

Primary and Secondary Immune Response:

How memory cells work

Law enforcement agents use a database of “mug shots” to help identify previous lawbreakers. The mug shots comprise a photo library of individuals who were arrested for criminal acts. Like these agents, some cells of your immune system also maintain a record of previous intruders. This recall is the basis of the memory response.

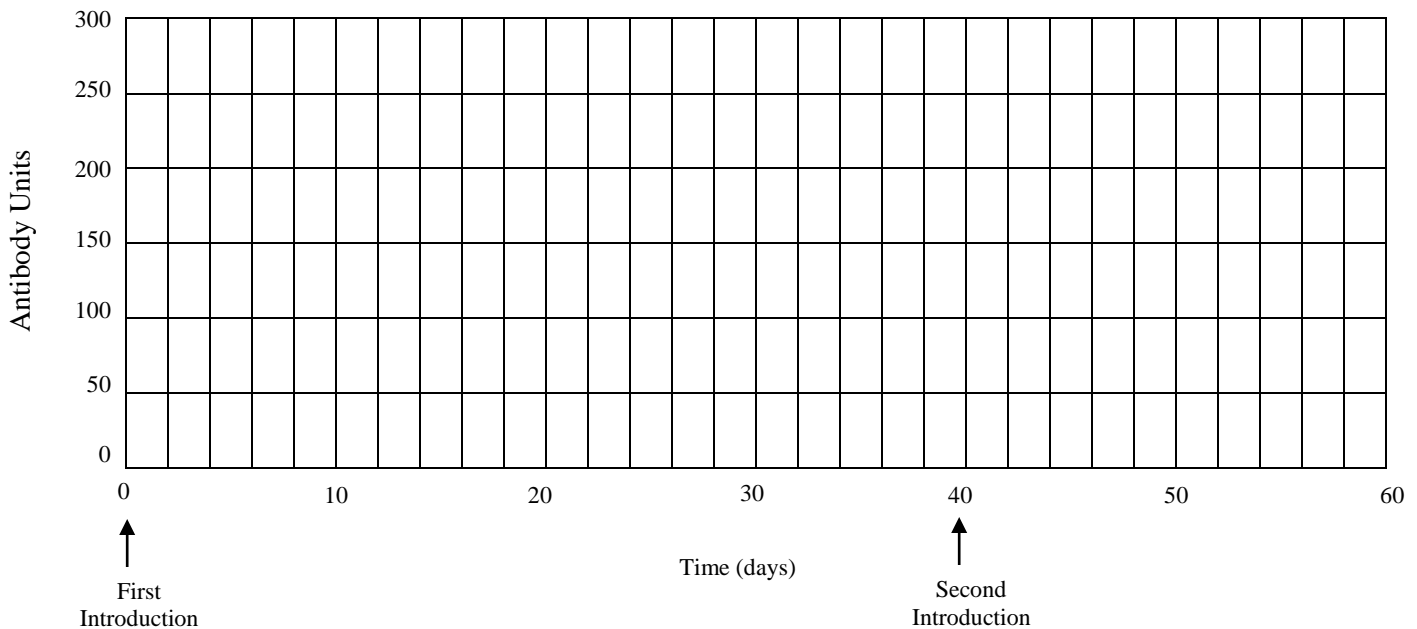
The first appearance of an infectious agent stimulates the primary immune response. During this response, the intruder is identified and eliminated. As part of this process, T_H cells activate antigen-specific T and B memory cells. A memory cell is dedicated to recalling only one type of antigen. Since your body encounters thousands of antigens, its mug shot portfolio must contain an equal number of different memory cell types.

If an antigen appears, the specific memory cells act quickly. Memory cells act quickly. Memory T cells become active T cells. They produce a secondary immune response. Plasma cells produce higher levels of antibodies in a short period. In addition, this second release of antibodies tends to be more effective in binding and deactivating the antigen.

Graphing Data

Graph the following data on the axis provided below. Assume that the antigen was first introduced at time 0 and later reintroduced on day 40.

Time (Days)	Antibody Units
0	0
2	0
4	10
6	30
8	70
10	120
12	120
14	100
16	80
18	50
20	20
22	15
24	10
26	5
28	0
30	0
32	0
34	0
36	0
38	0
40	0
42	10
44	40
46	90
48	150
50	250
52	300
54	280
56	260
58	230
60	200



1. Describe the primary and secondary immune response in terms of:

(a) speed

(b) number of antibodies produced.

2. Which immune cells contribute to the difference in response?

3. Why do people get, on average, 3-5 colds per year? Explain...

4. Why do most vaccinations require Booster shots? Explain...