NUTRITIONAL ADAPTATION
OF THE GASTROINTESTINAL
TRACT OF THE NEWBORN
Nutritional Adaptation of the Gastrointestinal Tract of the Newborn, Third Nestlé Nutrition Workshop, Talloires, France, June 3–6, 1982

Nutritional Adaptation of the Gastrointestinal Tract of the Newborn

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Preface

The gastrointestinal tract is an incredibly important organ, one of the primary organs in contact with the environment. Technically, any nutritional event that takes place requires the participation of the gastrointestinal tract. This volume, the third in the Nestlé Nutrition series, updates the most recent advances in developmental gastroenterology and relates these advances to human nutrition.

In order to lay a solid foundation for understanding the relationship between structure and function of the gastrointestinal tract, the volume opens with a section on fundamental biology. Structural studies are the first steps in the understanding of differences in cellular activity. Intestinal cells are in a continuous developmental cycle. In general, intestinal epithelial cells function in digestion and absorption, but there are also cells with specific functions that involve synthesis and elaboration of specific peptide hormones while others are concerned with synthesis of mucopolysaccharides.

The site of absorption and digestion of peptides and disaccharides is the brush border. Peptide absorption is a main contributor to the nutritional economy of the organism. In general, peptides are absorbed more rapidly by the cells of a young animal and transit the cell more quickly than in the cells of an older animal. Differences between young and old are also apparent with carbohydrates. Lactose is an example of a disaccharide that is digested more effectively by the young animal. Sucrase does not appear as an active enzyme nor is sucrose digested by the epithelia of the rat until two weeks after birth, after which the enzyme adapts to the concentration of sucrose in the diet.

Adaptation is a characteristic of all organisms and is specifically encountered in the gastrointestinal tract. Possibly, the fact that the gastrointestinal tract has direct contact with the environment emphasizes its structural and functional capability for adaptation to dietary change. This important aspect of intestinal physiology is clearly demonstrated by all the enzymes of the pancreas and many of the enzymes of the intestinal epithelium.

The second section, “Clinical Aspects of Gastrointestinal Function,” is composed of two important chapters. The first discusses noninvasive techniques for the evaluation of intestinal function. The second covers the puzzling and elusive necrotizing enterocolitis.

The last section of the book is concerned with infant nutrition. The first complete food to gain entrance to the gastrointestinal tract postnatally is milk, and its constituents are exceedingly important to the well-being of the recipient. These substances are a result of the millenia of evolutionary adaptation of the mammary gland. This biological fact alone should indicate that the milk produced by the human has been carefully biologically molded for the human.
This fact should not obviate against usefulness of specially created preparations of milk for those babies or mothers who need them.

Nutrition of the fetus and infant is critical since malnourishment early in life can have an effect over an entire lifetime. The fetus is completely dependent on the maternal diet and maternal physiologic vicissitudes. The small-for-gestational-age baby and the large-for-gestational-age baby are remarkable examples of the results of poor maternal nutrition. The former is an indication of undernutrition and the latter typifies overnutrition. There are also many environmental factors that could participate in the pathogenesis of these particular situations. Large-for-gestational-age and small-for-gestational-age infants are subjected to a variety of immediate and long-term risks. In the very-low-birth-weight infant there is a definite immaturity of the gastrointestinal tract. Often, in order to provide adequate nutrition for these infants, there is a need for complete or partial parenteral nutrition to provide for normal growth while waiting for the gastrointestinal tract to attain an adequate stage of development. Initially, the large-for-gestational-age infant also has a great deal of difficulty adjusting to the extrauterine environment. The problem of macrosomia derives in part from the inability for regulation of carbohydrate metabolism as a result of hyperinsulinism during pregnancy.

The conference was organized to exchange ideas, increase communication between disciplines, and to stimulate new thoughts and research activities. The material that follows gives evidence of the fulfillment of these goals. This volume will be of interest to pediatricians, internists and general practitioners, as well as specialists in epidemiology, nutrition, microbiology, immunology, and infectious diseases.

Norman Kretchmer, M.D.
Alexandre Minkowski, M.D.
Foreword

The Nestlé Nutrition Workshops are now well established. This volume is the third in the series, and four more workshops have been held in the period since the Talloires meeting.


By bringing together leading specialists in the field and widely diffusing the findings of each workshop we aim to contribute to an improved understanding of the important problems in pediatric nutrition.

P. R. Guesry, M.D.
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Acknowledgments

This volume is the third in a series based on workshops sponsored by Nestlé Nutrition, which is now an important contributor in the field of infant and young child nutrition. The meeting also represented a solid effort to establish cooperation among researchers throughout the world, as exemplified by the co-sponsorship by ARME (Aide à la Recherche Médicale pour l'Enfance) and the International Organization for the Study of Human Development.

Research in nutrition is a priority with the present state of our world. We intend to pursue that effort in the future with the help of Nestlé Nutrition.

Alexandre Minkowski, M.D.
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