

Acquired Immune System

(or adaptive immune system)

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The acquired immune system is activated by the innate immune system. It is a system that forms an immune response for specific pathogen as opposed by the innate system which is non-specific. It develops specific responses to pathogens and then genetically programs certain lymphocytes that will always be programmed for the pathogen and respond quickly and effectively against future attacks by that pathogen. The next time that pathogen or particles (antigens) from that pathogen are exposed to the immune system again those programmed cells quickly multiply and produce a large number of antibodies very quickly.

This is the system that vaccines work on. Dead, weakened, antigens or fully infective pathogens injected into or consumed by an animal will trigger the innate immune system and then the adaptive system. Once the adaptive system is activated there will always be some lymphocyte cells in the animal programmed for that pathogen. That is the basis of a vaccine. There is a difference in the effectiveness of these different states of pathogens injected. Living and weakened or altered pathogens are normally about 5 times more effective than dead pathogens or antigens. There are always a possible cost with anything that might be more effective. In the case of living pathogens used as vaccines there is always the chance of infecting other host as the pathogen becomes fully pathogenic over time while in the vaccinated animal. So many times there will be fully pathogenic organisms in the droppings or through infecting the person administering the vaccination. That is why manufactures usually have a warning to users to wear mask and gloves while giving vaccines with living pathogens. I would highly recommend if you use a living vaccine to use it at least a month before any shows so the pathogens aren't spread to other's birds through the droppings.

Another thing that determines effectiveness is the amount of antigen that is seen by the innate immune system. Depending on the pathogen it makes a difference in the location that the vaccine is injected and into what tissue type. Some vaccines are best if placed just under the skin while other need to be placed in the muscle. If there is not enough particles exposed to the innate system there won't be a response to it. Also the higher the number of particles seen by the innate system the bigger the immune response will be.

The main two types of lymphocytes that are part of the adaptive system are B lymphocytes and T lymphocytes. They are types of leukocytes and make up about 35% of the white blood cells in the body. Most cells are in the lymphatic system (lymph glands, ducts, etc.) and the rest are in the circulating blood. These cells are produced in the bone marrow from lymphatic stem cells. Many of these cells reside in lymph nodes. The lymph nodes are like a filtering system for the fluids that drain from tissue and cells. They are like a filter in a storm sewer that will trap and exposed any pathogens or antigens in the extra cellular fluid. That way the antigens are exposed to the lymphocytes very quickly. This is what people feel when their "glands" are swollen. The lymphocytes will start to multiply in the lymph nodes and make them swell once exposed to antigens. The fluid from this system eventually drains through the lymph duct until it drains in the one of the major veins and is recirculated in the blood.

There are different types of B and T lymphocytes along with other leukocytes that do different functions and you get different immune responses from them from them. An allergy is different from a viral infection and different from a foreign body response. So one type of response can drain the body from the energy to perform well in other immune responses. The cells in the body are a major organ. All the cells involved are larger than that of heart or stomach. If you look at the number of cells involved to make this system function you will understand why it is so taxing on a host body to respond to pathogens.