Introduction

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This special issue of Biology of the Neonate presents a series of contributions on the metabolic adaptation of the neonate at birth and during the first days and weeks of life. In addition, there are special articles devoted to the metabolic problems which concern the neonate. I am proud of having obtained contributions from leading scientists of different research areas. I do hope that these papers will be useful to the reader, and that the infants in our care will benefit from a better understanding of the metabolic problems that affect them.

The introductory paper of J. Girard concerns the fine biochemical mechanisms involved in the metabolic adaptation at birth. L. Sann and B. Salle treat the two more frequent metabolic disturbances, hypoglycemia and hypocalcemia, that occur in the neonatal wards. The article by R.A. Polin is addressed, more than to the mechanisms responsible for the neonatal hyperbilirubinemia, to the phototherapeutic treatment.

A protocol for newborns suspected of having a metabolic disease is presented by J.M. Saudubray et al. D.C. De Vivo and S. DiMauro discuss the mitochondrial defects of brain and muscle tissue. The biochemical correlates involve pyruvate metabolism, the citric cycle, and the respiratory chain. Lactic acidosis is the metabolic signature in these diseases although not present in all syndromes. The linkage between mitochondrial defects and sudden infant death syndrome is outlined by J.-P. Harpey. There is evidence for a disorder of fat oxidation in 17 % of 'near-miss' infants. Diagnosing and treating such disorders early in infancy may prevent the occurrence of some cases of SIDS.

The problem of carnitine deficiency and supplementation during total parenteral nutrition (TPN) is addressed by E. Schmidt-Sommerfeld and Duna Penn. The newborn is dependent upon fat for energy production. Fatty acid oxidation requires the cofactor carnitine. During TPN, plasma and tissue carnitine concentrations decrease, indicating an inadequate carnitine biosynthesis. In addition, L-carnitine supplementation seems able to improve fatty acid oxidation. Marked reduction of carnitine and acylcarnitines was also noted in infants given diets not containing carnitine. M. Novak stresses the fact that, even if in healthy term infants the lack

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of dietary carnitine does not induce deficiency symptoms, it reduces the uptake of fatty acids for β -oxidation. Moreover, the cumulative effect of various metabolic disorders and carnitine-deficient diets culminate in carnitine deficiency. According to B. Mel-egh, numerous experimental data have been provided evidences of possible beneficial effects of carnitine supplementation to the premature. The available data seems to be sufficient to suggest that neonatologists should prudently prevent the development of carnitine depletion in the premature and in the full-term infant especially if metabolic problems are present.

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