Helminth infections and immunosenescence: The friend of my enemy.

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Abstract

Age-associated alterations of the immune system, which known as "immunosenescence", is characterized by a decline in innate and adaptive immunity, which leading to increased susceptibility to age-associated diseases, such as infectious diseases, rheumatic disease and malignancies. On the other hand, helminth infections are among the most prevalent infections in older individuals, especially in the nursing homes. Most of helminth infections have minor clinical symptoms and usually causing chronic infections without treatment. Nevertheless, chronic helminthiasis alters immune responses somewhat similar to the immunosenescence. Some similarities also exist between helminth infections and immunosenescence: 1) both of them led to declining the immune responses; 2) undernutrition is a consequence of immunosenescence and helminthiasis; 3) vaccine efficacy declines in aging and individuals with helminth infections; 4) increase incidence and prevalence of infectious diseases in the elder individuals and patients with helminth infections; and 5) both of them promote tumorigenesis. Hence, it is probable that helminth infections in the elderly population can intensify the immunosenescence outcomes due to the synergistic immunoregulatory effects of each of them. It would be suggested that, diagnosis, treatment and prevention of helminth infections should be more considered in older individuals. Also, it would be suggested that helminths or their antigens can be used for investigation of immunosenescence because both of them possess some similarities in immune alterations. Taken together, this review offers new insights into the immunology of aging and helminth infections.

KEYWORDS

Aging; Co-infection; Helminth infections; Immune risk phenotype; Immunosenescence; Inflammaging; T helper 1; T helper 2; T regulatory cells