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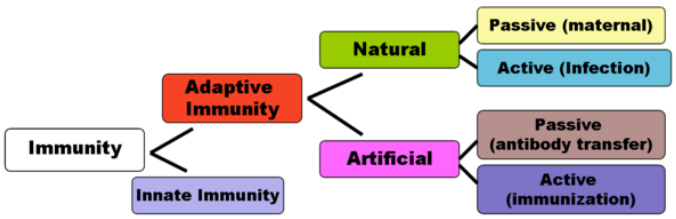
Medical surgical nursing assignment

1. Roles of the immune system
   The role of the immune system is to protect the body from any foreign matters that might cause any damage or homeostatis imbalance. The success of the immune system depends on its ability to discriminate between foreign(non self) and host(self) cells. When an organism is threatened by microorganisms, viruses, or cancer cells, the immune system acts to provide protection. Normally the immune system does not mount a response against self. This lack of an immune response is called tolerance.When a foreign matter enters the human body, the defense system recognizes this as foreign through the immune system. How the human body recognize foreign against itself employs a complex "I.D." system. Each cell in the human body carries on it's surface a mixture of proteins and sugars that serve to identify the cell to the immune system. Foreign objects lack the identifiers that all of the body's cells have, but each one has unique features or antigens where the immune system attaches identifiers called antibodies. This is the basis for the specific defense mechanisms. Once a person has built the antibodies for a specific antigen, the immune system will respond faster than if the had been no previous exposure to the antigen (i.e. one is immune to the pathogen, but only that specific pathogen, because the person's immune system responds faster.) The non–specific part of the immune system is mostly composed of phagocytes (eating–cells) which engulf and digest foreign substances like bacteria and viruses, which do not bear the body's specifc idenifers.
2. Describe the two types of immunity.
   - Innate or Natural or Nonspecific Immunity (L. innatus = inborn):Innate immunity is inherited by the organism from the parents and protects it from birth throughout life. For example humans have innate immunity against distemper, a fatal disease of dogs.As its name nonspecific suggests that it lacks specific responses to specific invaders. Innate immunity or nonspecific immunity is well done by providing different barriers to the entry of the foreign agents into our body. Innate immunity consists of four types of barriers— physical, physiological, cellular and cytokine barriers. The physical components include skin and mucous membrane. The physiological components include gastric acid, bile, ear wax, nasal hair,urine, sweat etc. The cellular components include certain leukocytes, monocytes, macrophages, natural killer cells, fever, inflammation etc.Innate immunity, also called native immunity, exists by virtue of an organisms constitution, that is its genetic

make–up, without an external stimulation or a previous infection. It is divided into two types: (a) Non–Specific innate immunity, a degree of resistance to all infections in general. (b) Specific innate immunity, a resistance to a particular kind of microorganism only. As a result, some races, particular individuals or breeds in agriculture do not suffer from certain infectious diseases.

- Acquired Immunity (= Adaptive or Specific Immunity):The immunity that an individual acquires after the birth is called acquired or adaptive or specific immunity. It is specific and mediated by antibodies or lymphocytes or both which make the antigen harmless.It not only relieves the victim of the infectious disease but also prevents its further attack in future. The memory cells formed by B cells and T cells are the basis of acquired immunity. Thus acquired immunity consists of specialized B and T lymphocytes and Antibodies. Adaptive immunity can also be divided by the type of immune mediators involved; humoral immunity is the aspect of immunity that is mediated by secreted antibodies, whereas cell mediated immunity involves T–lymphocytes alone. Humoral immunity is called active when the organism generates its antibodies, and passive when antibodies are transferred between individuals or species. Similarly, cell–mediated immunity is active when the organisms' T–cells are stimulated, and passive when T cells come from another organism. Adaptive immunity is specific, diverse, can recognise and respond to foreign molecules (non–self) and can avoid response to those molecules that are present within the body (self) of the person; and can retain memory of the first encounter.
  The following diagram describes the two types of immunity.



3. Explain the different types of antibodies and their roles.
   Human antibodies are classified into five isotypes (IgM, IgD, IgG, IgA, and IgE) according to their H chains, which provide each isotype with distinct characteristics and roles.
   - IgG: IgG is the most abundant antibody isotype in the blood (plasma), accounting for 70–75% of human immunoglobulins (antibodies). IgG detoxifies

harmful substances and is important in the recognition of antigen–antibody complexes by leukocytes and macrophages. IgG is transferred to the fetus through the placenta and protects the infant until its own immune system is functional.

- IgM: IgM usually circulates in the blood, accounting for about 10% of human immunoglobulins. IgM has a pentameric structure in which five basic Y–shaped molecules are linked together. B cells produce IgM first in response to microbial infection/antigen invasion.Although IgM has a lower affinity for antigens than IgG, it has higher avidity for antigens because of its pentameric/hexameric structure. IgM, by binding to the cell surface receptor, also activates cell signaling pathways.
- IgA: IgA is abundant in serum, nasal mucus, saliva, breast milk, and intestinal fluid, accounting for 10–15% of human immunoglobulins. IgA forms dimers (i.e., two IgA monomers joined together). IgA in breast milk protects the gastrointestinal tract of neonates from pathogens.
- IgE: IgE is present in minute amounts, accounting for no more than 0.001% of human immunoglobulins. Its original role is to protect against parasites. In regions where parasitic infection is rare, IgE is primarily involved in allergy.
- IgD: IgD accounts for less than 1% of human immunoglobulins. IgD may be involved in the induction of antibody production in B cells, but its exact function remains unknown.