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IMMUNOPATHOLOGIC PROCESSES IN CHRONIC VIRAL DISEASES[1]

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Immune complex disease is often associated with chronic virus infections. Several human and animal diseases are known to involve deposition of immune complexes; ones affecting man include hepatitis B, subacute sclerosing panencephalitis, and Burkitt's lymphoma.

Optimum conditions for the formation of immune-pathological complications occur in infections that involve ongoing viral replication and a continuous host immune response. Two different mechanisms leading to the appearance of tissue injury can be distinguished: damage to virus-infected cells by immunologic reactions, and injury of certain tissues by deposition of antigen-antibody complexes. The possible pathogenic significance of the former type of reaction has not been clarified, but there are several human and animal diseases in which deposition of immune complexes has been shown to occur (*1*). The primary sites for deposition of immune complexes are the renal glomeruli, the choroid plexus of the brain, and blood vessels (mainly arteries). Injury may also occur, however, in heart, lung, joint, and skin tissue.

Deposition of circulating complexes is an active process. Initiation of a release of vasoactive agents leads to increased vascular permeability, which allows larger complexes to be deposited along filtering membranes (*2*). Large antigen-antibody complexes are taken up by the reticuloendothelial system. As a consequence, a depression of this system may occur after prolonged exposure to circulating immune complexes. In most cases the viruses that cause immune complex diseases are relatively noncytopathic both in vivo and in vitro. Mainly enveloped viruses, but also naked ones, have been found capable of participating in immune complex formation.

[1]Working paper, WHO Scientific Group on Virus Diseases (Geneva, 1-5 September 1975)

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Circulating immune complexes were first shown in mice chronically infected with lactic dehydrogenase virus. Later several studies were done of mice infected with lymphocytic choriomeningitis virus and with leukoviruses. Other animal model systems that have been used are minks infected with Aleutian disease virus and horses infected with equine infectious anemia virus.

Human immune complexes might occur as a consequence of rubella and cytomegalovirus infections (primarily in connection with congenital disease), but this remains to be demonstrated. Evidence for the formation of immune complexes has been obtained from cases of hepatitis B, subacute sclerosing panencephalitis, and Burkitt's lymphoma. In hepatitis B it has been possible to identify circulating virus-host Ig complexes ultrastructurally, and immune fluorescence techniques have revealed virus-host Ig and complement in renal glomeruli, arteries, and the liver. In the case of subacute sclerosing panencephalitis, deposits of immune complexes, including measles antigen, have been found in kidney tissue and blood vessels. Corresponding findings have also been made in patients with Burkitt's lymphoma, and deposits of Ig and complement have been found in patients with certain other tumors. Further studies, including attempts to identify the antigen present in these complexes, are currently underway.

SUMMARY

Immune complex disease is frequently associated with chronic virus infections of both animals and man. The relative pathogenetic significance of tissue injury caused by deposition of immune complexes is only partly understood. Further study should be made of these problems through use of recently developed techniques for immune complex identification.

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