

**Review Article**  
**Mechanisms of Disease**  
**THE EFFECT OF INFECTIONS ON SUSCEPTIBILITY TO AUTOIMMUNE AND ALLERGIC DISEASES**

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THIS AUTHOR NOTES:

Infectious agents can suppress allergic and autoimmune disorders.

This author summarizes the evidence that the main factor in the increased prevalence of allergic and autoimmune diseases in industrialized countries is the "reduction in the incidence of infectious diseases in those countries over the past three decades."

There is a steady rise in the incidence of allergic and autoimmune diseases in developed countries over the past three decades.

These diseases are of two general types:

- (1) Allergic diseases, such as asthma, rhinitis, and atopic dermatitis.
- (2) Autoimmune diseases, such as multiple sclerosis, insulin-dependent type 1 diabetes, and Crohn's disease.

The incidence of these disorders began to increase in the 1950s and continues today.

There has been a significant decrease in the incidence of many infectious diseases in developed countries as a result of antibiotics, vaccination, and improved hygiene.

#### THE GEOGRAPHIC DISTRIBUTION OF ALLERGIC AND AUTOIMMUNE DISEASES

##### The North -South Gradient

Allergic and autoimmune diseases are not evenly distributed among continents or countries.

These diseases are greatest in the northern part of the Northern hemisphere, and decrease as one moves south (towards the equator). Likewise, these diseases are greatest in the southern part of the Southern hemisphere, and decrease as one moves north (towards the equator). This gradient holds true for multiple sclerosis, type I diabetes, Crohn's disease and allergy.

This gradient can't be explained genetically. Rather it is best explained environmentally.

A number of studies show a lower frequency of immunologic diseases in populations

with a low socioeconomic status as compared to those who are wealthier. As a rule, poor people have more infections and worse hygiene.

## CHILDHOOD INFECTION

Early childhood infections change immune system maturation.

“Young children with older brothers and sisters at home and those who attend a day-care center during the first six months of life subsequently have a lower incidence of asthma and type 1 diabetes.”

“The administration of antibiotics to children has been suspected to increase the risk of asthma and allergy.”

Antibiotics might alter immunity by modifying intestinal flora.

Vitamin D prevents or decreases the intensity of autoimmune diseases and other allergic diseases, and deficiency in vitamin D may increase the risk of type 1 diabetes and multiple sclerosis.

## IS THE DECREASED INCIDENCE OF INFECTIOUS DISEASES CAUSALLY RELATED TO THE INCREASED INCIDENCE OF IMMUNOLOGIC DISEASES?

There is evidence that exposure to infection is associated with decreased immune-related diseases.

Measles reduces the severity of the nephritic syndrome and atopic dermatitis.

“The administration of probiotics (which are live, nonpathogenic microbes incorporated into food) to infants with atopic dermatitis improved the skin lesions.” [I have noted many chiropractors recommending this to patients over the past few years].

Children who received antibiotics during infancy have a higher incidence of allergy and other atopic disorders.

Infections prevent the production of IgE antibodies, reducing airway hyper-responsiveness and asthma.

Decreased exposure of women to viruses before pregnancy may subsequently reduce the degree of protection against these viruses afforded to their newborns.

## CLINICAL IMPLICATIONS

“The relation between the reduction in the incidence of infectious diseases and the increase in the incidence of allergic and autoimmune diseases, on the one hand, and the apparent protective effect of infections against immune-mediated diseases, on the other hand, have clear clinical implications.”

"Vaccination strategies should be examined in the context of the hygiene hypothesis."

"Vaccinations may cause immunostimulation and thus have a favorable effect, or they may prevent 'protective' infections and thus have an unfavorable effect." **[WOW!]**

"The potential benefit of antibiotic therapy in situations in which the pathogenic role of a bacterium is doubtful should be carefully assessed."

"In addition to the problem of antibiotic resistance, unnecessary treatment with antibiotics could reduce the degree of physiological immunostimulation afforded by commensal bacteria." **[WOW!]**

"There is a certain irony in the fact that we must now search for new ways to reproduce the infectious diseases against which we have been fighting with great success over the past three decades." **[WOW!]**

"The challenge is an important one because of the high morbidity of allergic and autoimmune diseases."

The author ends this article by suggesting that these mechanisms might extend to other immune disorders, like non-Hodgkin's lymphomas [cancer], which is also increasing in developed countries.

#### KEY POINTS FROM DAN MURPHY

- (1) This review article was quite detailed, 10 pages long, with 133 references.
- (2) There is a steady, significant rise in the incidence of allergic and autoimmune diseases in developed countries over the past three decades.
- (3) The main reason for the increased prevalence of allergic and autoimmune diseases in industrialized countries is the reduction in the incidence of infectious diseases.
- (4) Infections can suppress allergic and autoimmune disorders.
- (5) Early childhood infections change immune system maturation.
- (6) The decrease in the incidence of many infectious diseases is the result of antibiotics, vaccination, and improved hygiene.
- (7) Antibiotics given to children increase the risk of asthma and allergy.
- (8) Allergic and autoimmune diseases cause high morbidity in children and adults.