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## THE CELL REACTIVITY OF THE BODY OF CHILDREN WITH SCOLIOSIS

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*The article is devoted to the study of the cellular reactivity of the body according to the value of 5 indices of intoxication, leukocyte indices of intoxication, nuclear index of the degree of endotoxycosis and hematological index of intoxication of children aged 11-14 with scoliosis and practically healthy peers. As a result of the study, it was established that the indicators of cellular reactivity of the body of practically healthy boys are almost no different from practically healthy girls of this age, in children with scoliosis aged 11-14, increased cellular reactivity is observed compared to practically healthy peers. according to the leukocyte index of intoxication according to B.A. Reis - by 12.78%, and for Yu.Ya. Kalf-Kalif - by 42.86%. In girls with scoliosis at the age of 11-14, there is an increase in the cellular reactivity of the body compared to boys with scoliosis of this age according to the hematological indicator of intoxication (according to V.S. Vasilyev). It was also established that girls have a tendency to increase the cellular reactivity of the body according to the leukocyte intoxication index and the intoxication index Cellular reactivity of the body of children with scoliosis depends on gender, and the indicator of cellular reactivity in practically healthy peers does not depend on gender.*

**Key words:** children at the age of 11-14 years, scoliosis, cellular reactivity.

### The connection of the publication with the planned research works.

The research work was carried out within the framework of the thesis work in accordance with the plan of the State Higher Educational Institution «DDPU». The research is a fragment of the ERW «Study of adaptive reactions of the organism that are formed under the influence of various factors of nature and society», state registration № 0115U003314.

### Introduction.

The natural reactivity of the human body includes, among others, natural resistance. This mechanism is caused by chemical and biological barriers, the normal microflora of all sense shells, enzyme systems of cells, which destroy and neutralize foreign agents, participate in protective reactions. Stability is ensured by factors and corresponding reactions of immune, nervous, endocrine and other systems [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12].

Cellular adaptive changes in the case of defects in the development of the organism of varying degrees of severity are the basis of the survival of the organism in the changing external world. In different periods of life and in other cases, there are significant variations in the expression of cellular reactivity (active, suppressed, reactivity), these are physiological reactions of adaptation (adjustment), and not evidence of the formation of any diseases [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12].

Cellular reactivity varies depending on the severity and period of the disease, in extreme situations and other cases. The conclusions regarding cellular reactivity are made on the basis of endogenous intoxication index values. In children with scoliosis, the cellular reactivity of the body was determined by the value of intoxication indices, leukocyte indices of intoxication ac-

ording to B.A. Reis and Yu.Ya. Kalf-Kalif, nuclear index of the degree of endotoxycosis and hematological index of intoxication (according to V.S. Vasilyev) [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12].

### The aim of the study.

The research was to study the cellular reactivity of the body of children at the age of 11 to 14 years old with scoliosis in comparison with their practically healthy peers, depending on gender.

### Object and research methods.

The bases for the study were: a specialized general educational sanatorium and boarding school for children with scoliosis in the city of Oleksiievo-Druzhkivka and secondary school № 17 in the city of Sloviansk, Donetsk region.

The study was conducted in 19 children at the age of 11 to 14 with scoliosis (9 boys and 10 girls). As a control group, similar studies were conducted in 24 practically healthy peers (12 boys and 12 girls).

In children with scoliosis, the cellular reactivity of the body was determined by the value of 5 indices of intoxication, leukocyte indices of intoxication according to B.A. Reis and Yu. Ya. Kalf-Kalif [6], the nuclear index of the degree of endotoxycosis and the hematological index of intoxication according to V.S. Vasilyev [1].

The statistical processing of the obtained results was carried out according to well-known methods of variable statistics with determination of average values (M) and standard error ( $\pm m$ ). The reliability of the data for independent samples is calculated according to the Student's t-test. The difference was considered significant at  $P > 0.05$ .

The research work was performed in accordance with generally accepted bioethical norms, in compliance with the relevant principles of the Helsinki Declaration

**Table – The cell reactivity of the body of children with scoliosis from the age of 11 to 14 years**

Indices	Standard units	Practically healthy children			Children with scoliosis					1	2
		Boys (n=12)	Girls (n=12)	P	Boys (n=9)		Girls (n=10)				
					Indicators	DCRV	Indicators	DCRV	P		
Index of intoxication	s.u.	0,067±0,007	0,069±0,008	>0,05	0,066±0,007	-I	0,073±0,008	+I	>0,05	>0,05	>0,05
The hematological index of intoxication (according to V.S. Vasyliiev)	s.u.	268,89±3,02	267,47±2,72	>0,05	258,02±2,65	-I	281,26±3,11	+I	<0,05	>0,05	<0,05
The nuclear index of the degree of endotoxiosis	s.u.	0,05±0,01	0,06±0,02	>0,05	0,05±0,01	-	0,05±0,01	-I	>0,05	>0,05	>0,05
Leukocyte intoxication index according to B.A. Reis	s.u.	1,71±0,02	1,61±0,02	<0,05	1,93±0,03	+I	1,87±0,04	+I	>0,05	<0,01	>0,05
Leukocyte intoxication index according to Ya.Ya. Kalf-Kalif	s.u.	0,63±0,07	0,52±0,05	>0,05	0,90±0,09	+I	0,80±0,08	+II	>0,05	<0,05	<0,05

**Note:** DCRV – the degree of cellular reactivity violations; P – the reliability of the differences between the indicators of boys and girls within the group; P1 – reliability of differences between the indicators of boys of both groups; P2 – the reliability of the differences between indicators in practically healthy people and those with scoliosis.

of Human Rights, the Council of Europe Convention on Human Rights and Biomedicine, and the relevant laws of Ukraine. All children’s parents gave written consent for their children’s participation in the study.

**Research results and their discussion.**

The results of the study of the cellular reactivity of the body of children with scoliosis from the age of 11 to 14 years are presented in the **table**.

The cellular reactivity of the body in practically healthy children from the age of 11 to 14 years has practically no gender differences. The indicators of cellular reactivity of the body of practically healthy boys are almost no difference from practically healthy girls of this age. However, in practically healthy boys, the leukocyte intoxication index according to B.A. Reis is 6.91% higher than in practically healthy girls of this age.

In boys with scoliosis from the age of 11 to 14 years the increased cellular reactivity was revealed compared to practically healthy boys according to the following indicators. According to the leukocyte index of intoxication according to B.A. Reis – by 12.78%, according to Y. Ya. Kalf-Kalif – by 42.86%. Girls with scoliosis at the age of 11-14 compared to practically healthy girls of this age have a higher cellular reactivity of the body according to the hematological indicator of intoxication (according to V.S. Vasyliiev) by 5.16%. According to the leukocyte index of intoxication according to Ya.Ya. Kalf-Kalif – by 53.85%. In addition, they develop a tendency to increase the cellular reactivity of the body according to the leukocyte index of intoxication according to B.A. Reis – by 16.15% and according to the intoxication indicator – by 5.80%.

So, in girls with scoliosis, the cellular reactivity of the body is formed, which according to most indicators is higher than in practically healthy girls from the age of 11 to 14.

In girls with scoliosis at the age of 11-14 years, an increase in cellular reactivity of the body is noted in comparison with boys with scoliosis of this age according to the hematological indicator of intoxication (according to V.S. Vasyliiev) by 9.01% and by the indicator of intoxication – by 10.61%. However, it was noted that in boys with scoliosis of this age, the cellular reactivity of the body is higher than in girls with scoliosis according to the leukocytic index of intoxication according to Y.Ya. Kalf-Kalifu by 25.0%, and according to the leukocytic index of intoxication according to B.A. Reis – by 3.21%.

**Conclusions.**

Thus, the cellular reactivity of the body of children with scoliosis at the age of 11-14 depends on gender and the indicator of cellular reactivity. In girls with scoliosis, the level of cellular reactivity is higher than in boys with scoliosis at this age. In children with scoliosis, the level of cellular reactivity of the body is slightly higher than in practically healthy children. The cellular reactivity of the body of practically healthy children from the age of 11to14 does not depend on gender, as it does in children with scoliosis from the age of 7 to 10.

**Prospects for further research.**

The main scientific provisions obtained in this article are the basis for the next stage of research aimed at studying the cellular reactivity of the body of children with scoliosis at the age of 15-17 years.

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### КЛІТИННА РЕАКТИВНІСТЬ ОРГАНІЗМУ ДІТЕЙ ЗІ СКОЛІОЗОМ

**Дичко Д., Дичко О., Неханевич О., Шейко В., Клименко Ю., Яковленко В., Дичко В.**

**Резюме.** Клітинні адаптаційні зміни при дефектах розвитку організму з різного ступеня тяжкості є основою виживання організму в постійно мінливому зовнішньому світі.

**Мета роботи:** дослідження полягало у визначенні клітинної реактивності організму дітей віком 11-14 років хворих на сколіоз в порівнянні з їх практично здоровими однолітками в залежності від статі.

**Об'єкт і методи дослідження.** Базами для дослідження виступили: спеціалізована загальноосвітня санаторна школа-інтернат для дітей зі сколіозом м. Олексієво-Дружківка та загальноосвітня школа № 17 м. Слов'янська Донецької області. Дослідження проведено у 19 дітей віком 11-14 років зі сколіозом (9 хлопчиків і 10 дівчаток). У якості контрольної групи аналогічні дослідження були проведені у 24 практично здорових однолітках (12 хлопчиків і 12 дівчаток).

**Результати.** Клітинна реактивність організму у практично здорових дітей у віці 11-14 років практично не має гендерних відмінностей. У хлопчиків зі сколіозом у віці 11-14 років виявлена підвищена клітинна реактивність у порівнянні з практично здоровими. Дівчата зі сколіозом у віці 11-14 років у порівнянні з практично здоровими дівчатками цього віку мають вищу клітинну реактивність організму за гематологічним показником інтоксикації (по В.С. Васильєву). Крім того, у них формується тенденція до збільшення клітинної реактивності організму за лейкоцитарним індексом інтоксикації по Б.А. Рейсу – на 16,15% і за показником інтоксикації – на 5,80%. Отже, у дівчаток зі сколіозом сформована клітинна реактивність організму, яка по більшості показників вище, ніж у практично здорових дівчаток у віці 11-14 років. У дівчаток зі сколіозом у віці 11-14 років відзначається підвищення клітинної реактивності організму в порівнянні з хлопчиками зі сколіозом цього віку по гематологічному показнику інтоксикації (по В.С. Васильєву) на 9,01% і за показником інтоксикації – на 10,61%. Однак, відзначено, що у хлопчиків зі сколіозом цього віку клітинна реактивність організму вища, ніж у дівчаток зі сколіозом по лейкоцитарному індексу інтоксикації за Я.Я.Кальф-Каліфу на 25,0%, і по лейкоцитарному індексу інтоксикації по Б.А. Рейсу – на 3,21%.

**Висновки.** Таким чином, клітинна реактивність організму дітей зі сколіозом у віці 11-14 років перебуває в залежності від статі і показника клітинної реактивності. У дівчаток зі сколіозом рівень клітинної реактивності вищий, ніж у хлопчиків зі сколіозом в цьому віці. У дітей зі сколіозом рівень клітинної реактивності організму трохи вище, ніж у практично здорових дітей. Клітинна реактивність організму практично здорових дітей у віці 11-14 років не залежить від статі, як у дітей зі сколіозом у віці 7-10 років.

**Ключові слова:** діти 11-14 років, сколіоз, клітинна реактивність.

### THE CELL REACTIVITY OF THE BODY OF CHILDREN WITH SCOLIOSIS

**Dychko D., Dychko O., Nekhanevych O., Sheiko V., Klymenko O., Yakovenko V., Dychko V.**

**Abstract.** The cellular adaptive changes in the case of developmental defects of the organism of varying degrees of severity are the basis of the body's survival in the changing external world.

**Purpose:** the research consisted of study the cellular reactivity of the body of children at the age of 11-14 with scoliosis in comparison with their practically healthy peers, depending on gender.

**The object and methods of research.** The bases for the study were: specialized general sanatorium boarding school № 13 for children with scoliosis in Oleksiievo-Druzhkivka and secondary school № 17 in Sloviansk, Donetsk region. The study was conducted in 19 children at the age of 11–14 with scoliosis (9 boys and 10 girls). As a control group, similar studies were conducted in 24 practically healthy peers (12 boys and 12 girls).

**Results.** The cellular reactivity of the body in practically healthy children at the of 11-14 years has practically no gender differences. In boys with scoliosis at the age of 11-14 years, the increased cellular reactivity was found compared to practically healthy ones. Girls with scoliosis at the age of 11-14 compared to practically healthy girls of this age have a higher cellular reactivity of the body according to the hematological indicator of intoxication (according to V.S. Vasyliiev). In addition, they develop a tendency to increase the cellular reactivity of the body according to the leukocyte index of intoxication according to B.A. Reis – by 16.15% and according to the intoxication indicator – by 5.80%. So, in girls with scoliosis, the cellular reactivity of the body is formed, which according to most indicators is higher than in practically healthy girls at the age of 11-14.

In girls with scoliosis at the age of 11-14 years, an increase in cellular reactivity of the body is noted in comparison with boys with scoliosis of this age according to the hematological indicator of intoxication (according to V.S. Vasyliiev) by 9.01% and by the indicator of intoxication – by 10.61%. However, it was noted that in boys with scoliosis of this age, the cellular reactivity of the body is higher than in girls with scoliosis according to the leukocytic index of intoxication according to Y.Ya. Kalf-Kalif by 25.0%, and according to the leukocytic index of intoxication according to B.A. Reis – by 3.21%.

**Conclusions.** Thus, the cellular reactivity of the body of children with scoliosis at the age of 11-14 depends on gender and the indicator of cellular reactivity. In girls with scoliosis, the level of cellular reactivity is higher than in

boys with scoliosis at this age. In children with scoliosis, the level of cellular reactivity of the body is slightly higher than in practically healthy children. The cellular reactivity of the body of practically healthy children at the age from 11 to 14 years does not depend on gender, as in children with scoliosis at the age of 7-10 years.

**Key words:** children at the age of 11-14 years, scoliosis, cellular reactivity.

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**Conflict of interest:**

The Authors declare no conflict of interest.

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