

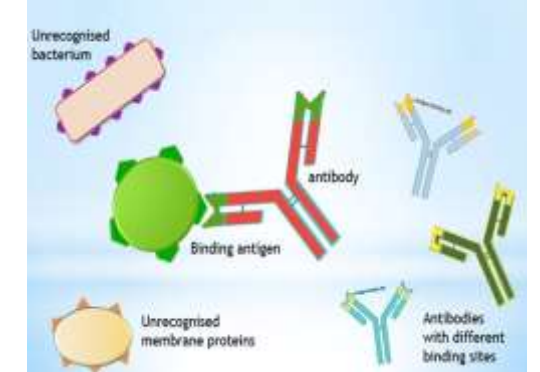
Cells, pathogens, antigens and antibodies:

- Pathogens are _____
- The surface of each pathogen has unique molecules called _____
- Antibodies are _____
- Steps in antibody formation in the body. (highlight one word in each step)
 - antigen presentation by macrophages
 - activation of helper T-cells leading to
 - activation of B-lymphocytes which divide
 - to form clones of antibody-secreting plasma cells and memory cells.

Monoclonal antibodies are made by the following steps.

- Induce an immune response in an animal’s immune system using the desired antigen
- Harvest activated _____ cells from the animal’s spleen
- Fuse tumour cells (melanoma) and these harvested B-cells,
- Grow these "h _____" cells allowing the production of antibodies.
- Extract the antibodies to use as monoclonal antibodies.
- One example of treatment. - _____

Highlight all the “antigens” and “antibodies”



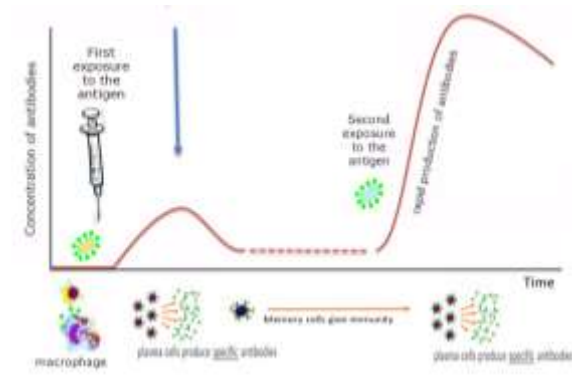
Re-order the bullet points to explain how vaccinations give immunity

Vaccines contain a harmless form of a pathogen (which is often injected into the body in a vaccination)

- The helper T-cells then activate B-lymphocytes to produce antibodies.
- The B-lymphocytes clone themselves and form plasma cells which make antibodies and memory cells.
- The memory cells in the immune system give us immunity to the pathogens we have already been infected by.
- The production of antibodies first involves macrophages engulfing the pathogen
- Macrophages present the antigens to helper T-cell which activates them.

If the body is infected with the pathogen, memory cells enable it to produce antibodies more rapidly.

Label 1° & 2° immune response & cloned cells



Compare & contrast the human elbow and the ‘knee’ of a grasshopper.

Osmosis is _____

Osmoconformers regulate water by _____

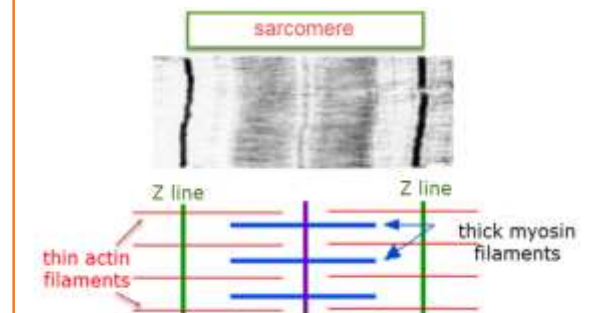
Osmoregulators control water balance using structures such as _____ or _____

Nitrogen can be excreted from animals as the following chemicals _____ or _____ or _____

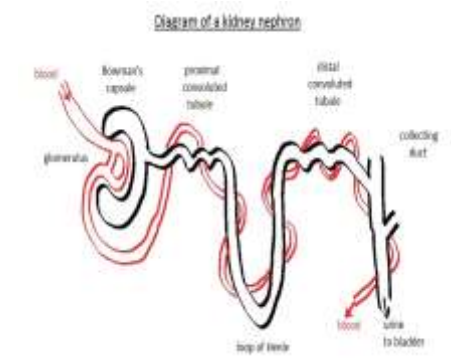
A kidney nephron is _____

List the events which take place during a muscle contraction

A sarcomere – sliding filament theory



Annotate the functions of a nephron



Compare oogenesis and spermatogenesis

Oogenesis	Spermatogenesis

• State a disadvantage of external fertilization

• Describe an advantage of internal fertilization has over external fertilization.

Describe the hormones which cause positive feedback at birth

