

THE IMMUNE RESPONSE

Doc 7: Immunological memory

Prof: Mohamad Ouaidat

Content:

- Characteristics of primary and secondary responses.
- Bases of immunological memory.
- Importance of immunological memory.

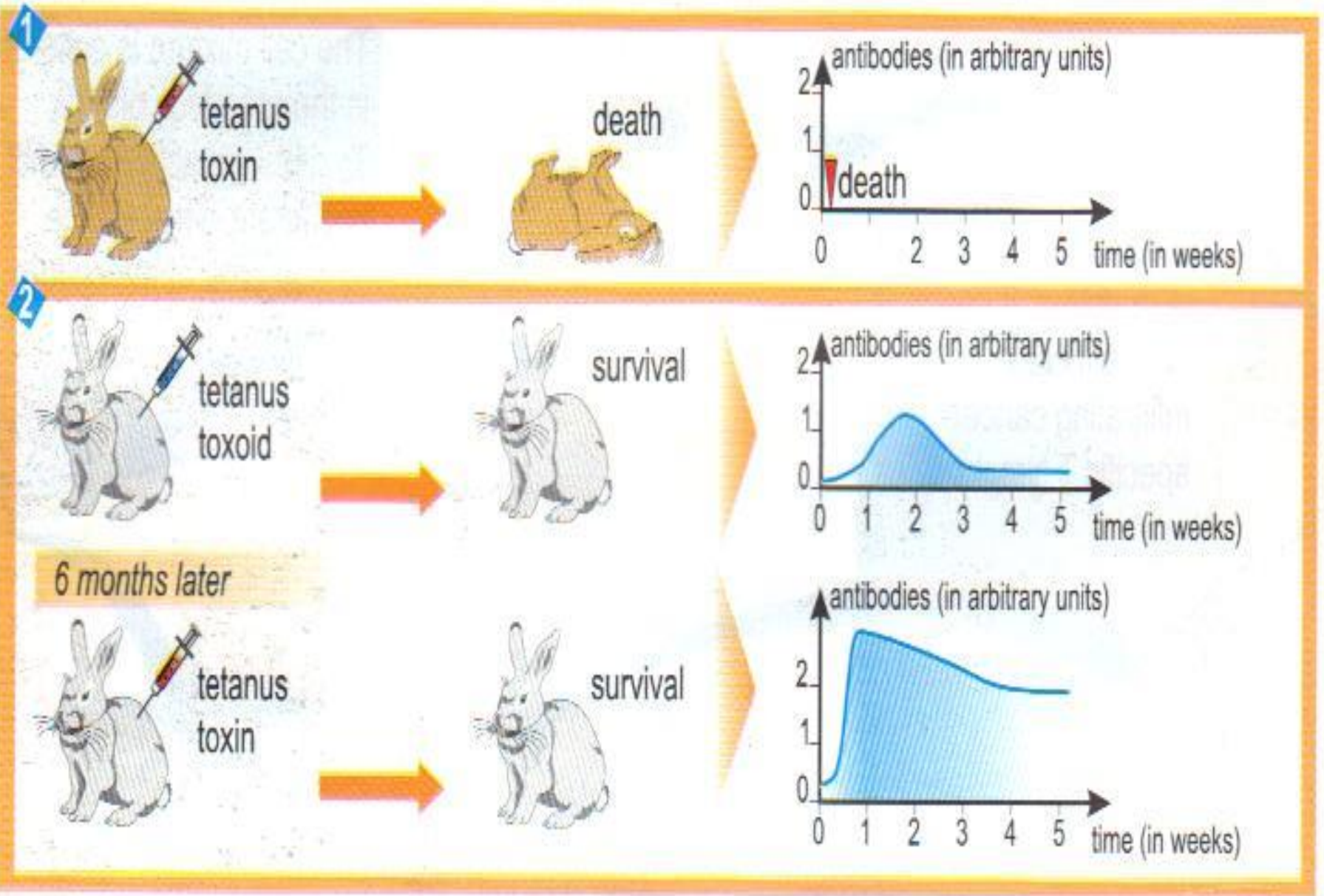
Recalling about

- Evolution of activated B and Tc lymphocytes.
- Toxin and toxoid

Motivation

The specific immune response is characterized by ensuring a long term resistance against an antigen after it has been encountered for a first time. The immune system keeps in memory the encounter with the antigen and sets a counter-attack against it. How does the immune system keep the antigen in memory? What are the characteristics of the immunological memory?





Doc.a An experiment showing the effects of immunological memory.

1- The death of the rabbit is due to the absence of anti-tetanus toxin antibodies in its blood.

2- In the primary response, the amount of antibodies is 1.2 a.u which is less than that in the secondary response (3a.u). The production of antibodies begins after 1week in the primary response which is longer than in the secondary response which is within 2 days.

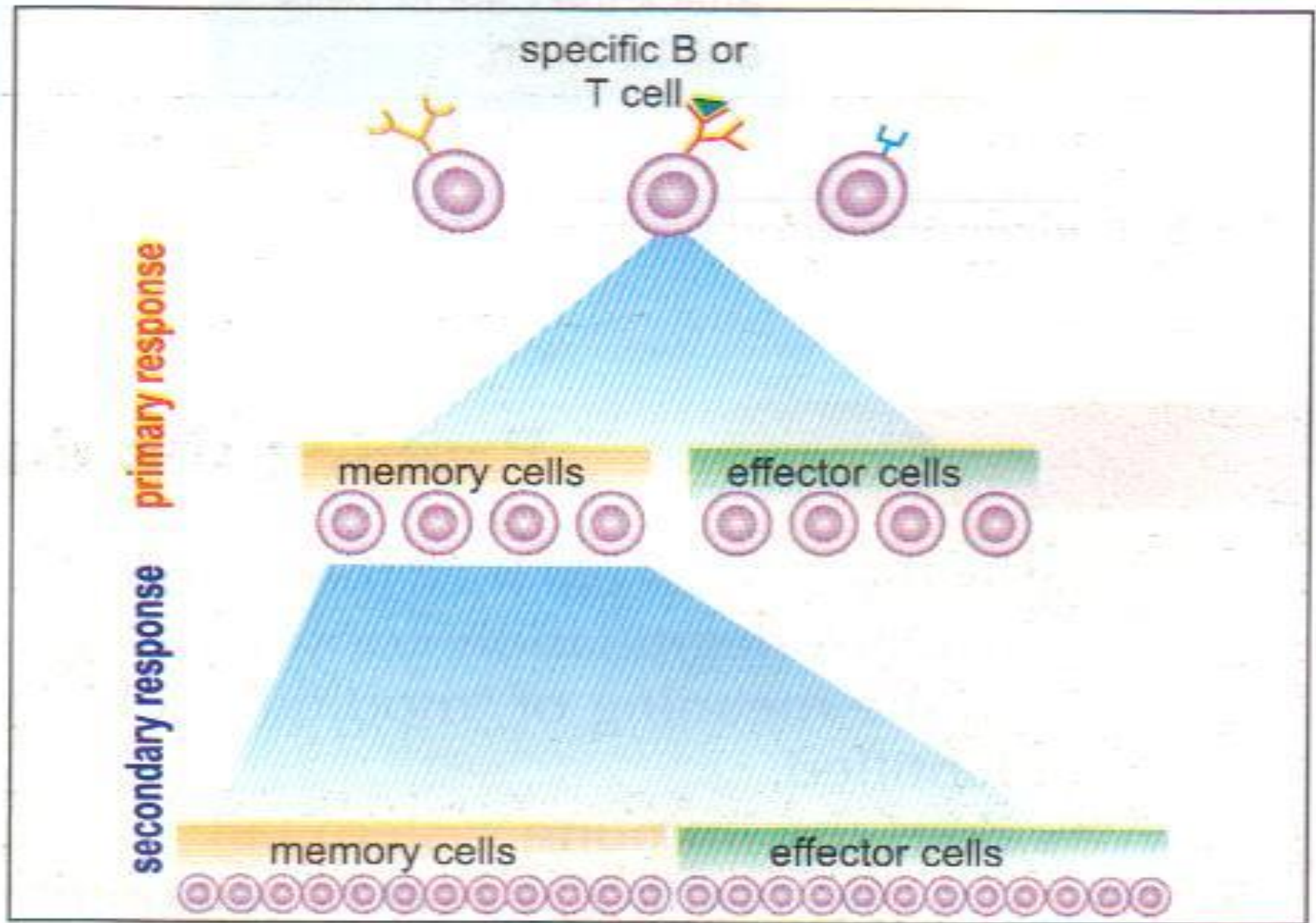
The duration of the primary response is about 2weeks which is shorter than that of the secondary one (over than 5weeks).

We conclude that the secondary immune response is rapid, amplified and long lasting.

3- A tetanus toxoid(attenuated tetanus toxin) induces a protection against the corresponding antigen (tetanus toxin) through specific antibodies secretion.

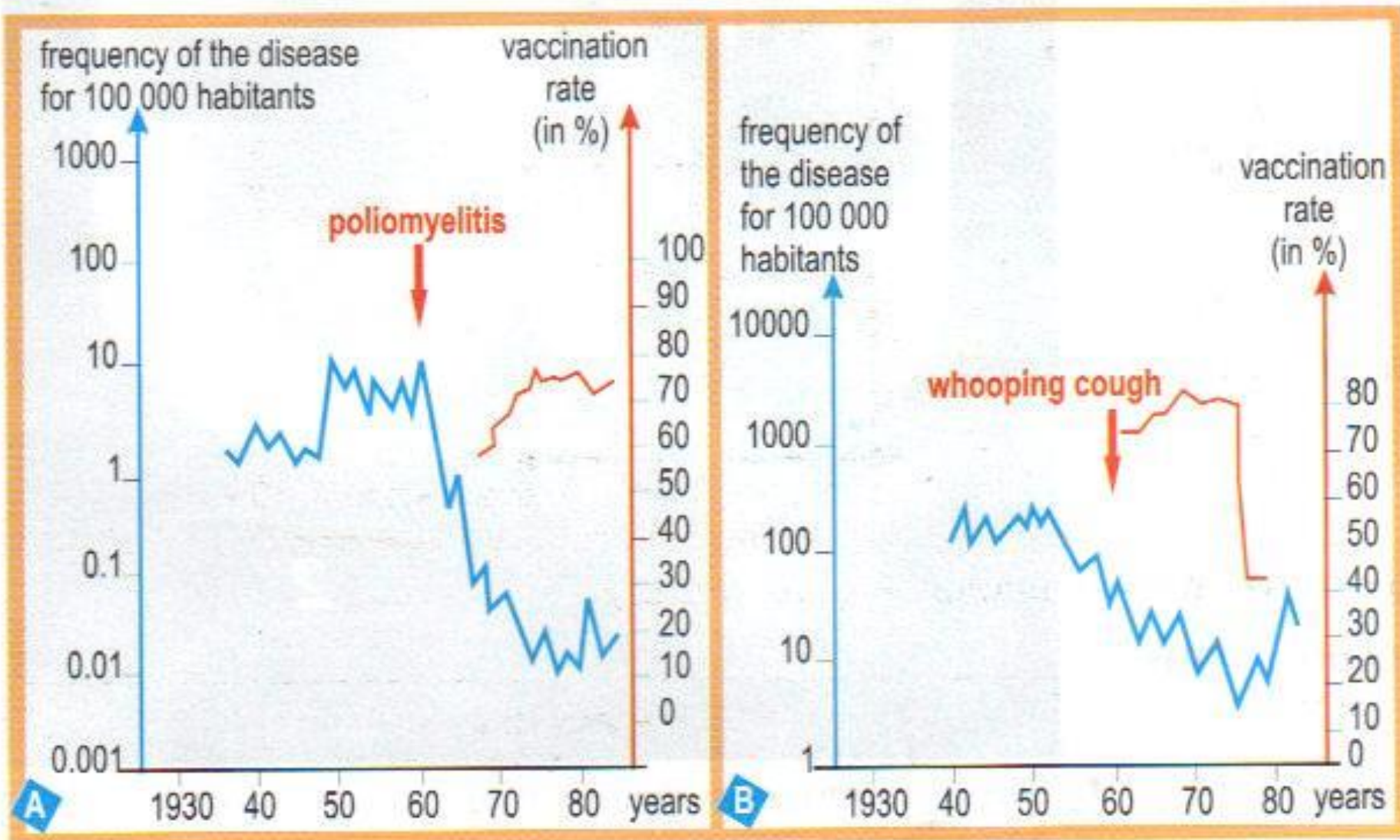
Table comparing primary and secondary responses

	Primary response	Secondary
Amount of plasma antibody	Low	High
Duration of the response	Short	Long
Latency or delay before production of antibodies	Slow (after one week)	Fast (after 2 days)



Doc.b Activation of memory cells during a secondary response.

1- Since B and T memory cells are more numerous and more differentiated, the secondary immune response is faster, amplified and more persistent.



Doc.c Graphic results of the epidemiological survey performed in England from 1930 till 1979. Each arrow indicates the date of introduction of mass vaccination for each disease.

1-1. The vaccine is a killed or attenuated microorganism or purified microbial antigens.

1-2. The vaccine is not pathogenic, but immunogenic. It can induce a primary immune response and a long term immunological memory.

2- In the case of poliomyelitis, the frequency decreases from 10 to 0.01 for 100000 habitants. Moreover, the frequency decreases in the case of whooping cough from 400 to 5 for 100000 habitants. Therefore, vaccination reduces the frequency of the diseases.

3- The decrease in the rate of vaccination of whooping cough increases the number of the affected individuals and recrudescence of the disease.