

## **Mastery Series: Limitations of Adaptive Immunity**

1. Why do we often need “booster” shots for disease vaccinations?
2. Why might a child not be considered protected from a disease until he/she has received the vaccine numerous times?
3. Where are lymphocytes produced?
4. Where are lymphocytes “trained”?
5. What happens to the thymus at the end of childhood?
6. What happens to lymphocytes that activate to “self” antigens?
7. What does “auto-immune” literally mean?
8. Compare an autoimmune disease with an allergy: how are they the same and how are they different?
9. Give examples of autoimmune diseases.

## Mastery Series ANSWERS: Limitations of Adaptive Immunity

1. Why do we often need “booster” shots for disease vaccinations?  
\*memory cells die over time; a new exposure “boosts” the amount of circulating memory cells  
\*many vaccinations do not induce the level of memory cells that the actual disease does; numerous exposures are then necessary to achieve a reasonable level of circulating memory cells/antibodies
2. Why might a child not be considered protected from a disease until he/she has received the vaccine numerous times?  
The child is considered protected when his/her antibody level reaches a certain level—it may take numerous vaccinations to boost antibody production to that desired level
3. Where are lymphocytes produced? **Bone marrow**
4. Where are lymphocytes “trained”? **thymus**
5. What happens to the thymus at the end of childhood? **Atrophies and is mostly replaced with fat**
6. What happens to lymphocytes that activate to “self” antigens in the thymus? **destroyed**
7. What does “auto-immune” literally mean? **Immune response to self**
8. Compare an autoimmune disease with an allergy: how are the same and how are they different? **Same: immune response to a non-pathogen; different: autoimmune is immune response to an antigen in one’s own body; an allergy is an immune response to an antigen in the environment or the food**
9. Give examples of autoimmune diseases.  
**Crohn’s Disease—antibodies made to lining of intestine**  
**Multiple Sclerosis—antibodies made to the myelin sheath**  
**Type I Diabetes—antibodies made to insulin-producing cells**  
**Lupus—antibodies made to parts of the nucleus (so widely varying symptoms may result)**  
**Rheumatoid Arthritis—antibodies made to the synovial membrane**