

Preface

Developmental physiology is a relatively new area of biologic and medical science. Frequently this large area has been divided into the developmental physiology of the embryo, fetus, perinatal, or neonatal individual and infant. Knowledge of fetal physiology is needed for a thorough understanding of the functional and metabolic situation of the newborn. The physiology of the perinatal period comprises the most important developmental period that climaxes with parturition of the fetus from its protective intrauterine environment. In these two volumes the contributors have focused on the final preparation for birth, the process of birth, the impact of parturition on the biologic functions of the newborn infant, and an establishment of homeostasis in the early postnatal period.

The prime concern in this text is with human beings, but important information on mammals has been included. Advances in obstetric and pediatric knowledge are dependent not only upon clinical observation, but also on studies of animal development by physiologists, biochemists, geneticists, and others. Pediatric research is concerned primarily with the physiology of normal and abnormal individuals with the direct aim to improve the diagnosis and management of patients. Studies of the developmental physiology of animals are oriented towards analyzing the effects of precisely controlled factors. The presentation of data from human beings together with results from animal experiments may lead to premature or erroneous conclusions concerning the applicability of animal findings to human beings. Some contributors have formulated principles and hypotheses, often by generalizations from the findings of animal experiments. Such generalizations and hypotheses may accelerate the progress of developmental research, but they should not be accepted as applicable to human beings without direct supporting evidence.

Developmental physiology differs from adult physiology in important ways. In adults, the range of functional capacity is fixed. By contrast, the functional capacities of developing organisms and, consequently, the methodology of their measurement, change with the developmental level. For example, the fetus and the newborn differ in metabolism. In this respect, then, they should be considered separately and in relation to other changes which occur between these two developmental levels.

The rates of change in size and functional capacity in individuals are regulated by both genetic and environmental factors. Furthermore, information about the genotypes of individuals would permit more reliable predictions of attained values and rates of change. Among nongenetic factors involved are, for example, the degree of physical and functional derangement during parturition and the rate and extent of postnatal adaptation.

Originally it was intended that this work would survey the entire field of prenatal and postnatal developmental physiology. Owing to the scarcity of relevant data, some omis-

sions, especially those for the fetal period, were unavoidable. I hope, however, that the material included will stimulate research and help to bridge the gaps among the specialized disciplines concerned with perinatology and developmental physiology.

I am most grateful for the cooperation of the contributors; their enthusiasm and helpfulness have made this publication possible. My sincere thanks are due to the publishers, especially to Mr. Richard Van Frank, who helped tremendously with his valuable advice, skill, and patience. I am grateful also to my assistant, Miss Rose Stoltzfus, for her kind and efficient help; to my wife, who prepared numerous drawings; and to Mrs. Dorothy Clark, Mrs. Alice Rockway, and Mrs. Donna Tipton, who typed the manuscripts. Throughout, I have been encouraged and assisted by Dr. L. W. Sontag, Director of the Fels Research Institute, and I have been supported by funds made available from the Samuel S. Fels Fund of Philadelphia.

May 1970

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