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INTRODUCTION

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For a long time, physiologists have been reluctant to attempt to study the early developmental stages of the regulatory systems in which they were interested. Adult systems seemed complicated enough without confronting, in addition, the smaller size, changing characteristics, and special requirements of infant mammals, whose needs were met better by their mothers than by experimenters.

Recently, this situation has begun to change. Partly, this has been the result of rapid growth in micromethods of all sorts which now makes physiological study of 10-g rat pups feasible. Second, in the field now called Developmental Psychobiology a number of discoveries have been made about the natural environment of the young, their physical needs, and their behavioral capacities which have given us an infrastructure of knowledge on which to base more detailed study of their physiology. And the field of environmental physiology has shown us how much can be learned by studying organisms in the unanesthetized state and in response to defined, but relatively natural environments. Finally, a convincing number of studies have raised important questions as to how early experiences alter physiological systems of the developing young so as to produce adults with different responses to stress and significantly changed susceptibility to disease.

In the past, biologists had a concept of development based on structural growth processes and on embryology in particular: early development was thought to be an unfolding of genetic "instructions" through which physiological systems gradually became more responsive, as control mechanisms known to operate in adults gradually became more effective. This view of the infant as a hyporesponsive adult did not excite much interest in early development.

But the new biology of early development gives a very different picture, as revealed in the following four papers. We have learned that infants are not hyporesponsive, but rather that their physiological controls are differently *organized* at different stages in development. The infant's physiology can be very different from that of adults, partly due to a second characteristic: physiological regulatory systems have different rates of maturation and develop with surprising independence from each other. This can be helpful, for it functionally dissects complicated physiological control systems, as Sigurd Ackerman will illustrate for the regulation of gastric acid secretion. It reveals itself, for example, in the parallel and independent development of controls for feeding that Alan Epstein has discovered, and in the shifting balance of sympathetic and parasympathetic control of cardiac rate in the developing infant rat that I will describe. The mother, as the most salient aspect of the infant's environment, has emerged as a physiological regulator, an extension of the infant's homeostatic systems, as Saul Schanberg and I will describe. These processes illustrate how the mother–infant relationship contributes to the expression of the mother's genetic potential in her offspring and may play a role in determining their susceptibility to disease.

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