BIOLOGICAL REFERENCE SYSTEMS IN THE ASSESSMENT OF NUTRITIONAL STATUS

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The assessment of nutritional status in the laboratory or clinic has a different significance and is based on methods other than those used in the assessment of nutritional status in epidemiological investigations. In this paper, we shall pay attention to the second type of assessment.

PREMISES FOR ASSESSING NUTRITIONAL STATUS

As we shall show below, the assessment of nutritional status of either an individual or a whole population cannot be arbitrary. In other words, there are not, nor can there be, universal measures of nutritional status, because all the properties of an individual, or of a population, that indicate nutritional status result from the past development of every individual and generation and, to some extent, the development of preceding generations. This occurs because of metabolic influences from the mother on the development of the fetus and also on the fetal gametes, which is a kind of "heritability" on the mother's line. In addition, the sensitivity of the body to environmental factors is determined genetically as well as being influenced by maternal effects on the metabolism of the fetus. Ontogenetic development, per se, is a process of adaptation of the body to the external environment. The

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chance to survive, to bear, and to rear offspring allows the prolongation of the species. The process of adaptation to the environment is not separate for isolated factors, but it is integrated with the necessity to maintain homeostasis of the organism. Consequently, the body is somewhat "comprehensive" in its response to a single stimulus, or to multiple stimuli.

The conviction that the response of the organism to a set of modifying factors is complicated probably arose as a result of the necessity to investigate many environmental factors. The conviction that the extent of the modifications in the organism is proportional to the variable factors in the environment is not, however, self-evident. To some extent, these modifications depend on the sensitivity and resistance of the organism to environmental stimuli, on the stage of development and on the past experience of the organism in respect of the particular stimuli (Figure 1).

Nutrition is only one of many environmental factors. It is impossible to understand its effects and to evaluate the nutritional status of the organism without considering physical activity and other aspects of the mode of life, climatic conditions (particularly temperature), and other factors. The same level of nutrient intake can produce more than one "nutritional status" depending on the whole ecological situation of the individual. Consequently, traits should be chosen for assessing nutritional status that have a self-evident interpretation. Furthermore, it is necessary to select a standard population, as a biological reference system, that will have a known relationship to the population to be assessed.

To demonstrate a few aspects of this complicated problem, some actual situations will be described. They will illustrate the essence of the problem better than theoretical reasoning.

Example 1. In villages of poor but relatively homogeneous nutrition, the similarity between children and their parents is much greater than in a town with a higher living standard and a large assortment of food-stuffs\(^1\) (Table I). We excluded illegitimate children,