Terminology and Nomenclature

IMMUNOGLOBULIN E, A NEW CLASS OF HUMAN IMMUNOGLOBULIN *

Studies of the nature of the antibodies associated with isologous skin-sensitizing activity have indicated the presence of a previously unrecognized immunoglobulin in human serum. The immunoglobulin has been identified by virtue of specific antigenic determinants. Independently, a protein with similar antigen characteristics has been identified both in the serum of a patient with multiple myeloma and in normal serum. It is proposed that the normal protein and antigenically related myeloma proteins shall be designated IgE or γE, and the heavy polypeptide chains of these molecules be designated ϵ (epsilon)-chains, in accordance with an earlier memorandum entitled *Nomenclature for Human Immunoglobulins.*[a] This replaces the previous usage of γE-globulin and IgND.

IgE has antigenic determinants in common with other immunoglobulin classes, as well as specific antigenic determinants. IgE from non-myeloma sources has been found to contain the determinants of light chains of Type K and Type L. The E myeloma protein has been found to have light chains of Type L. The specific antigenic determinants of IgE have not been detected in IgG, IgA, IgM and IgD. Antisera specific for IgE have failed to react with immunoglobulins of these four classes and their currently recognized subclasses. Conversely antisera specific for these classes and their subclasses have failed to react with IgE.

Studies on the E myeloma protein have shown that it contains heavy and light polypeptide chains with respective molecular weights of approximately 75 500 and 22 500. The unique determinants of IgE were not present on its light chains. The IgE determinants have not yet been directly demonstrated on the isolated heavy chains, but are thought to be located there for the following reasons.

(*a*) Digestion of the E myeloma protein with papain produced two kinds of fragments, referred to as Fab- and Fc-fragments by analogy with the fragments produced by the action of papain on IgG. The Fab-fragment contained light chain determinants but no IgE determinants. The Fc-fragment lacked light chain determinants. The IgE specific determinants were found only on this fragment.

(*b*) Molecular weight data were consistent with the Fc-fragment being a portion of the heavy chains. The molecular weight of the intact molecule was found to be approximately 200 000. Following complete reduction and dissociation, 20% of the protein was recovered as light chains of molecular weight of approximately 22 500, indicating two light chains per molecule. Assuming two heavy chains per molecule the molecular weight of each heavy chain was calculated to be approximately 75 500. The Fc-fragment had an approximate molecular weight of 100 000, as estimated from sedimentation and gel-filtration data.

Consideration of the antigenic analysis and the physicochemical data has therefore indicated that IgE determinants are located in the heavy chains of the molecule.

There is evidence for antibody activity in IgE. IgE from selected sera has been shown to combine with a number of antigens in several techniques of radioimmunoassay. The specificity of these reactions is comparable to the specificity of antigen-binding by other classes of immunoglobulins.

In studies of immediate-type hypersensitivity the binding activity of IgE for a given allergen in various human sera was found to correlate with the ability

* This memorandum was drafted by the signatories (see overleaf) following discussions held at the WHO International Reference Centre for Immunoglobulins in Lausanne in February 1968. A French version will be published in a later issue.

[a] *Bull. Wld Hlth Org.*, 1964, **30**, 447-450.

of these sera passively to sensitize human skin to that allergen. IgE non-reactive with specific allergen and the E myeloma protein blocked this sensitization. The ability to induce or block isologous passive skin sensitization may be a characteristic of the human IgE class.

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