

Appendix E.—The Cause and Pathological Development of Autoimmune Diseases*

The cause and pathological development of autoimmune diseases are thought to be due to several mechanisms, each having varying importance in different diseases. These mechanisms are: inactivation reactions, cytotoxic reactions, immune complex deposition, anaphylaxis, and delayed hypersensitivity.

With inactivation reactions, autoimmune antibodies are directed against molecules that are receptors or mediators for important physiological functions. For example, people with myasthenia gravis have antibodies directed against neurotransmitter receptors on muscle membranes, and thus the conduction of electrical impulses between nerve and muscle is disturbed.

In diseases in which cytotoxic antibodies are thought to play a role, antibodies are directed against molecules on the surface of cells, and reactions between the antibodies and antigens result in the killing of the cells through complement mechanisms or clearance by lymphoid tissues. This can lead to depletion of sets of cells required for vital functions, such as platelet loss in idiopathic thrombocytopenic purpura.

In many diseases, deposition of immune complexes in tissues is thought to be the mechanism for the destructive lesions observed. These immune complexes may consist of antibodies and viral antigens, cancer

antigens or other antigens. In these diseases, the complexes are of such a nature or in such great amounts that they saturate the normal clearing system in lymphoid tissues (or these clearing systems are deficient secondary to the underlying disease). Deposition of the complexes in vessel walls, in structures of the kidney, and joint spaces leads to inflammation due to the activation of complement or cellular immune responses. Vasculitis, glomerulonephritis and arthritis, for example, can be the result.

Anaphylaxis refers to the release by antigen stimulation of immediately reacting inflammatory agents by tissue cells which have antibodies directly on their surfaces. Severe anaphylactic reactions are life threatening. Diseases that are manifested by anaphylactic reactions include food allergies, insect allergies, and asthma.

Finally, there are diseases transmitted by cellular immune mechanisms, referred to as delayed hypersensitivity reactions. In this case, specifically, sensitized lymphocytes infiltrate tissues and cause destruction. Often circulatory antibodies participate in the process as well. Examples of this disorder include viral hepatitis and graft rejection.

* This appendix is condensed from Frost & Sullivan, Inc., *in-Vivo Hemodetoxification and Hemoprocessing Markets in U. S.*, New York, June 1981.