Perinatal Protein Restriction induces Modulation in Liver Mitochondrial Bioenergetics

Filho, R.C.S.¹, Leite, A.C.R.², Silva, A.B.³, Nascimento, L.C.P.³, Freitas, C.M.³, Maia, M.B.S.², Lagranha, C.J.¹, Fernandes, M.P.¹

¹Department of Physical Education and Sports Science, Centro Acadêmico de Vitória, UFPE, Vitória de Santo Antão-PE, ²Department of Physiology and Pharmacology, UFPE, Recife-PE, ³Department of Nutrition, Centro Acadêmico de Vitória, UFPE, Vitória de Santo Antão-PE.

During the critical period of development, the body to be influenced by external factors, such as malnutrition, and may induce biochemical changes in tissues. Thus our aim was evaluate the effects of protein restriction in the liver mitochondrial bioenergetics. Male Wistar rats were divided according to the mother’s diet. Control group (17% casein), and low protein (LP) group (8% casein). After lactation (21 days), pups began receiving Labina. At 100 days of age the animals were sacrificed and the liver mitochondria isolated by differential centrifugation. We evaluate mitochondrial respiratory rates parameters (phosphorylating (State 3), resting (State 4) and uncoupled state), ATP synthesis and mitochondrial membrane potential (ΔΨm). Our results showed a significant increase of the state 3 (Control group: 56.96 ± 4.57 nmolO2/mg/min vs LP group: 79.4 ± 8.81 nmolO2/mg/min, p<0.05), state 4 (Control group: 20.07 ± 2.3 nmolO2/mg/min vs LP group: 28.45 ± 2.4 nmolO2/mg/min, p<0.05) and in uncoupled state (Control group: 66.18 ± 7.44 nmolO2/mg/min vs LP group: 94.83 ± 9.2 nmolO2/mg/min, p<0.05) in LP group when compared to control group. Furthermore, LP group presented a higher resistance to ΔΨm disruption than control group (Control group: 7.93 ± 0.75 vs LP group: 17.96 ± 3.31, p<0.05) and increase in ATP production (Control group: 56 ± 3.1 pmol vs LP group: 171 ± 0.48 pmol, p<0.05). Our data suggest that protein restriction during critical period of development induce alteration in mitochondrial bioenergetics in a way that increase the respiratory rates parameters and ATP synthesis decreasing mitochondrial dysfunction.

Word Keys: Perinatal protein restriction, mitochondrial membrane potential, ATP, liver.

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