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# COMPARISON OF THE PATHOGENETIC MECHANISMS IN ALEUTIAN DISEASE OF MINK AND SYSTEMIC LUPUS ERYTHEMATOSIS OF MAN

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The term "collagen diseases" was first used by Klemperer, Pollack and Baehr years ago to designate a group of poorly understood human diseases in which the supporting or connective tissues of the body were thought to be involved.[1] The diseases originally placed in this category were systemic lupus erythematosus (SLE), dermatomyositis, rheumatoid arthritis, polyarteritis nodosa, scleroderma, and others. Several of these diseases had lesions such as fibrinoid arteritis that were morphologically similar to lesions induced by immunologic mechanisms. The possible role of immunologic processes and autoimmunity in the genesis of these diseases was then considered. Information concerning the pathogenesis of several of the diseases originally classified as collagen diseases have not been investigated in more detail. One of these SLE, will be compared to Aleutian disease (AD) of mink in this paper.

Aleutian disease of mink is characterized by a chronic course, persistent viremia, hypergammaglobulinemia, plasmacytosis, glomerulonephritis, arteritis, anemia, and hepatitis.[2] Within the past several years, research has elucidated some of the mechanisms in the pathogenesis of AD. Many of these mechanisms are similar to those in SLE. These findings indicate that a virus can initiate the spectrum of tissue alterations observed in a disease such as SLE in which the etiology is unknown.

In both SLE and AD the clinical course is chronic and progressive with indications that genetics play a role in disease expression. Mink homozygous recessive (aa) for the Aleutian gene and most mink that are heterozygous or homozygous dominant for the Aleutian gene die from the disease, but aa mink develop a more rapid clinical course.[3] Some non-Aleutian type mink recover from the disease, but the number of these animals that recover is unknown. The contribution of genetics to disease expression in AD is known and has been suggested in SLE.[4]

The virus of AD persists in infected mink for their life, but the possible viral etiology for SLE is only speculation. Structures that resemble myxoviruses have been observed in the tissues of individuals with SLE, but these same structures have been found in the tissues of non-SLE patients.[5] The latter casts doubt upon the role of these structures as the etiologic agent of SLE.

The glomerulonephritis in SLE has been investigated in considerable detail[6] and has been found to be initiated by the deposition of DNA-anti-DNA complexes.

Lupus patients develop anti-DNA antibodies and also have circulating DNA. This results in the formation of complexes that are deposited in the glomeruli, fix complement and lead to glomerular disfunction. In AD affected mink, the glomerulitis that develops is morphologically similar to that of SLE. Studies on the mechanisms involved in the genesis of the glomerular alteration in AD indicate that they are quite similar to that of SLE.[2] Instead of being DNA-anti-DNA complexes that are deposited as in SLE, however, complexes composed of virus-anti-virus are deposited in the glomeruli of AD affected mink.[7] These complexes initiate the same type of events that cause glomerulonephritis in SLE.

In both human patients with SLE and mink with AD a number of similar lesions occur. In both diseases there is hypergammaglobulinemia, plasmacytosis, arteritis, hepatitis, and anemia. Most of these alterations have not been investigated in depth in either disease. In both diseases, however, there are suggestions that many of these changes are initiated by immunologic processes. The probable involvement of immunologic mechanisms in the pathogenesis of the lesions in both of the diseases is indirectly indicated by the amelioration or prevention of these lesions by immunosuppressive therapy. The standard therapy for lupus patients is corticosteroid therapy often accompanied by the use of immunosuppressive drugs. Studies with AD infected mink have indicated that the treatment of mink with the immunosuppressive drug, cyclophosphamide, prevents the occurrence of lesions, but not the propagation of the agent.[8]

## Summary

A comparison of SLE in man and AD in mink indicates that these two diseases have a number of similarities. These include the clinical disease, lesions and the genesis of some of the lesions. Immunologic processes appear to play the dominant role in the genesis of both diseases. The fact that a virus can initiate a disease syndrome in mink similar to that reported for SLE in man indicates that continued efforts must be made to determine the role of a virus in the etiology of SLE in man.

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