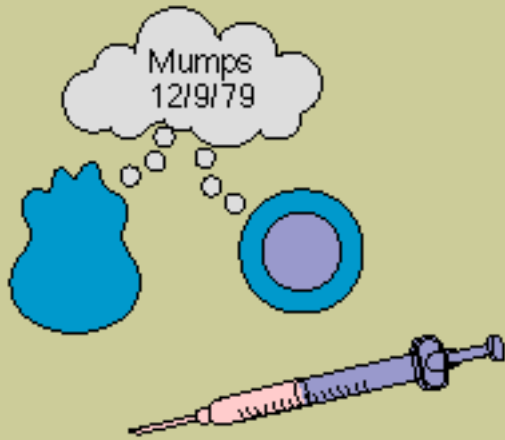


### Long-term Immunity



## Immunity: Short- and Long-Term Cell Memory

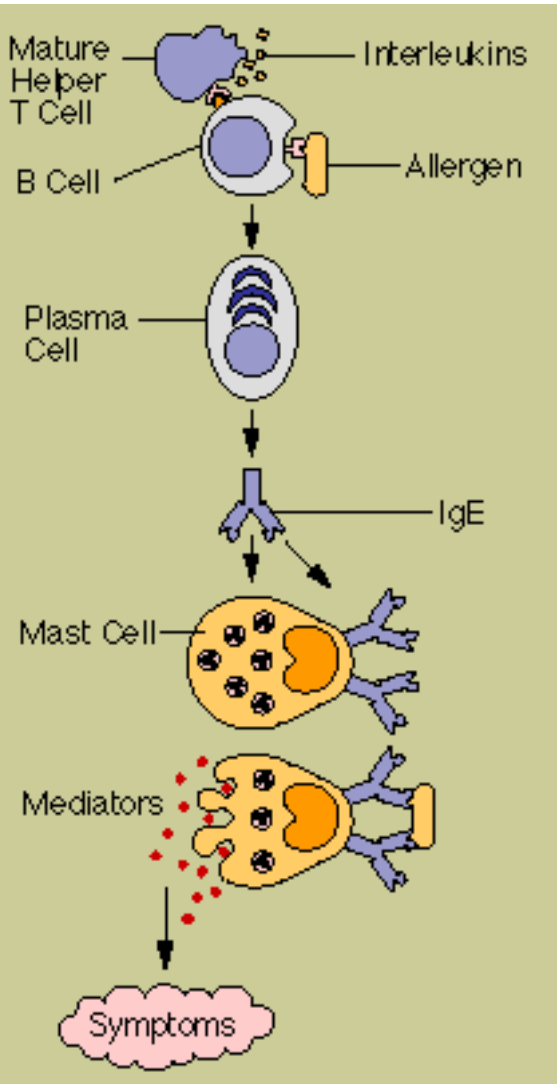
Whenever T cells and B cells are activated, some become "memory" cells.

The next time that an individual encounters that same antigen, the immune system is primed to destroy it quickly. Long-term immunity can be stimulated not only by infection but also by vaccines made from infectious agents that have been inactivated or, more commonly, from minute portions of the microbe.

### Short-term Immunity



Short-term immunity can be transferred passively from one individual to another via antibody-containing serum; similarly, infants are protected by antibodies they receive from their mothers (primarily before birth)



## Disorders of the Immune System: Allergy

When the immune system malfunctions, it can unleash a torrent of disorders and diseases.

One of the most familiar is allergy. Allergies such as hay fever and hives are related to the antibody known as IgE. The first time an allergy-prone person is exposed to an allergen—for instance, grass pollen—the individual's B cells make large amounts of grass pollen IgE antibody. These IgE molecules attach to granule-containing cells known as mast cells, which are plentiful in the lungs, skin, tongue, and linings of the nose and gastrointestinal tract. The next time that person encounters grass pollen, the IgE-primed mast cell releases powerful chemicals that cause the wheezing, sneezing, and other symptoms of allergy.