ISSN 3060-4567

SUBSTRATE SUPPLY FOR ENERGY PROCESSES IN CHILDREN

Fayzullayeva Khilola Bakhronovna
assistant of the Department of Biological Chemistry
Saparbayeva Mukhlisakhan
Student of the Medical Faculty, Group 220
Samarkand State Medical University

Annotation: *The use of substrates as energy sources changes during the first months of a child's life. Since anaerobic glycolysis predominates in newborns, which provides relatively little energy, and energy expenditure per unit of body mass is very high, the newborn utilizes energy reserves accumulated in utero during the first days after birth to sustain vital processes. The presence of these reserves determines the effectiveness of the child's adaptation to extrauterine life.*

Keywords: *newborns, energy, glucose, substrate, glycolysis, fatty acids.*

Objective of the Study: Analysis of changes in substrate supply for energy processes in children.

Discussion and Research Results

In the first hours of life, the newborn uses glycogen as an endogenous energy source. However, at birth, the child has insufficient glycogen reserves. At the moment of birth, the blood sugar level of the newborn corresponds to that of the mother. Stress hormones released during labor rapidly deplete glycogen stores in the liver. Within 2–3 hours after birth, blood glucose levels in newborns decrease to hypoglycemic levels. Under these conditions, non-esterified fatty acids (NEFA) become the primary energy source. The cooling of the newborn’s body, which occurs after birth due to transitioning from the maternal environment to a new habitat, triggers the release of hormones (thyroxine, norepinephrine in brown adipose tissue, and glucagon during hypoglycemia), which activate the breakdown of triglycerides to produce fatty acids.

ISSN 3060-4567

The concentration of NEFA in the blood increases and is subsequently used for energy production.

Since proteins are virtually not used as an energy source during the first days after birth, and carbohydrate reserves are extremely low, NEFA become the primary endogenous energy source for newborns. Lipolysis reaches its peak on the 3rd–4th day after birth, coinciding with the period of maximum weight loss in newborns. All tissues, except the brain and erythrocytes, consume NEFA. Simultaneously, tissues increase their use of ketone bodies, which also serve as an energy resource. From the second week of life, blood glucose levels in newborns gradually rise, while NEFA levels decrease; however, NEFA levels remain higher than in older children until about three months of age.

Under these conditions, when hypoglycemia prevents tissues from effectively using blood glucose and intense lipolysis depletes energy reserves in the newborn's body, the infant remains at the threshold of energy balance during the first week of life.

Conclusions

From a biochemical standpoint, covering energy expenditures during this age period should be achieved through proper organization of infant nutrition. Early initiation of the first feeding is crucial to prevent an increase in catabolic processes in the body. The regularity of feedings is also essential, as missing even one meal inevitably mobilizes fat reserves to compensate for the acute energy deficit. Starvation in early infancy is considered unacceptable as it leads to profound metabolic changes in the body, which are more severe in younger infants.

REFERENCES

1. Bakhronovna K. F. THE SIGNIFICANCE OF CLINICAL AND LABORATORY CRITERIA IN THE EARLY DIAGNOSIS OF POSTHYPOXIC COMPLICATIONS IN NEWBORNS BORN WITH HYPOXIA //World of Scientific news in Science. – 2024. – Т. 2. – №. 3. – С. 258-263.

2. Fomon, S. J. (2001). Nutrition of Normal Infants. Mosby.

ISSN 3060-4567

3. Fayzullaeva H. et al. Metabolic status as an indicator of post-hypoxic complications in newborns born in asphxia //European Journal of Molecular and Clinical Medicine. – 2020. – Т. 7. – №. 2. – С. 2370-2374.

4. Ugli S. D. O., Erkinovna N. M. FOOD ADDITIVES E-171, E-173 AND MECHANISM OF THEIR INFLUENCE ON THE ORGANISM FROM THE BIOCHEMICAL POINT OF VIEW //Research Focus. – 2024. – Т. 3. – №. 1. – С. 229-232.

5. Sattarova K. G. et al. Analysis of Biochemical Indicators in Patients Infected with Echinococcosis //E3S Web of Conferences. – EDP Sciences, 2024. – Т. 491. – С. 03010.

6. Hay, W. W., & Thureen, P. J. (2010). Energy Requirements, Protein-Energy Metabolism, and Glucose Homeostasis. In: Polin, R. A., Abman, S. H. (Eds.), Fetal and Neonatal Physiology. Elsevier.

7. Koletzko, B., Poindexter, B., & Uauy, R. (2014). Nutritional Care of Preterm Infants. Karger.

8. Martin, R. J., Fanaroff, A. A., & Walsh, M. C. (2015). Neonatal-Perinatal Medicine: Diseases of the Fetus and Infant. Elsevier.

9. Sunehag, A. L., Haymond, M. W. (2002). Glucose and Fatty Acid Metabolism in Newborns. Clinics in Perinatology, 29(2), 311-323.