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Commentary

Brief Note on Immunology and Developmental Immunology

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DESCRIPTION

Immunology is a branch of biology that analyzes how immunological systems work in all living things. Immunology charts, measures, and contextualizes the immune system's physiological functioning in both health and disease, as well as immune system malfunctions in immunological disorders like autoimmune diseases, hypersensitivities, immune physical, chemical, and physiological aspects of the immune system's components, as well as deficiency and transplant rejection. Immunology can be used in a wide range of medical fields, including organ transplantation, oncology, rheumatology, virology, bacteriology, parasitology, psychiatry, and dermatology.

The thymus, bone marrow, and primary lymphatic tissues such as the spleen, tonsils, lymph arteries, lymph nodes, adenoids, and liver are essential lymphoid organs of the immune system. Many immune system components, on the other hand, are cellular in origin and are embedded or circulating in diverse tissues throughout the body, rather from becoming connected with specific organs. Parts of the immune system organs, such as the thymus, spleen, bone marrow, lymph nodes, and other lymphatic tissues, can be surgically removed for examination while patients are still alive when health conditions develop to emergency level.

The ability of both the body to react to antigens is determined by a person's age, antigen type, maternal factors, and the context in which the antigen is given. Because both their innate and adaptive immune responses are significantly repressed, neonates are considered to be in a state of physiological immunodeficiency. Protein antigens are well-received by a child's immune system after birth, whereas glycoproteins and polysaccharides are not. In fact, low-virulence species like Staphylococcus and Pseudomonas cause a large number of infections in newborns. Opsonic activity and the ability to activate the complement cascade in newborns are extremely limited. Hormones induce and mediate various physical, physiological, and immunological changes in the human body during adolescence, with 17-estradiol (estrogen) being the most important in females and testosterone being the most important in males. Around the age of ten, estradiol begins to act, followed by testosterone a few months later. There is evidence that these hormones have an influence on the development and control of the immune system, including an increased risk of developing pubescent and post-pubescent autoimmunity, in addition to acting directly on primary and secondary sexual characteristics.

Cell surface receptors on B cells and macrophages have been shown to sense hormone levels in the system. Some male androgens, such as testosterone, have been observed to reduce the stress response to infection, whereas the female sex hormone 17-estradiol has been shown to control the level of immune response. Other androgens, such as DHEA, on the other hand, boost immunological response. For puberty and post-puberty, male sex hormones appear to have stronger power over the immune system than during the rest of a man's adult life, just as they do in females. Immunological response is also influenced by physical changes throughout puberty, such as thymic involution. Though immunosenescence has been related to thymic involution, it is not caused by ageing because the organ involutes at a young age in humans, as early as the first year following birth.

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