with those by Kuttner C., and Wiesner H. RBC and hemoglobin concentration of Mongolian horse (D,Badamdorj, 1983 and Saipolda et al, 2011) are slightly lower than takhi. Although takhi is seen as forebear of Mongolian takhi, there is a basis to see that their body structure, functions and metabolic rates become different for thousands years in association with environmental factors. On the other hand, they were living in foreign lands for about 100 years and kept under different climatic and semi-pastured conditions. As well main way of defending their body is their speed. It results in stimulating muscular development, which requires enormous amounts of energy and oxygen adsorption for shorter period and such biological feature may be expressed with higher level fof RBC and hemoglobin.

WBC and total proteins are similar to those reported by others, while globulin is less than Mongolian horse. Concentration of globulin, the major protein responsible for animal body humoral immunity, which is slightly less than horse, are attracting our interests and further study can be theoretically important, because it is observed that there is a tendency of relatively lower immune parameters of animals in environment with lower number of pathogenic microflora. Such issues reveal there is necessity of further study of body resistance and immunity of takhi.

Concentrations of calcium and phosphorus are similar to those reported by others and ratio of thise minerals are normal.

Despite our study is now at the start only, it has been demonstrated that takh herds have adapted to their native lands and they are not suffering from any metabolic disorders.

CONCLUSIONS

1. There are 8.3 million red blood cells and 8000 white blood cells in 1 mm^3 whole blood of takhi reintroduced in Khustain natural park, and hemoglobin is 179.6±3.2 g/l.
2. Total proteins, calcium and phosphorus of takhi were 67± 0.6 g/l, 2.1±0.31 mmol/l, and 1.1±0.2 mmol/l respectively.

SUMMARY

There were 8.3 million red blood cells and 8000 white blood cells in 1 mm^3 whole blood of takhi reintroduced in Khustain natural park, and hemoglobin was 179.6±3.2 g/l. As well, total proteins, calcium and phosphorus of takhi were 67± 0.6 g/l, 2.1±0.31 mmol/l, and 1.1±0.2 mmol/l respectively and they were similar to those in Mongolian horses. It has been necessary to investigate further adaptability of takhi in asscoation with both internal and external environments of its body.

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