

## **Participation of Sense Smell at the Regulation of serum Glycemic Reactions, PT, T, TT of Rabbit Babies which have Undergone Prenatal Hypoxia at the Initial Period of Postnatal Ontogenesis**

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### **ABSTRACT**

In the present study, the pathologic effects of hypoxia on serum glucose level, prothrombin (PT), thrombin (T), thrombin time (TT) and also smell sense insufficiency were investigated during embryonic period in 30-day infant rabbits. The research (which was carried out during 2009-2011) was based on an experimental design and used two groups: two experimental groups (11-20 and 21-30 days) and a control group including pregnant rabbits. The statistical results for day 30 of infants suffering from hypoxia and smell sense insufficiency in experimental groups showed reduction of glucose, PT, T and TT level and there was a significant difference between control and experimental groups.

**KEYWORDS:** Hypoxia, Glucose, Prothrombin, Thrombin, Sense Smell.

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### **1. INTRODUCTION**

The data obtained through the recent researches showed that it is possible to find the secrets of body organisms including metabolism and blood circulation system that supplies oxygen to numerous cells of other organs and body tissues that face pathologic problems.

So, the daily healthy and vital status of human depends on environmental conditions during its embryonic growth in uterus which is effective on postnatal life. Numerous studies were made on rabbit fetus in uterus with pathologic problem. Undoubtedly, it is necessary to study about this case and studies made in this regard by scientist have proved our opinions about mentioned subject [1-8]. Considering the scientific papers mentioned in references, hypoxia makes irreversible pathologic changes in the brain and other organs of system in internal fluids (somato-visceral), in homeostasis and behavioral interactions in most cases, whether during the pregnancy period of after that and faces the natural growth and development of organisms with serious problems [9-14]. Hypoxia in body organism (hemostatic, homeostatic) shows sensory and fermentative effects and makes changes in mechanisms and it is clinically important and necessary to learn them from physiologic viewpoint. The author has studied about hypoxia in different stages of pregnancy in rabbits and has also studies the smell sense of 30-day infants and found that insufficiency in smell sense result in changes in the amount of glucose, prothrombin (PT), thrombin (T), thrombin time (TT).

It is interesting that the smell can influence the quality and emotional tone of dreams. The researches took roses near the nose of subjects who were in the stage of dreaming and then woke them up and told them to talk about their dreams. While the subjects reported no smell in their dreams, the emotional sense of their dreams had completely changed based on the stimulant. Smell of rose stimulated good feelings and the smell of rotten egg had converse effects [15]. Smell sense in most creatures stimulated specific behaviors like mate finding, territorialization, alert announcement and attack. Most species of animals release scented materials (pheromone) under special conditions which affect other animals as a chemical messenger and make some physiologic changes in their bodies and causes special behaviors. For example, in most of mammals the smell of one sex affects the hypothalamus and hypotheses of the mammal of the other sex and facilitates the maturity process (physiology of nerves and endocrines). It is observed that the scientific findings are correspondent with the published papers and discussions about hypoxia and smell sense.

### **2. MATERIAL AND METHODS**

The studies were conducted on pregnant rabbits that experienced hypoxia in daily period of 20 minutes with pregnancy period of 30 days (1-10, 11-20, 21-30). First, the rabbits were divided into two groups and then some female rabbits were selected as experimental groups and some as control group. The experimental rabbits were divided into three groups and their infants were under hypoxia 20 minutes per day with the combination of N<sub>2</sub> (93%) and O<sub>2</sub> (7%) during pregnancy period, (day 1-10) during 30 days of pregnancy for the first group, (day 11-20) for the second group and (day 21-30) for the third group. Hypoxia was conducted using xvatova method

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(1978) and was observed with (oximeter pulse) 7% O<sub>2</sub> inside the box. Blood samples were taken from 30-day infants of both groups that were grown under natural air and the amounts of glucose, PT, T and TT were determined. The olfactory nerve system (epithelium) of infants in both group was stopped using Pogrebkova method [16] and after restoring the amount of glucose was measured using a Canadian glucometer, PT with German Kit and TT with French Stago Kit.

According to these studies we can conclude that oxygen detrition and olfactory nerve transaction (Epithelium) make changes in blood fibrin and is observed in the organism of 30-day rabbit infants. However, the effect of pre-birth hypoxia on blood is very strong in long term, but the effect of olfactory nerve transaction (Epithelium) on blood is weak in short term. The effect of sense smell on blood is less than that of hypoxia and this is clearly shown by different tests conducted by us. We believe that such effects in the blood of 30 – day infants shoe the interaction in nervous adjustments that perform homeo and haemostatic indexes. Humoral, endocrine and fermentative mechanisms can also related with weak performance. At the end, I want to mention that according to the factors obtained through tests and relying on the obtained scientific result , the subject of hypoxia sense were studied from the viewpoint of scientific physiology and clinical practical issues and the importance of the cases are shown.

### 3. RESULTS

The results of analysis of variance in pretest There is a significance in level of glucose , prothrombin , Thrombin and Thrombin time between control rabbits infants (30 days) and 30 days old infants by hypoxia (11-21 days) and (21-30 days).

Also, the result of LSD test showed that the level of glucose and prothrombin was only decreased significantly in infants by hypoxia (11-20 days) compared to control group and thrombin time was increased significantly in infants by hypoxia (11-20 days) and (21-30 days) relative to control group.

Also , the results of analysis of variance in post test showed that there had a significance difference in level of glucose, prothrombin, thrombin and thrombin time between control rabbits infants and infants by hypoxia (10-20 days) and (21-30 days) in all groups after de-receptor olfactory nerve.

Also it is revealed that the levels of glucose, prothrombin, thrombin were decreased significantly in infants by hypoxia (11-20 days) and (21-30 days) compared to control group and level of thrombin time was increased significantly in groups by hypoxia (11-20 days ) and (21-30 days) relative to control group.

**Table 1.** Comparison of blood indices of control 30 days infants and 30 days infants by hypoxia (11-20 days) and (21-30 days) in pretest and after dereceptor olfactory nerve in posttest

Group		Control	11-20 Day	21-30 Day
Glucose	Pretest	152.5+4.7	118.4+9.3**	132.5+7.2**
	Posttest	151.0+7.36	140.0 +5.4**	131.0+6.38**
Prothrombin	Pretest	16.4+1.8	11.6+0.54*	11.5+0.66
	Posttest	16.3+2.5	10.5+1.7**	7.4+0.80**
Thrombin	Pretest	29+0.71	18+0.76**	28+0.52
	Posttest	21.0+3.6	17+2.4*	16.2+1.50**
Thrombin time	Pretest	13.9+5	19.5+2**	16.41+1.7*
	Posttest	12.0+1.7	18.0+1*	15.0+0.80*

\*Significance in %5, \*\* Significance in %1

### 4. DISCUSSION

The studies conducted about the changes in blood circulation systems of rabbits and biochemical components of cells of fetus suffering from hypoxia for a long time inside the uterus during different growth stages showed that occlusion in blood and reduction of glucose rate, PT, T and TT were observed in their 30-day newborns. These studies helped us determine the time of negative effects of pre-birth hypoxia. For the first time, we found that the fetuses experiencing pre-birth hypoxia inside uterus during growth stages show disorders and serious effects on glucose systems and occlusive factors during biological periods after birth in comparison with control fetuses. Our other objective in these basic studies is to analyze the olfactory nerve system of 30-day fetus in control and experimental groups and its effect on glucose, PT, T and TT and the results of studies show that there is a reduction in glucose and blood occlusion rate. Wundt [17] found that epithelium of respiratory system shows special defense against infections and disorder of defense and also lack of smell senses and anosmia in animals result in disorder of reproduction process. When smell sense decreases (hyposmia), the person faces problems in smelling of aromatic materials or in all types of qualities. Sometimes, human suffers from smell sense disorder (parosmia) without any disability which is called smell hallucination. In all cases of inability of smelling the materials without any disability is because of speaking disorder and intelligence reduction.

Guyton and Hall [18] found that smell sense has pleasant and unpleasant emotional characteristics more than sense of taste and that is why it is more important than the sense of taste when selecting a food. In fact, when a person has eaten a food which was not pleasant for him, he will overcome by nausea by the smell of that food and a perfume with a pleasant smell can stimulate sexual excitement in human instead.

In some lower animals, the smells are the main factor of stimulation the sexual excitement (physiologic psychology, page 190). Besides, these findings show that smell sense insufficiency influences the rate of glucose, PT, T and TT. Physiologically, the statistical analysis of experimental studies shows that hypoxia, epithelium rupture and smells sense insufficiency results in chronic and incurable diseases and is directly related to creation of occlusion process. These findings are in accordance with those of the previous papers.

## 5. CONCLUSION

As a result of conducted researches it is revealed that level glycemic reactions, time of a prothrombin and thrombin in the blood of rabbits, burns from mothers subject to a hypoxemia during the various periods of pregnancy in comparison with normal animals are essentially reduced. After the decrepitating of sense smell glucose maintenances, time of a prothrombin and thrombin in the blood at the 30<sup>th</sup> day rabbits, developed under hypoxia in separate (1-10, 11-20 and 21-30 days) periods embryogenesis are lowered as, in comparison with normal and after comparison with prenatal hypoxia.

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## REFERENCES

1. Abdulkarimova SL, AH Husseinov, Mamedov XB; prenatal hypoxia in young rabbits of the 20-day gray matter limbic brain functional development of the visual effects , Institute of Physiology and scholarly works of the Fizio Külliyyatı logs, Baku, 2008, XXVİcild, p. 7-11
2. Gaziyevev AQ, Mustafaeva GQ Embryogenesis E11-E20 in the early stages of postnatal development of blood parameters of rabbits were subjected to a factor of hypoxia. Institute of Physiology of the scientific works of physiologists' society, Baku, 2008, Volume XXVI, p. 99-103.
3. Farhadi,Naser. Affected prenatal ontogenesis hypoxia 30 days of the determination of the amount of glucose in the blood after epiploectomy, Azerbaijan Institute of Physiology and scientific works of the Society of physiologists, Baku, 2008, XXVİcild, p. 76-79.
4. Berezinski V.A Hypoxia and individual characteristics of reactivity. Kiev. publishing house " Naukova dumka". 1978. 235 pages.
5. Van-Lir E. Sütkney K. Hypoxia . publishing house " medicine".1967. 368 pages.
6. Vataeva L.A , Otellin V.A,Kassil V.G. and other. Hypoxia in the prenatal and early postnatal ontogenesis of rats. effects on brain development and formation of behavior.// Reports of the Russian Academy of Sciences,1998. Tome 363. № 3.page 409-411.
7. Elensperger G., Elensperger R., Herrera E. et al. Fetal brain hypometabolizm during prolonged hypoxemia // J. Physiol, 2005, N 3, p. 963-975.
8. Gross J. Burgoyne R.D., Rose S.P. Influence of prenatal hypoxia on brain development: Effects on body weight, brain weight, DNA, protein, acetylcholine esterase, 3-quanintilidiny benzillate binding and in vivo incorporation of (14C) lysine into sub cellular fractions // J. Neurochemistry, 1981, v. 37, N 4, p. 229-237.
9. Aliev A.G Inter and eksteroretserivnye regulation glycemic response in normal conditions and after the pineal gland dysfunction analyzers in postnatal ontogenesis. summary of the doctoral thesis...Baku 1992. Page 46.
10. Aliev A.G. Allahverdieva K.M. the role of physical activity and olfactory analyzer in the regulation of the dynamics changes in the circadian rhythm of the glycemic response to early postnatal ontogenesis. Medical sciences 2010. №5 Page 7-11
11. Bigidi E.V. Olfactory reception is mediated by tyrosine kinase and phosphoinositide signaling systems // sensor systems. 2005. № 1, page 44-48.
12. Guseynov A.G. The structural organization of the neocortex in the rabbit prenatal ontogenesis// success of Physiological Sciences, 2003, tome 34. №2. Page 64-75.
13. Sosunov A.A,Chelischev U.A, Mak-Hann and other. Neurogenesis in the adult mammalian brain // ontogeny,2002. Tome 33.№6, page 405-420.
14. Nimura Y., Nei M. Evolutionary dynamics of olfactory and other chemosensory genes in vertebrates // J. Human Genet., 2006, v. 51, N 6, p. 505-517.
15. Mucigant-caretta carla, Bodimichela, caretta Antonio, Time course of alteration after olfactory bulbectomy in mice. Physiology & behavior, 2006, 89:637-643.
16. Pogrebkova A.D. Respiratory reactions when the dogs olfactory reception. In the book of the physiology and interoception.Moskow. publishing house " science", 1972, publication 2, page 14-21.
17. Wundt WM. Physiology and psychology. 1874. Page 192.
18. Arthur c.Guyton and Hall, Medical Physiology, page 668.