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VITAMIN DEFICIENCY EXPERIMENTATION AS A RESEARCH METHOD IN BIOLOGY¹

By Dr. S. BURT WOLBACH
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VITAMINS are organic substances, not related chemically to one another, indispensable to normal functioning of some one or more animal species. They are effective in small amounts, do not furnish energy, are not structural materials as the fats, carbohydrates and proteins, but are necessary for the chemistry of cells. Our knowledge of them came through discoveries that substances of plant origin—the vitamins or provitamins of to-day—are essential for the well-being of many animals. Species not requiring a given vitamin in their diet may have the power of synthesizing it from elementary compounds, as has been proved for the rat in the case of vitamin C. Absence of a vitamin results in the suspension, in all probability, of a single type of intracellular chemistry neces-

sary for the tissue concerned, and indirectly, for the organism as a whole. One of the outstanding results of the attempts of Howe and myself to achieve morphological characterizations of the vitamin deficiencies was the discovery that cells deprived of a function essential for the organism as a whole may, nevertheless, survive and multiply.

We have endeavored to find the initial tissue or cellular responses to each vitamin deficiency with the belief that the cells first to exhibit changes would be those in which the vitamin was necessary for the performance of an essential chemical process. In some instances we have succeeded for the requirements of a morphological characterization, but with all members of the B group, B₁ and the B₂ components, we have failed, possibly because the chemistries involved are common to many tissues and concern energy processes

¹ DeLamar Lecture, the Johns Hopkins University, School of Hygiene and Public Health, May 11, 1937.

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