

Natural Immunity

Natural, innate, or native immunity depends on factors that are inborn and can be classified as species immunity, racial immunity, and individual immunity.

Species Immunity

In general, cold-blooded animals are not susceptible to diseases common to warm-blooded animals. Humans are not all susceptible to certain diseases of lower animals, such as chicken cholera. However, a number of infections that occur primarily in animals can be transmitted to humans. Among the most important are anthrax (in cattle, sheep, horses), plague (in rodents), and rabies (in cats, dogs, bats, and others). Correspondingly, many human diseases do not naturally occur in animals. Examples include gonorrhea, typhoid fever, influenza, measles, mumps, and poliomyelitis.

Racial Immunity

Human races differ in susceptibility to common infections (e.g., yellow fever, pneumonia, tuberculosis). Factors that determine racial immunity are elusive and not well known. Racial immunity should not be used synonymously or confused with environmental immunity. Environmental immunity may be the result of resistance to infection among individuals in a community resulting from the degree of acquired immunity and other factors (e.g., nutrition, genetic constitution, fatigue). For example, tuberculosis and smallpox wreaked havoc among the Eskimos and American Indians when these groups were first exposed to them. However, with the course of time, the disease tends to become less severe, and it may eventually reach the same level of incidence and severity as among other races with whom the disease has been endemic for a long time.

Individual Immunity

Apart from any specific immunity to a particular infectious agent, individuals vary in the ability to resist common microbiologic diseases. Some individuals have little capacity to resist skin disorders, the common cold, and other familiar diseases. The natural

resistance of the same individual may vary from time to time.

General good health, demonstrated by healthy body tissues, skin, and mucous membranes; leukocytes in plentiful supply; and an active and positive lifestyle (i.e., little or no smoking, alcohol, social drug use), provides adequate barriers to bacterial infiltration. Resident bacteria in the gastrointestinal tract and upper respiratory tract, for example, provide resistance to infection. These play a vital role in resisting invasion by other species of microorganisms capable of producing infection. Also, stomach acid is to a degree capable of destroying ingested bacteria. Intestinal enzymes are also known to provide secondary defense mechanisms.

Acquired Immunity

Acquired immunity is a specific immunity that may be active or passive. *T lymphocytes* regulate cell-mediated immunity and are responsible for controlling certain bacterial and viral infections. These lymphocytes are responsible for mediating graft versus host disease, allograft rejection, and delayed hypersensitivity reactions.

T lymphocytes augment the activity of *B lymphocytes*, which are primarily involved with humoral immunity and antibody production. Once an antigen is introduced into the body, *B lymphocytes* differentiate into plasma cells that produce antibodies specific to the invading antigen. These antibodies, known synonymously as immunoglobulins, attach to the invading antigen and cause its destruction by phagocytes and the complement system.

Once exposed to an antigen, the *T* and *B lymphocytes* demonstrate memory that allows them to recognize and respond to a specific antigen when exposed again. The second response is far greater in magnitude to the first immunologic response. This memory of an antigen by the immune system allows sensitized individuals to resist infections on subsequent exposure.

Active Immunity

Active immunity develops in response to antigenic substances in the body. This may