Pre-and post-natal protein deprivaton and refeeding in Wistar rats – effects on thymic morphology

Fontes, RBV., Baptista, JS., Boldrini, SC., Oliveira, DA., Luiz, LF., Cristofaro, M., Cavalli, MA., Seyfert, CE., Meyer, WP. and Liberti, EA.

Instituto de Ciências Biomédicas, Universidade de São Paulo

Undernourishment is a multifactorial condition extremely prevalent in Brazil particularly in the pediatric population. Immunologic consequences of undernourishment have been well-studied from a clinical perspective but morphological information concerning lymphoid tissue and the thymus under this situation are scarce especially coupled with subsequent refeeding. Our objective is to study morphological alterations in the thymus of Wistar rats using a well-studied model of pre- and post-natal protein deprivation and refeeding. Fifteen Wistar rats were divided into undernourished (UN – 10 rats) and nourished (N – 5 rats) groups from the prenatal period. Undernourished mothers were kept on protein-deprived (5%) while nourished mothers received their regular diet (20% protein). After birth rats were kept with their respective N or UN mothers until the 21st day of life. From the 21st day onward, 5 N and 5 UN rats received their usual diet until sacrifice on the 60th day while 5 UN rats switched their diet to N and were thus named RN (renourished). The thymus of these animals were removed, weighed, fixed and 6-micrometer thick sections were obtained along the axis with the largest cross-sectional area. Sections were stained according to H&E, Masson and Sirius-Red techniques. Both body and thymus weight were lower in UN animals. Qualitative analysis of the RN sections yielded similar results compared to N control sections. However, UN sections exhibited markedly altered morphology in both lymphoid and non-lymphoid structures. The cortical layer was noticeably atrophic with an evanescent cortico-medullary interface. Type I collagen fibers were predominant in the interlobular septum of the UN group. Adipose-like vacuoles found between lobules in UN and RN rats suggested precocious involution as seen in elderly rats. Thymic lymphoid structures were largely preserved in RN animals as compared to N controls on day 60 of this experiment while UN animals had a noticeably altered morphology. Although some RN animals had interlobular vacuoles, renourishment was largely successful in restoring normal thymic morphology, from which normal function may be inferred.