

## Evaluation of immunological response of HIV/AIDS patients placed on HAART and Herbal Medicine within 12 Month treatment

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Immunological response of 140 HIV/AIDS patients who willingly after informed consent, accepted to participate in the study, included 100 HIV patients in Mile Four Hospital who were placed on HAART and 40 HIV patients who went for treatment at Herbal clinics at Izzi Local Government Area and were given herbal concoction. Blood specimens from the two groups were taken every four months (0 month (before medication started), then 4 months later, 8 months and 12 months. CD4+ cells and white blood cell counts (WBC) were determined with ABACUS 380 automated machine in accordance with manufacturer's instructions. The findings from the investigations revealed that all the patients who religiously took HAART medication had steady CD4+ lymphocytes for 8 months before an increase of about 5 to 20 CD4+/mm<sup>3</sup>. It was also observed that patients with low CD4+ cell counts of 120 to 250 cells per mm<sup>3</sup> had increase of 5 to 10 cells/mm<sup>3</sup>, whereas others with CD4+ cell counts of 300-500 cell/mm<sup>3</sup> increased with 15- 20 CD4+ cells/mm<sup>3</sup>. For patients on herbal concoction, the decline of CD4+ cell count was noticed from the 4th month of medication.

The innate immune response is an organism's first response to foreign invaders. This immune response is evolutionary conserved across many different species with all multi-cellular organisms having some sort of variation of an innate response. The innate immune system consists of physical barriers such as skin and mucous membranes, various cell types like neutrophils, macrophages, and monocytes, and soluble factors including cytokines and complement. In contrast to the adaptive immune response, the innate response is not specific to any one foreign invader and as a result, works quickly to rid the body of pathogens.

When a foreign pathogen bypasses the physical barriers and enters an organism, the PRRs on macrophages will recognize and bind to specific PAMPs. This binding results in the activation of a signaling pathway which allows for the transcription factor phagocytize and kill any pathogens or microbes.

An immune response is a reaction which occurs within an organism for the purpose of defending against foreign invaders. These invaders include a wide variety of different microorganisms and including viruses, bacteria, parasites, and fungi which could cause serious problems to the health of the host organism if not cleared from the body.

The first contact that an organism has with a particular antigen will result in the production of effector T and B cells which are activated cells that defend against the pathogen

The production of these effector cells as a result of the first-time exposure is called a primary immune response. Memory T and memory B cells are also produced in the case that the same pathogen enters the organism again. If the organism does happen to become re-exposed to the same pathogen, the secondary immune response will kick in and the immune system will be able to respond in both a fast and strong manner because of the memory cells from the first exposure. Vaccines introduce a weakened, killed, or fragmented microorganism in order to evoke a primary immune response. This is so that in the case that an exposure to the real pathogen occurs, the body can rely on the secondary immune response to quickly defend against it.

The adaptive immune response is the body's second line of defense. The cells of the adaptive immune system are extremely specific because during early developmental stages the B and T cells develop antigen receptors that are specific to only certain antigens. This is extremely important for B and T cell activation. B and T cells are extremely dangerous cells, and if they are able to attack without undergoing a rigorous process of activation, a faulty B or T cell can begin exterminating the host's own healthy cells. Activation of naïve helper T cells occurs when antigen-presenting cells (APCs) present foreign antigen via MHC class II molecules on their cell surface. These APCs include dendritic cells, B cells, and macrophages which are specially equipped not only with MHC class II but also with co-stimulatory ligands which are recognized by co-stimulatory receptors on helper T cells. Without the co-stimulatory molecules, the adaptive immune response would be inefficient and T cells would become anergic.



