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APP Dysregulation in Neuronal and Skin Cells from Fragile X Patients Depends on Age

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Introduction

Oxidative stress, which is brought on by reactive oxygen species, is associated with pregnancy and childbirth. Oxidative stress has the potential to negatively affect both the course of labor and the development of the fetus. It is possible to assess the newborn's health and the possibility of pregnancy-related health issues by tracking the oxidative stress markers. As a result, research into oxidative stress throughout the physiological course of labor is the first step in understanding the role of oxidative stress in the pathophysiology of miscarriages and neonatal health issues. The study's objective was to assess how much oxidative stress was placed on mother-child pairings during physiological labor in the umbilical cord blood and venous blood. To donate venous umbilical cord blood and the mother's venous blood during the first stage of labor 128 mother-child couples were recruited to donate the mother's venous blood during the first stage of labor and the venous umbilical cord blood after the baby was born. The total antioxidant status with cofactors and glutathione peroxidase activity in venous blood plasma and umbilical cord blood were assessed. The value and concentration of maternal blood plasma were much lower than those of newborn umbilical cord blood. Moms' blood, however, had far higher levels of activity and concentration than babies did. Similar Mn concentrations were found in the mother's blood plasma and the newborns' umbilical cord blood. Umbilical cord blood has higher levels of antioxidant enzymes and total antioxidant capacity, according to our findings. Gene editing has enormous potential for treating genetic diseases such as cystic fibrosis, sickle cell anemia, and Huntington's disease. It could also be used to enhance human traits such as intelligence, athleticism, and appearance. However, gene editing raises ethical questions about the potential misuse of the technology and the creation of designer babies.

Description

Another area of genetics that is transforming healthcare is personalized medicine. Personalized medicine is the idea that medical treatments can be tailored to an individual's unique genetic makeup. By analyzing a patient's DNA, doctors can determine which treatments are most likely to be effective and which drugs might cause harmful side effects. One example of personalized medicine is the use of pharmacogenomics, which is the study of how an individual's genes affect their response to drugs. By analyzing a patient's DNA, doctors can determine which drugs are most likely to work for them and which ones might cause adverse reactions. Personalized medicine is also being used in cancer treatment. By analyzing a patient's tumor DNA, doctors can identify specific mutations that are driving the cancer and develop treatments that target those mutations. This approach, known as precision oncology, has already shown promising results in clinical trials. Genetic testing is another area of genetics that is becoming more accessible to the general public. Genetic testing involves analyzing a person's DNA to determine if they have a genetic predisposition to certain diseases or conditions. For example, genetic testing can reveal if someone is at increased risk for breast cancer, Alzheimer's disease, or heart disease.

Genetic testing is becoming more affordable and more widely available. Companies like 23andMe and Ancestry.com offer genetic testing services that provide information about a person's ancestry and genetic health risks. However, genetic testing also raises concerns about privacy and the potential misuse of genetic information Epigenetics is the study of how environmental factors can affect gene expression without changing the underlying DNA sequence. Epigenetic changes can be caused by factors such as diet, stress, and exposure to toxins. These changes can be passed down from one generation to the next and can have a profound impact on an individual's health and well-being. One example of epigenetic changes is the effect of maternal nutrition on fetal development. Studies have shown that a mother's diet during pregnancy can affect the epigenetic marks on her which can lead to changes in gene expression that affect the child's risk for obesity, diabetes, and other diseases.

Additionally, higher levels of lipid peroxidation are linked to higher levels of triglycerides, total cholesterol, cholesterol, and oxidative stress indicators Nitric oxide synthase activity in the uterus declines during the end of pregnancy. The uteroplacental blood flow is decreased during labour due to the uterine muscle's contractile activity. The uterine muscle is first activated, and oxytocin and prostaglandin synthesis are boosted. Vascular resistance lowers and placental vessel diameter rises during this period. This ensures blood circulation, guards the foetus against hypoxia, and prevents decreased uteroplacental blood flow after delivery [1-3].

Reactive oxygen species production is known to rise during pregnancy and delivery, which may lead to an imbalance between pro- and antioxidants. Total antioxidant status, which assesses the capacity to fend off harm from reactive oxygen species and their derivatives, is the factor defining the activity of the non-specific pool of antioxidants. TAS levels in the first trimester of pregnancy in pregnant women are substantially lower than in non-pregnant women, according to studies. The dynamic of changes throughout pregnancy was also discovered in the second and third trimesters; the total antioxidant capacity of plasma rises, reaching levels comparable to those seen in non-pregnant women in the final week of pregnancy. This parameter rises to eight weeks after delivery following childbirth. Maternal blood's mean total antioxidant status values were substantially lower than those of umbilical cord blood, which may indicate that the antioxidant reserve has been depleted as a result of the system's diminished effectiveness and increased generation of reactive oxygen species. The observed discrepancies between maternal and child levels may be explained by the increase in foetal antioxidant reserves upon full-term birth. Other researchers who evaluated that adversely correlate with noted an intriguing finding. Compared to maternal blood, the umbilical cord blood had a lower concentration by approximately [4].

A vast variety of antioxidants in human bodies work to repair damaged molecules, limits the activity of free radicals, or prevents their creation, shielding the body from their damaging effects. Manganese, copper, and zinc metal ions are involved in hormone production, regulation, and serving as cofactors for antioxidant enzymes nuclear factor kappa B is released during birthing to balance oxidative stress and control the inflammatory response in the placental

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membrane. Different patterns of the oxidative response and modifications in oxidative and antioxidant indicators may result from the imbalance of metal ions between the mother and the foetus. In our investigation, the mean manganese concentrations in umbilical cord blood and venous blood plasma were comparable [5].

Conclusion

Genetics is a rapidly evolving field that is transforming our understanding of human health and disease. Advances in gene editing, personalized medicine, genetic testing, and epigenetics are providing new insights into the causes and treatments of a wide range of conditions. However, these advances also raise ethical concerns about the potential misuse of genetic information and the creation of designer babies. As genetics continues to advance on causal mechanisms will help guide the development of system-level multifaceted interventions given the knowledge that the complexity associated with SMI necessitates special consideration and that improving the quality of care for this population group has the potential to make up for some of the structural health inequities they encounter throughout their lives.

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