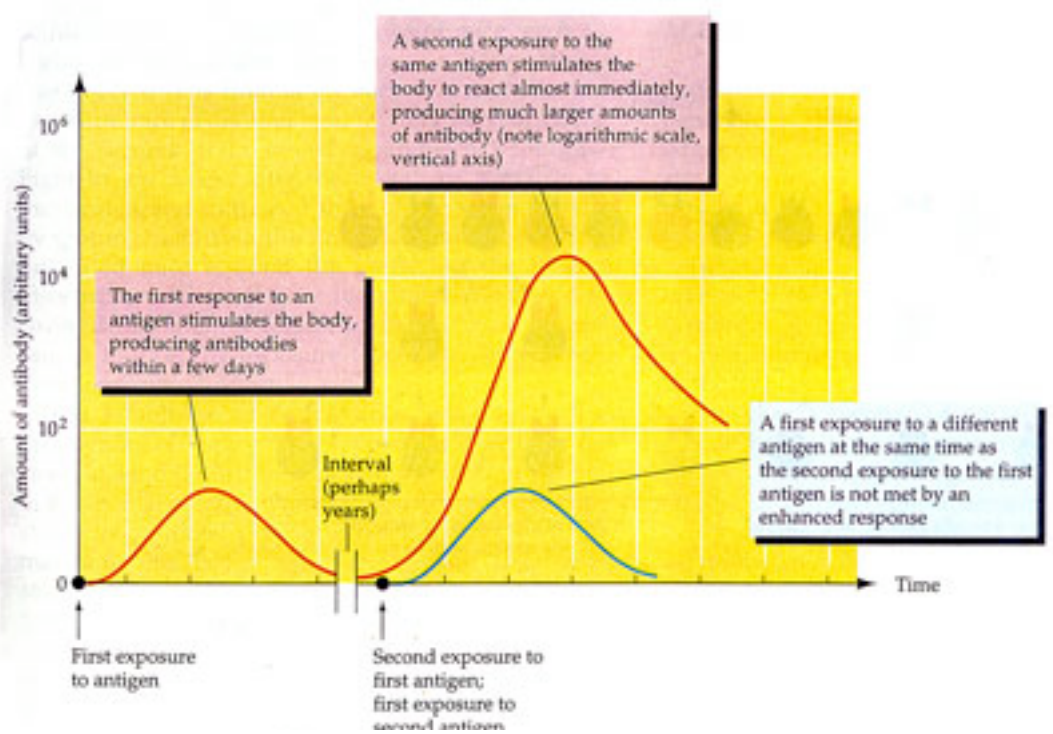
The Immune System has a Memory

Among the remarkable capabilities of the immune system is the ability to "remember" antigens that it has encountered before. A first encounter of a B cell with an antigen leads to a slowly rising synthesis of antibody (**primary response**). A second encounter with the same antigen leads to a more rapid and greater response (**secondary response**). Only a previously encountered antigen provokes the secondary response: the system has learned to recognize the antigen to which it was previously exposed (See figure below). The basis of learning in the immune system is the formation of long-lived memory cells: After an encounter with an antigen, memory cells with the surface antibody directed to the antigen persist in the body for many years, in many cases for the lifetime of the organism.

These circulating memory cells carry on their surfaces the particular antibodies that bind to reinvading antigens. The memory cells respond so rapidly that a second encounter with an antigen leads to a much faster and more effective response than the first (See figure). This is why once a person has been infected by a given virus, that virus can never catch the body unprepared again. It also explains why children are so much more susceptible to infectious diseases than are adults.



The immune system remembers. Immunological memory – the ability of the body to remember an antigen it has been exposed to – is the basis for medical immunization against disease.

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