

Immune System Effects of Aging

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The immune system's [1] job is to protect the body from foreign or harmful invaders. Invaders like these include Microbes are microscopic creatures (commonly called germs, such as bacteria, viruses, and fungi) parasitic organisms (such as worms) Cells that cause cancer, Organs and tissues that have been transplanted. The immune system must be able to differentiate between these invaders and protect the body. The immune system evolves over time.

Newborns are the most vulnerable. Acquired (specific) immunity [2] is not completely established at birth. Newborns, on the other hand, have antibodies that crossed the mother's placenta during pregnancy. Before their immune systems have completely developed, these antibodies protect newborns from infections. Antibodies from the mother's breast milk are often passed on to breastfed newborns.]

The immune system becomes less successful as people age in the following ways:

- The immune system loses its ability to differentiate between self and nonself (that is, to identify foreign antigens). As a result, autoimmune diseases are on the rise.
- Bacteria, cancer cells, and other antigens are destroyed more slowly by macrophages (which eat bacteria and other foreign cells). This slowdown may be one of the reasons why cancer is more prevalent in the elderly.
- T cells, which recognize antigens they've seen before, are slower to respond to the antigens
- White blood cells that can react to new antigens are in short supply.
- Complement proteins are found in smaller quantities in older people, and they do not develop as many of these proteins in response to bacterial infections as younger people do.
- While the total amount of antibody generated in response to an antigen remains constant, the antibodies' ability to bind to the antigen decreases. This shift could explain why pneumonia, influenza, infective endocarditic, and tetanus are more prevalent among the elderly and cause more deaths.

These adjustments can also explain why vaccines are less successful in older people, which is why booster shots are so critical for them (which are available for some vaccines).

Aging [3] is linked to a number of morbidities, many of which eventually lead to organ failure and death. Older people become more vulnerable to cancers and diseases as their protective immunity deteriorates. Surprisingly, ageing is linked to an increased risk of inflammatory diseases, especially cardiovascular disease. Many elderly degenerative disorders, such as Alzheimer's, Parkinson's, and osteoarthritis, have a significant component of tissue-damaging inflammation. Similarly, auto antibodies are much more likely to be generated in older people. In essence, immune ageing is linked to a decrease in defensive immunity as well as an increase in the incidence of inflammatory diseases.

Chronic organ diseases, such as chronic obstructive pulmonary disease and chronic kidney disease, are thought to speed up the ageing process and cause similar phenotypes including muscle wasting, osteoporosis, and vascular ageing. The acceleration of organism ageing caused by the failure of a major organ system, such as renal or respiratory failure, has obvious consequences

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