Clinical Immunology

Recently clinical immunology has developed from a narrow, though important, discipline, limited to serologic tests in infections and hematologic disorders and to vaccination and immunization, into a diverse and sophisticated medical specialty — as is reflected in the papers on clinical immunology in the scientific section of this issue of the Journal — affecting almost all fields of medicine. Such medical achievements as transplantation of the kidney and other organs, and therapy of cancer and leukemia would not be possible without immunologic assistance. Immunotherapy is a new, fascinating adjunct to conventional therapy. Our understanding of the mechanisms of resistance to infection, rheumatologic disorders, host reaction to malignant cells, and even some endocrinologic, neurologic and other diseases, became possible only through the great expansion in our knowledge of immunologic mechanisms.

Because clinical immunology is so complex and diverse, one issue of the Journal can cover only a small part of the discipline; the aim in this issue is to familiarize the reader with immunologic abnormalities, in particular the so-called M component.

Immunoglobulins are synthesized by many clones of plasmocytes and lymphocytes (immunoglobulin-producing cells, IPC). Sometimes one clone proliferates excessively. The reason for this is unknown, but such proliferation is often malignant. Recent studies have shown that prolonged antigenic stimulation and hyperimmunization may cause excessive proliferation of one or more clones of IPC. The synthetic product of such growth is a homogeneous immunoglobulin, which, when secreted from the cells, circulates in the blood and is sometimes excreted into the urine. Since all the molecules of the homogeneous immunoglobulin are structurally identical, they have the same electrical charge and the same molecular weight. They appear in the serum (or urine) electrophoretogram as a narrow, discrete band, and on an immunoelectrophoretic plate as a short, distinctly curved line of precipitation. This narrow band or short, curved line is called an M component. The M component may have features that are not characteristic of a normal immunoglobulin: it may precipitate, crystalize at temperatures below that of the human body, or gel when heated. Functional properties of the M component may also be unusual: it may agglutinate erythrocytes in cold or warm temperatures (cold or warm agglutinins) or kill various mammalian cells in the presence of complement (cytotoxins). However, an M component seldom exhibits antibody activity that is characteristic of a physiologically synthesized immunoglobulin.

M components were once thought to denote a malignant disease such as myeloma or macroglobulinemia. However, findings of recent studies have changed this viewpoint. It was noted that rabbits hyperimmunized with certain bacterial antigens produced M components that disappeared after antigenic stimulation ceased. Transient M components were also found to develop in some patients after viral or bacterial infections or after hypersensitivity reactions. Also, M components were found in the sera of some patients who did not suffer from lymphoplasmacytic neoplastic diseases.

In conditions such as primary generalized amyloidosis or lymphoma a definite relation exists between the M components and the disease. The M components are probably produced by the cells responsible for the pathologic process. In conditions such as malignant epithelial lesions, chronic liver diseases, collagen disorders and lichen myxedematosus, the M components apparently are not produced by the cells responsible for the pathologic process but by IPCs that proliferate abnormally, probably as a reaction to abnormal antigenic stimulation. M components occasionally appear in apparently healthy individuals, more often in elderly people, and in some, neoplastic diseases may eventually develop.

The detection of M components is of special importance in medicine. Since the tests used for this are simple and relatively inexpensive, their widespread use in medical practice is advocated. Awareness by practising physicians of the importance of immunoglobulin abnormalities will improve the standard of patient care.

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