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J P N Mishra, J Neuro Neurophysiol 2023, Volume 14

## Neural modulation of immunity with reference to yogic practices

Despite the variety of mechanisms of nonspecific resistance, they all have one thing in common they are designed to protect the body from any kind of pathogen or other foreign substance. They are not specifically directed against a particular microbe. Specific resistance to disease, called immunity involves the production of a specific type of cell or a specific molecule (antibody) to destroy a particular antigen. If antigen 1 invades the body, antibody 1 is produced against it. If antigen 2 invades the body, antibody 2 is produced against it and so on.

An Antigen (Ag), or Immunogen, is a chemical substance that when being introduced into the body, causes the body to produce specific antibodies and/or specific cells called T cells, which can react with antigen. Antigen, thus have two properties. The first is Immunogenicity, the ability to stimulate the formation of specific antibodies. The second is reactivity, ability of the antigen to react specifically with the produced antibodies. The antigen with of these two characteristics is called a complete antigen. Antibodies do not form against the whole antigen. At specific regions of the surface of the antigen, called antigenic determinant sites, specific chemical groups of the antigen combined with the antibodies. This combination depends upon the size and shape of the determinant site and the way it corresponds to the chemical structure of the antibody. The combination is very much like lock-and-key analogy used to describe the combination of enzyme and substrate molecule.

As a rule, the antigens are foreign substances They are not usually part of the chemistry of the body. The body's own substances, recognized as "self," do not act as antigens; substances identified as "non-self", however stimulate antibody production. There are certain conditions in which the distinction between self and non-self-breakdown and the antibodies that attack the body are produced. The process of recognition of self or non- self and determinant site along with the outcome of the combination is being regulated by specific neural centres in the brain, by using memory T cells and the same could be modulated by the practice of pranayama and meditation. The sensory nerve endings in the blood flow itself brings in information of a specific foreign body (antigen), followed by acquisition and analysis in

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May 02-03, 2023

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in cerebral cortex, the desired reaction to produce antibodies takes place which, finally results in well- modulated specific resistance i.e., promoted immunity.

Antibodies are proteins produced by the body in response to the presence of an antigen and can combine specifically with antigen. Antibodies belong to a group of proteins called globulins and for reasons they are also known as Immunoglobulins or Ig. Five different classes of Immunoglobins are known to exist in humans. These are designated as IgG, IgA, IgM, IgD and IgE. Each has a distinct chemical structure and a specific biological role.

The ability of the body to defend itself against invading agents such as bacteria, toxins, viruses and foreign bodies through immune response is subconsciously regulated by central nervous system, thereby giving a scope of the involvement of mind. The responses consist of formation of specialized blood cells, the lymphocytes that have the capacity to attach to the foreign agent and destroy it. This is called cellular (cell mediated) immunity and is particularly effective against all kinds of foreign invaders. In another response the body produces circulating antibodies that can attack an invading object. This type of resistance is termed as humoral (antibody- mediated) immunity and is particularly effective against strong bacterial and viral infections.

In both cellular and humoral immunity lymphocyte are there to play a key role. In cellular immunity lymphocytes are converted into “T-cells” to have a direct fight with invading foreign agents whereas when lymphocytes are modifies as B- cells (called humoral immunity) to produce a specialized protein- based chemical compound, called antibody, to kill the invader antigen without having any direct scuffle within no time. In fact, all the blood vessels are innervated with branches of both sensory and motor nerves hanging in blood stream. Firstly, they recognize the foreign elements; send the message to cerebral cortex. After acquisition and analysis, the response is prepared and communicated to lymphocytes to convert into either T cell or B cell as per the strength of the antigen. Hence, the process totally depends upon the communication from the nerves for the conversion of lymphocytes and destruction of antigen.

Thus, the process of immunity depends upon the mind modulation of the lymphocytes’ action. The principle of ‘panchkosha’ very clearly states that pranayama regulates the mind body communication and facilitates the availability pranic energy at cellular level including nerve cells. Simultaneously practice of meditation gives a significant focus on generation of thoughts for T cell and B cell production which finally boosts the efficiency of immunity.

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## Biography

J P N Mishra has completed his PhD in the discipline of Life Sciences (Human Physiology) from Banaras Hindu University, Varanasi, India in 1982. He has worked as Professor and Dean, School of Life Sciences, Central University of Gujarat, India. He has 109 research papers in reputed journals, 10 books and more than 100 popular health articles to his credit. The area of his research is Human physiology, Sleep science and Yoga therapy. He has travelled across the globe to deliver lectures on sleep science and yoga therapy. Currently, he is serving as Registrar at NIPER, Hyderabad, India.

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**Received:** April 25, 2023; **Accepted:** April 27, 2023 ; **Published:** May 02, 2023

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