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AUTONOMOUS NERVOUS REGULATION OF THE BIRD'S BODY ACCORDING TO TYPOLOGICAL FEATURES

АВТОНОМНА НЕРВОВА РЕГУЛЯЦІЯ ОРГАНІЗМУ ПТИЦІ ЗА ТИПОЛОГІЧНИМИ ОСОБЛИВОСТЯМИ

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Annotation. *Studies of the typological features of the autonomic nervous system in chickens revealed the lowest fashion indicators in combination with the highest values of heart rate in sympathicotonic chickens compared to normo- and vagotonic chickens. At the same time, vagotonics had a tendency to the highest values of fashion, to lower values of fashion amplitude and heart rate. At the same time, in chickens with a balanced type of vegetative regulation, lower average indicators of superoxide dismutase of 2.877 units of act./mg of hemoglobin were found, which are compensated by a higher activity of other investigated enzymes of antioxidant protection - catalase and glutathione peroxidase, which indicates a balance of enzymatic activity in chickens with a predominance normotonic tone of the ANS. In vagotonic chickens, a tendency to increase the average indicators of the activity of all investigated enzymes of the antioxidant system compared to normo- and sympathic chickens was revealed. At the same time, the average value of SOD activity in sympathicotonic chickens is statistically higher than that of normotonic chickens by 8.7%.*

Key words: *vegetative regulation, enzymes, chickens, antioxidant system, tone, catalase, glutathione peroxidase.*

Since the autonomic nervous system regulates the functional state of internal organs, determining the predominance of parasympathetic or sympathetic tone in chickens is the first stage of research, which makes it possible to divide experimental birds into groups based on the tone of autonomous nervous regulation [8, 12].

Studies of the typological features of the autonomic nervous system in chickens revealed the lowest fashion indicators in combination with the highest heart rate values in sympathotic chickens compared to normo- and vagotonic chickens. [5, 14].

At the same time, vagotonics had a tendency to the highest values of fashion, to lower values of fashion amplitude and heart rate [1, 10, 11].

After statistical analysis of the data, the results of spectrophotometric studies of the activity of the enzymatic link of the antioxidant system in the blood of 35-day-old chickens are presented in Table 2 by types of autonomous regulation.

Table 1 - Indicators of tone of autonomous nervous regulation (M±m, n=8)

ANS indicators	Tone of the autonomic nervous system		
	Sympathetics	Normotonics	Vagotonics
Fashion, s	0,15 ± 0,005***	0,16 ± 0,007	0,17 ± 0,013
Amplitude of fashion,%	53 ± 10,39	51 ± 9,50	48 ± 5,04
Heart rate, beats/min	404 ± 7,41***	366 ± 18,57	351 ± 24,74

At the same time, in chickens with a balanced type of vegetative regulation, lower average indicators of superoxide dismutase of 2.877 units of act./mg of hemoglobin were found, which are compensated by a higher activity of other investigated enzymes of antioxidant protection - catalase and glutathione peroxidase, which indicates a balance of enzymatic activity in chickens with a predominance normotonic tone of the ANS.

Table 2 - Indicators of the activity of the enzymatic link of the antioxidant system depending on the tone of the autonomic nervous system in chickens 35 days old (M±m, n=8)

Indicator	Tone of the autonomic nervous system		
	Vagotonics	Normotonics	Sympathetics
Superoxide dismutase, unit act./mg of hemoglobin	3,161 ± 0,092	2,877 ± 0,067	3,150 ± 0,147***
Catalase, H2O2\dm3×min×103	70,193 ± 3,513	69,16 ± 3,431	68,640 ± 2,589
Glutathione peroxidase, glutathione\dm3×min×103	15,335 ± 0,424	13,133 ± 0,427	12,609 ± 0,658

In vagotonic chickens, a tendency to increase the average indicators of the activity of all investigated enzymes of the antioxidant system compared to normo- and sympathic chickens was revealed. At the same time, the average value of SOD activity in sympathicotonic chickens is statistically higher than that of normotonic chickens by

8.7%. This indicates a more active consumption of oxygen in sympathicotonics, as a result of which the formation of superoxide radical increases, which requires a greater amount of SOD to accelerate its neutralization.

However, lower indicators of the overall activity of the enzyme link of the antioxidant system in 35-day-old birds with predominance of the tone of the sympathetic department of autonomic regulation compared to birds of other types of autonomic regulation are noted [3,4, 12]. For example, studies [2, 9] showed a tendency to decrease the activity indicators of superoxide dismutase, catalase, and glutathione peroxidase in birds with a predominance of the sympathetic department of autonomous regulation by 0.4%, 2.2%, and 21.6%, respectively, compared to vagotonics. At the same time, there is a tendency to increase the indicators of the activity of the studied enzymes in vagotonic chickens, which increases with age, compared to normo- and sympathic chickens.

Indicators of the activity of the enzymatic link of the antioxidant system depending on the tone of the autonomic nervous system in 60-day-old chickens (M±m, n=8)

Indicator	Autonomic nervous system tone		
	Vagotonics	Normotonics	Sympathetics
Superoxide dismutase, unit act./mg of hemoglobin	3,27±0,07*	3,35±0,08	3,18±0,10**
Catalase, H2O2\dm3×min×103	77,4±3,10	74,6±3,32	74,5±5,43
Glutathione peroxidase, glutathione\dm3×min×103	16,39±0,83	14,21±0,65	13,27±0,75*

In 60-day-old sympathicotonic chickens, indicators of superoxide dismutase activity remain at a lower level than normotonic chickens by 5.4%, and in vagotonic chickens, a tendency to decrease by 2.8% is noted. The indicator of glutathione peroxidase with the predominance of the sympathetic department of autonomous

regulation is statistically lower by 23.5% and 7.1%, for vago and normotonics. At the same time, the level of catalase also has the lowest values compared to vago- and normotonic drugs. The lowest content of antioxidant enzymes with the predominance of sympathicotonia explains the presence of the largest number of lipid peroxidation products, which increases with intensive processes of oxidation of free radicals in the presence of active forms of oxygen. Correlations were established in 35-day-old chickens between the activity of superoxide dismutase and the predominance of the parasympathetic and normotonic divisions of the autonomic nervous system (r = 0.43-0.59)/. At the same time, there was no relationship between sympathicotonia and superoxide dismutase activity [1,7, 13].

The indicators of catalase and glutathione peroxidase had no correlations with the types of autonomic regulation in chickens 35 and 60 days old. Thus, the level of relationships between superoxide dismutase and types of the autonomic nervous system deteriorates and completely disappears with age, which may be related to the stabilization and balance between the number of reactive oxygen species and the work of enzymes of the antioxidant system. However, at the same time, relationships between different links of the antioxidant system, in particular between the studied enzymes and vitamins, were revealed.

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Анотація. *Дослідженнями типологічних особливостей автономної нервової системи у курей було виявлено найнижчі показники моди у поєднанні із найвищими значеннями частоти серцевих скорочень у курей симпатикотоніків порівняно із нормо- та ваготоніками. Ваготоніки при цьому мали тенденцію до найвищих показників моди, на нижчих значень амплітуди моди та частоти серцевих скорочень. При цьому у курей з врівноваженим типом вегетативної регуляції виявлено нижчі середні показники супероксиддисмутази 2,877 од.акт.\мг гемоглобіну, які компенсуються більш високою активністю інших досліджуваних ензимів антиоксидантного захисту – каталази та глутатіонпероксидази, що вказує на баланс ферментативної активності у курей з переважанням нормотонічного тонусу АНС. У курей-ваготоніків виявлено тенденцію до збільшення середніх показників активності всіх досліджених ензимів антиоксидантної системи порівняно із нормо- та симпатикотоніками. При цьому середнє значення активності СОД у курей-симпатикотоніків статистично більше за нормотоніків на 8,7% .*

Ключові слова: *вегетативні регуляції, ензими, кури, антиоксидантна система, тонус, каталази, глутатіонпероксидаза.*