**IMMUNITY**

**UNIT OBJECTIVE**

* By the end of this unit the learners should be able to understand the mechanisms of immunity.

**INTRODUCTION**

* Immunity is the ability of the human body to tolerate the presence of materials indigenous to the body (self), and to eliminate foreign materials. This provides the protection from infectious disease, since most microbes are identified as foreign by the immune system. Immunity to a microbe is usually indicated by the presence of antibody specific to that organism.

**HOW THE BODY DEVELOPS IMMUNITY**

* There are two (2) basic ways to acquire immunity against infections, namely: - **Active immunity** and **passive immunity.**
* **Active immunity** is acquired when a person’s own immune system is stimulated to produce antigen specific antibodies and immune cells. This type of immunity often lasts for many years and it may be permanent. Active immunity can be divided into **Natural active immunity** and **artificial active immunity.**
* **Passive immunity** results when antibodies are transferred from one person or animal to another. Passive immunity disappears over time and usually within weeks or months. It is divided into **natural** **passive immunity** and **artificial passive immunity.**

1. **Natural Active Immunity**

* This is the immunity acquired after an individual has survived an infection with the disease causing form of the organism. When a foreign particle or organism invades the body, white blood cells called lymphocytes identify the substance (antigen). The WBCs produce antibodies which are able to identify and kill or inactivate the antigen. The patient recovers and the body lymphocytes keep the memory of these organisms for life. This means that next time the same organism attacks the patient, the lymphocytes are ready to produce large amount of antibodies, which will overcome the organism. The patient will not get ill again hence he/she is said to have acquired natural immunity. **Example:** If a child has had measles and recovered, the child’s lymphocytes produce antibodies anytime the child encounters the measles virus throughout the child’s life.

1. **Artificial Active Immunity**

* This is the type of immunity given through vaccine administration. A vaccine is made from an organism which is either killed or attenuated i.e it has lost its harmfulness, or its part or toxin rendered harmless (“toxoid”). However, its antigenicity will still be identified by the lymphocytes and will induce production of antibodies. **Example:** If a child gets the oral polio vaccine (attenuated live polio virus), the child’s body will produce antibodies against poliovirus and hence will be protected against poliomyelitis without having been sick.

1. **Natural Passive Immunity**

* Passively acquired antibodies are responsible for the protection of newborns and young infants against certain diseases. The transfer of antibodies from mothers to foetus across the placenta during the last 2-3 months of pregnancy provides the newborn with a portion of the mother’s immunological experience. **Examples** of passive transfer include when:
* Tetanus antibodies induced in the mother following immunization with tetanus toxoid easily passes across the placenta to the unborn child providing protection against tetanus in the neonatal period.
* Measles antibodies made by the mother, passes through the placenta and breast milk, protecting the newborn during the first month of life.
* Protection is better against some diseases (e.g measles, rubella and tetanus) than others (e.g polio, pertusis).

1. **Artificial Passive Immunity**

* “Borrowed” antibodies can also protect one temporarily. These borrowed and prepared antibodies are from serum (antiserum) of a person or animal that has been exposed to an antigen and has produced antibodies which are purified and are directly injected to the person at the site of infection to immediately counteract the offending antigen. Sources of passive artificial immunity include blood and blood products, immune hyper-immune globulin and animal antitoxins.

**HERD IMMUNITY**

* This is the protective effect accorded to the few individuals who have not been immunized in a community that has a high proportion of immunized population. Herd immunity usually depends upon a high percentage of children immunized, evenly distributed in a given area. A community becomes susceptible to the disease if a large number of people who are not immune enter it either by birth or immigration (e.g when an influx of unvaccinated refugees occurs in an area. There are two (2) ways of developing herd immunity:
* High natural infection rate in the community.
* Artificial immunization.