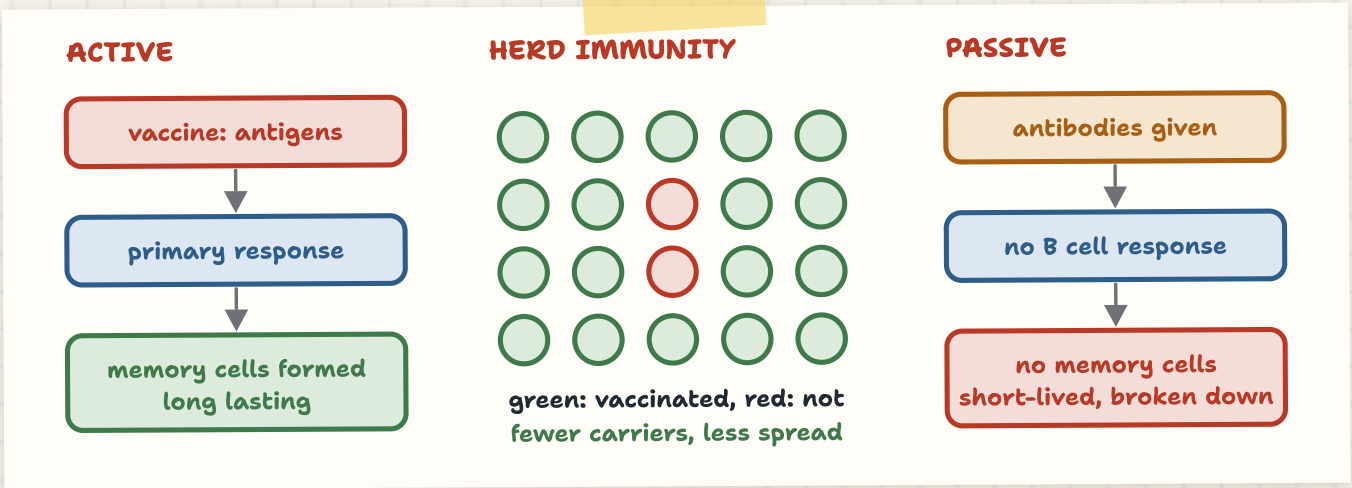
Vaccines, Herd Immunity, Active vs Passive

Vaccines give antigens that make memory cells (active immunity); herd immunity protects the unvaccinated; passive immunity gives antibodies only.



Key terms

vaccine	contains antigens (e.g. dead or weakened pathogen) that cause a primary response and memory cells.
active immunity	the body makes its own antibodies after meeting an antigen; memory cells give long-lasting protection.
passive immunity	antibodies given directly (injection or from mother); no memory cells, so protection is temporary.
herd immunity	when most of a population is vaccinated, the pathogen spreads less, so unvaccinated people are less likely to be infected.
memory cell	a long-lived cell that divides quickly into plasma cells at the next infection.
secondary response	faster and larger antibody production that destroys the pathogen before symptoms.

I can...

- [ ] Vaccines give protection for individuals and populations
- [ ] Herd immunity
- [ ] Differences between active and passive immunity

EXAM TRAP

A vaccine contains antigens, not antibodies. Herd immunity does not make the unvaccinated immune: they are less likely to meet the pathogen. Passive immunity gives no memory cells, so it does not last.

4 marks: what earns them

1. The vaccine contains antigens (from the pathogen), which cause a primary response and the formation of memory cells
   Not: vaccine contains antibodies; contains the disease, with no antigens or memory cells
2. On later infection, memory cells divide quickly into plasma cells, giving a faster, larger secondary response (antibodies), so the pathogen is destroyed before symptoms
   Not: memory cells produce antibodies directly; antibodies stay in the blood
3. Herd immunity: most of the population is vaccinated, so the pathogen spreads less / fewer carriers, so unvaccinated people are less likely to be infected
   Not: everyone is vaccinated; unvaccinated people become immune or are protected, with no mechanism
4. Passive immunity: antibodies are given directly (injected or from mother), so no memory cells form and protection is short-lived (antibodies broken down)
   Not: passive immunity lasts a long time; passive immunity involves antigens

Remember

Vaccine: antigens, so memory cells.

Herd: fewer carriers, less spread.

Passive: borrowed antibodies, no memory.

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