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Genetotrophic Disease

THE PROGRESSIVE SOLUTION of human disease problems during recent years has been considerably advanced by the generous financial support of numerous organizations. Grants-in-aid to investigators, many of whom are located at widely separated universities and small research foundations, have stimulated a multiplicity of viewpoints and methods of approach. When investigators are free to select and pursue the research of their choice, the development of such concepts is favored. In smaller laboratories, long-range programs along fundamental lines tend to develop, since there is no immediate urgency for clinical application.

In this laboratory a new research approach to the cancer problem has been based upon Roger J. Williams' concept of genetotrophic disease, which, though stemming from hereditary roots, is alterable by nutritional means. Recent advances in biochemical genetics have established a firm theoretical foundation for this concept. Nutrition plays an important role in a number of pathological conditions, including cancer, and our own work has shown that nutritional factors can alter susceptibility to cancer.

We are now investigating the fundamental nature of resistance to transplantable tumors. From determinations on the urinary constituents of large numbers of similar animals we are establishing the skeletal metabolic patterns of individual rats whose tumor-susceptibility status is known. We have found that in our closely bred strain there are significant differences in excretory patterns between tumor-resistant and tumor-susceptible individuals. It is not essential to use strictly homologous strains, although obviously the more highly inbred the animals, the more similar their metabolic patterns. Utilizing the pattern so established for each individual, we are attempting to enhance the resistance of susceptible animals.

Once the prime factors in the metabolic pattern of laboratory animals can be determined with the aid

of techniques such as multiple factor analysis, it should become possible to apply scientifically selected procedures to humans. Once these preliminaries are accomplished, the suggestion of Dr. Toennies in a recent communication in *THE SCIENTIFIC MONTHLY*, that a clinical study be made, becomes practical.

Reduced to a cellular or enzymatic basis, it is probable that a great number of pathological conditions have their roots in metabolic malfunction. Although all these metabolic processes operate within the genetic framework of the individual, it is apparent that many should be susceptible to attack by nutritional means—in a very broad sense. It is quite likely, therefore, that the genetotrophic disease concept may be applicable to a very diverse group of illnesses in addition to alcoholism, mental disease, and cancer. This may well be the most practical approach to the investigation of degenerative diseases and to the entire problem of geriatrics, and may make possible preventive treatment before extensive and irreparable damage has occurred. In effect, man's life span could be prolonged to more nearly its theoretical length, and at the same time this would help solve one of the great problems of our time; namely, the premature deterioration of the human individual. The prolongation of human creative productivity for even a short time would prevent untold cultural and economic loss.

A more immediate application would be to use the technique for selecting individuals able to withstand adverse environmental conditions—an important consideration in national defense. In addition, it would make possible prophylactic treatment of individuals against the deleterious effects of adverse environments, as well as those of aging. The possibilities inherent in the ramifications of the genetotrophic disease concept are limited only by the ingenuity of the investigator.

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