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SJBO preparation 1

Prokaryotes	Eukaryotes
- usually in bacteria, archaea, etc	- usually in plants, animals, fungi, protists
- ~~both~~ has ~~have~~ DNA, cytoplasm, ribosomes, cell membrane	- ~~both~~ have has DNA, cytoplasm, ribosomes, cell membrane
- no nucleus	- has nucleus
- unicellular organisms	- Multicellular or unicellular organisms

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Jal bio olympiad

Q: diff levels of biodiversity?

genetic / species / ecosystems

highest biodiv → tropics

lowest biodiv → north/south poles

How does climate change affect biodiv?

~~temp in~~ - ↑ temperature kill species

- melting of ice increase water which can flow and ~~kill~~ destroy habitats
- ~~it~~ it can cause drought and kill species with the lack of water

loss of rich biodiversity? - loss of species, ~~lose~~ lose biomedicines and genetic diversity for food

why is preservation of genetic diversity for food important?
some genetics are resistant to pests, climate change and ~~to~~ viruses/diseases

rich biodiversity in the tropics help us in ~~what~~ what - food, medicines and materials

Bio 2

Stem cells - They are self renewable, they can differentiate into specialised cells

Zygotic stem cells	Embryonic stem cells	Adult stem cells
↓	↓	↓
totipotent	pluripotent	multipotent
↳ can develop into any cell in the body (can create an organism)	can develop into all or most of the cells but cannot create organisms	can develop into more than one cell type but more limited than pluripotent

~~embryonic stem cells~~

Haematopoietic stem cells - used to differentiate into specialised types of blood cells in the body

induced pluripotent stem cells (iPSC) - reverse back to its original stem cells by growing that certain cell with specific genetic instructions

bio 3

4 types of vaccines

- parts of a microorganism
- live but weaken form
- inactive killed pathogens
- inactive toxins

↓ these act as a memory of a pathogen, body will remember and be more prepared

herd immunity

↓ if enough people are vaccinated, disease could be controlled

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SJBO 4

innate immune system

↓

molecules, organ cells people are born with that fights the harmful microorganisms

internal immune system

('to eat')
- phagocytes → engulf microorganisms

- neutrophils - 'self destruct' (basically puss)
- macrophages - free types | fixed types
  ('big eaters') (patrol and engulf) (attached to fibers etc)

↓

reals it with cytoplasmic extentions (can do more than once)

- natural killers cells

- can kill own cells if they are infected

△ How does it kill?

- It releases an enzyme and apoptosis occurs

↓

△ How?

- healthy cell contain major histocompatibility complex, MHC 1

- unhealthy cell stops making MHC 1

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SJBO 4

Humoral Immunity

~~Adaptiz~~

- Adaptive immune system - molecules, cells, organs etc that provide highly specific defences to protect the body from foreign particles

· They remember specific pathogen → main difference between AIS and IIS

- dispatches antibodies

Key words

- Neutralisation - antibodies physically block binding sites of viruses
- agglunination

Adaptive defences

- B lymphocytes will attach onto microorganisms

· able to distinguish healthy and infected cell or virus

· when matured it has alot of protein ~~for~~ receptors (1) are membrane-bound organisms (can freely roam (1) and bind and mark thru ~~apor~~ opsonization)

· it will attach and bind and will multiply (2) itself all having instructions that are designed to fight that specific flu* with a specific antibody (most are effector cells / fighter cells (2))

Adaptive immune response

- T-lymphocytes (t-cells)

· go after infected cells (causes inflammation, activate* macrophages, get other t-cells ready)

· helper/cytoxic t-cells (do the killing thru apoptosis)

helper t-cells - similar to B cells, it binds to a specific class 2 MHC and antigen and the clone itself with some memory cells and mostly helper t-cells. + regulatory t-cells

Regulatory t-cells - inhibiting cytokines that deactive other immune cells.

activate the cells? - releases cytokines which will activate more t-cells which will in turn activate t-cytotoxic cells

Effector cells (active fighters)?

- have alot of RER for high antibody production

Professional Antigen presenting cells

- some cells like Phagocytes, Natural killers wear parts of the micro-organism they killed (happens both in IIS and AIS)

- They can also be macrophages, dendritic cells, b-cells (class 2 MHC)

All nucleated cells have class 1 MHC

- infected cells make unusual protein and it will put pieces of it on its MHC