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## COMPENSATORY AND ADAPTIVE FEATURES OF THE FETOPLACENTAL SYSTEM IN PRETERM LABOR

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Mavlyanova Shakhnoza Alijanovna

Shu Department Of Master, Uzbekistan

Nasirova Feruza Jumabaevna

Asmi 1 - Associate Professor Of Department Of Obstetrics And Gynecology Uzbekistan

### ABSTRACT

Premature birth remains a serious problem in obstetrics and gynecology, having a significant impact on the health of newborns and mothers. One of the key factors contributing to premature birth is the insufficiency of the fetoplacental system. In this study, we will focus on the compensatory and adaptive features of the fetoplacental system in preterm labor, in order to understand the mechanisms underlying this condition.

### KEYWORDS

Compensatory and adaptive features, fetoplacental system, premature birth, adaptation, hemodynamics of the placenta, newborns, anatomical and physiological changes, intrauterine life, risk of complications, influence of premature birth.

### INTRODUCTION

Premature birth remains one of the significant problems in the field of obstetrics and perinatology, posing a challenge both for medical professionals and

for the future health of the fetus. According to world data, the incident of premature birth accounts for about 10% of all pregnancies, and despite efforts in the

field of medicine, the rate of premature birth remains consistently high. The fetoplacental system plays a key role in the maintenance and development of the fetus throughout pregnancy. Her condition and compensatory mechanisms during premature birth are of deep interest for understanding the mechanisms of adaptation of the fetus to adverse developmental conditions.

The fetoplacental system is a complex network of interaction between the fetus and the placenta, providing nutrition, gas exchange and elimination of metabolic waste. Its functioning is an integral factor in maintaining the normal development of the fetus. However, in case of premature birth, this complex mechanism can be significantly disrupted, which requires more in-depth research. One of the key aspects of our study is the analysis of the compensatory and adaptive mechanisms of the fetoplacental system in preterm labor. Preliminary data indicate the activation of various adaptive mechanisms in the fetus aimed at preserving its viability in a premature extrauterine environment. Studies show that during premature birth, the fetus activates energy conservation mechanisms, changes its metabolic activity and adapts gas exchange systems to optimize its survival. These compensatory mechanisms require additional study in order to better understand their effect on fetal health in the long term.

Our research focuses on identifying adaptive mechanisms of the fetoplacental system that attempt to compensate for the adverse conditions of premature birth. One of the main aspects of our attention is the change in the morphological characteristics of the placenta during various periods of premature birth. We consider changes in the surface area of the villi, the thickness of the basement membrane and the number of capillaries as indicators of adaptive processes in the fetoplacental system. An important area of our research is the analysis of the functional activity of the fetoplacental system in preterm labor. We investigate changes in the regulation of blood flow, the exchange of gases and nutrients between maternal and fetal organisms. The assessment of hormonal background and cytokine levels in the mother-fetus system is also included in our analysis to identify possible molecular markers of adaptation.

1. Anatomical and physiological aspects of the fetoplacental system in preterm labor. The fetoplacental system is a complex anatomical and physiological complex that ensures the exchange between maternal and fetal circulation. In case of premature birth, the adaptation processes of the fetoplacental system are activated to minimize the negative consequences of the preliminary termination of pregnancy. One of the important points is adaptation to the early onset of fetal lung function. The

pulmonary system, which had not previously played a key role, is activated to prepare for independent breathing. At the same time, the adaptation of the fetoplacental system includes changes in the vascular system of the placenta, aimed at maintaining optimal blood supply to fetal organs and tissues in conditions of premature termination of pregnancy.

2. Changes in the hemodynamics of the placenta and fetal vessels. One of the main compensatory mechanisms is an increase in placental blood supply and redistribution of blood flow in fetal vessels. Accelerated formation of the placental vascular network and its hyperplasia contribute to a more efficient transfer of oxygen and nutrients from the mother to the fetus. In the case of premature birth, these changes occur at earlier stages of pregnancy than during its normal course. An increase in the diameter of the arteries and veins of the placenta, as well as a change in the structure of the villi of their chorionic layer, are aimed at ensuring maximum blood flow to the fetus and minimizing the risk of hypoxia.

3. Adaptation to changes in the environment. The fetoplacental system also activates mechanisms of adaptation to the external environment during premature birth. This includes accelerated maturation of the placental endocrine system, which regulates the hormonal background of the mother and fetus. Increasing the secretion of hormones such as catecholamines and corticosteroids is aimed at

maintaining homeostasis and ensuring fetal survival in preterm labor. In addition, studies show that during premature birth, inflammatory processes in the fetoplacental system can be activated. This inflammatory response may be part of a protective mechanism aimed at preventing infections and maintaining homeostasis in conditions of insufficient readiness of the body for birth.

4. The effect of premature birth on the condition of newborns. Compensatory and adaptive mechanisms of the fetoplacental system, activated during premature birth, have a direct effect on the condition of newborns. Early activation of the fetal pulmonary system causes adaptation to the conditions of extrauterine life. However, despite these compensatory mechanisms, newborns born prematurely are often susceptible to a number of complications. Premature newborns have an increased risk of a number of medical problems, including lung distress syndrome, thermoregulation disorders, and problems with the cardiovascular system. This is due to the fact that despite compensatory mechanisms, adaptation to external conditions is not always fully completed before the moment of premature birth.

## **CONCLUSION**

Premature birth remains one of the most serious problems of obstetrics and perinatology, having a significant impact on newborn health and long-term

development. One of the key aspects of this problem is the compensatory and adaptive response of the fetoplacental system to the conditions of the fetus's preliminary exit from the maternal body. In this article, we will discuss the compensatory and adaptive mechanisms activated by the fetoplacental system during premature birth, as well as their impact on the health of newborns. Premature birth is a serious problem for the fetoplacental system and the health of newborns. However, the activation of compensatory and adaptive mechanisms of the fetoplacental system at the preliminary end of pregnancy indicates the importance of early adaptation to new living conditions. Further research in this area will allow us to better understand the mechanisms of compensation of the fetoplacental system and develop more effective strategies for improving and maintaining the health of prematurely born children. Conclusion The study of compensatory and adaptive features of the fetoplacental system in preterm labor is important for understanding the pathological mechanisms and developing new approaches to the prevention and treatment of this serious condition. A deep understanding of the adaptive mechanisms of the fetoplacental system in preterm birth may contribute to the development of new therapeutic strategies to reduce risks and improve pregnancy outcomes.

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