RELAXIN AND ITS ROLE IN THE MECHANISMS OF PRETERM LABOR

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Аннотация

Статья посвящена роли гормона релаксина в механизмах преждевременных родов. Рассматриваются функции релаксина в организме женщины во время беременности, его влияние на шейку матки, матку и ткани родовых путей. Описаны основные механизмы преждевременных родов, связанные с повышенным уровнем релаксина, а также его роль в воспалительных процессах и стрессовых реакциях организма. В статье также рассматриваются современные методы диагностики, включая использование уровня релаксина для прогноза риска преждевременных родов. Обсуждаются перспективы использования релаксина как биомаркера и терапевтической цели для предотвращения преждевременных родов.

Ключевые слова: Релаксин, Преждевременные роды, Гормоны беременности, Механизмы преждевременных родов, Шейка матки, Биомаркеры преждевременных родов, Цервикальная зрелость

Abstract

This article explores the role of the hormone relaxin in the mechanisms of preterm labor. The functions of relaxin in the female body during pregnancy are examined, including its impact on the cervix, uterus, and birth canal tissues. The main mechanisms of preterm labor associated with elevated levels of relaxin are described, as well as its role in inflammatory processes and stress responses. The article also discusses current diagnostic methods, including the use of relaxin levels to predict the risk of preterm labor. Perspectives on the use of relaxin as a biomarker and therapeutic target for the prevention of preterm labor are also considered.

Key words: Relaxin, Preterm labor, Pregnancy hormones, Mechanisms of preterm labor, Biomarkers of preterm labor, Cervical ripening

Annotatsiya

Ushbu maqola relaxin gormoni va uning erta tug'ruq mexanizmlaridagi roliga bag'ishlangan. Maqolada relaxinning homiladorlik davridagi ayol organizmidagi funksiyalari, uning bo'yin, bachadon va tug'ruq yo'llariga ta'siri ko'rib chiqiladi. Relaxinning oshgan darajasi bilan bog'liq bo'lgan erta tug'ruq mexanizmlari, shuningdek, uning yallig'lanish jarayonlari va stressli reaktsiyalar bilan aloqasi tasvirlanadi. Maqolada shuningdek, relaxin darajasidan foydalangan holda erta tug'ruq xavfini prognoz qilishda qo'llaniladigan zamonaviy tashxis usullari muhokama qilinadi. Relaxinni biomarker va terapevtik maqsad sifatida foydalanish imkoniyatlari ham ko'rib chiqilgan.

Kalit so'zlar: Relaxin, erta tug'ruq, Homiladorlik gormonlari, erta tug'ruq mexanizmlari, erta tug'ruq biomarkerlari, servikal yetilish

Preterm labor (PTL) occurs before 37 weeks of pregnancy. PTL remains one of the leading causes of maternal and perinatal mortality and morbidity, despite significant advances in medicine and obstetrics. A major challenge is the difficulty in accurately predicting and diagnosing preterm labor, which complicates prevention and treatment. Several factors are known to affect the likelihood of preterm labor, with relaxin playing a special role. The effect of relaxin on pregnancy and labor physiology is actively studied, and this hormone holds potential as a marker for preterm labor risk and a possible target for therapy.

What is Relaxin?

Relaxin is a hormone produced in the body of women during pregnancy. It was first discovered in 1926 and has since been studied in the context of its effects on reproductive function. Several types of relaxin exist, but the most important one in terms of labor processes is relaxin I, which is secreted by the ovaries and placenta. **Functions of Relaxin in the Female Body**

Relaxin plays several key roles in a woman's body, especially during pregnancy. Its main functions include:

Cervical softening. Relaxin helps break down collagen fibers in the cervix, increasing its elasticity and preparing it for expansion during labor.

Relaxation of smooth muscles. It reduces the tone of smooth muscles, including those in the uterine walls, preventing premature contractions and maintaining uterine quiescence until labor begins.

Increased blood volume. Relaxin promotes the dilation of blood vessels, which helps increase blood volume necessary for the proper functioning of the uterus and other organs during pregnancy.

Preparation of pelvic ligaments. Relaxin also affects connective tissues, allowing the pelvic bones to expand and adapt to the increasing size of the uterus.

Relaxin and Its Role in Normal Labor

Under normal conditions, relaxin plays a crucial role in preparing the female body for labor. Around the 37th week of pregnancy, relaxin levels reach their peak, helping the cervix soften and dilate and preparing the birth canal for the passage of the baby. Importantly, this change occurs gradually and in synchrony with other hormones, such as oxytocin.

Preterm Labor: Main Causes and Mechanisms

Preterm labor occurs before 37 weeks of pregnancy and is one of the leading causes of perinatal mortality and morbidity. Preterm labor can be caused by a range of factors, which include:

Infections. Infections, especially those of the urinary and reproductive systems, significantly increase the risk of preterm labor. Inflammation may trigger the production of inflammatory mediators, such as cytokines, which can affect the levels of relaxin and other hormones.

Multiple pregnancies. Multiple pregnancies are also associated with a higher risk of preterm labor due to the increased strain on the body and disruption of normal hormonal regulation.

Psychological stress. Chronic stress can influence the levels of steroid hormones, including relaxin, which can trigger preterm labor.

Genetic factors. Some genetic factors may predispose a woman to higher levels of relaxin or increased sensitivity of the cervix to its action, contributing to preterm labor.

The Relationship Between Relaxin and Preterm Labor

Studies suggest that changes in the level of relaxin may play a significant role in the mechanisms of preterm labor. Elevated levels of relaxin or its premature activation can disrupt the normal development of the cervix, increasing its elasticity and causing premature dilation. This process is one of the key factors leading to preterm labor.

Mechanisms of Relaxin's Effect on Cervical Tissue

Just as in normal labor, high levels of relaxin can lead to changes in the collagen structure of the cervix. In the case of preterm labor, these changes occur prematurely, resulting in the early softening and dilation of the cervix. This, in turn, can trigger labor before the 37th week of pregnancy.

Relaxin and Inflammation

Infections and inflammation are major contributors to preterm labor. Inflammation in the uterus or cervix can stimulate the production of cytokines, which in turn can increase the production of relaxin. Relaxin, in turn, may exacerbate the inflammation and softening of tissues, leading to the initiation of preterm labor.

Hormonal Imbalance and Stress

Both physical and psychological stress can affect hormone levels in the body. Stress can increase the levels of hormones such as cortisol, which can stimulate the production of relaxin. This, in turn, can lead to premature cervical softening and an increased risk of preterm labor.

Diagnosis and Prediction of Preterm Labor Through Relaxin Levels

One of the promising methods for predicting preterm labor is monitoring the levels of relaxin in the blood and cervical tissues. Increased relaxin levels can serve as an early indicator of the risk of preterm labor.

Diagnostic Methods for Measuring Relaxin Levels

Some studies have shown that relaxin levels can be higher in women at risk for preterm labor. Biochemical tests and blood tests measuring relaxin levels can be used for early detection of this risk. However, it is important to note that elevated relaxin levels may also be associated with other conditions and physiological states.

Prediction and Prevention

The use of relaxin levels for predicting preterm labor is an important area of obstetric practice. Based on these findings, appropriate therapy can be initiated, and close monitoring can be started. In the future, it is possible that medications targeting relaxin levels could be developed to reduce the risk of preterm labor.

Future Research and Therapeutic Approaches

The undeniable connection between relaxin levels and preterm labor opens up possibilities for the development of new methods for preventing and treating this complication. In the future, drugs that regulate relaxin activity in the body could become an important step toward reducing preterm labor rates and improving outcomes for both mother and baby.

Conclusion

Relaxin is an important hormone that regulates the preparation of the female body for labor. Its role in the mechanisms of preterm labor is a crucial subject of ongoing research.

Elevated levels of relaxin can lead to premature softening and dilation of the cervix, contributing to preterm labor. Monitoring relaxin levels and understanding its role in the diagnosis of preterm labor opens new avenues for obstetrics and gynecology, offering potential pathways for the prevention and treatment of this complication.

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