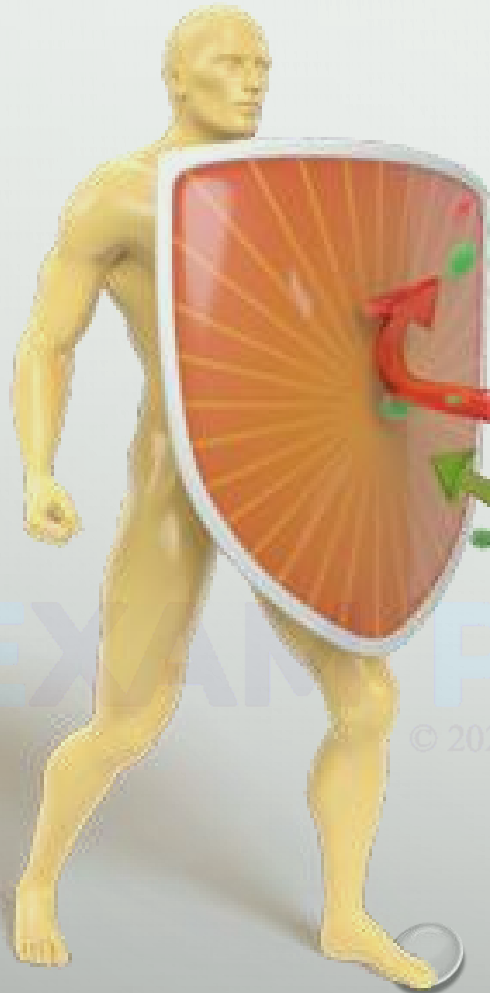


10 pathogens and immunity



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Pathogens and immunity

pathogen

pathogen

A pathogen is a **microorganism** that **causes disease**.

pathogen 病原体
influenza 流感
Common cold 感冒
Poliomyelitis (polio) 天花
cholera 霍乱
tuberculosis 肺结核
malaria 疟疾
diarrhea 腹泻

Group to which pathogen belongs	Examples of diseases which they cause
viruses	influenza, common cold, poliomyelitis, AIDS
bacteria	cholera, syphilis, whooping cough, tuberculosis, tetanus
protoctists	malaria, amoebic dysentery
fungi	athlete's foot, ringworm

Pathogens and immunity

Transmissible disease

Transmissible disease

A disease in which the pathogen can be passed from one host to another

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Transmissible disease 传染性疾病

Pathogens and immunity

Transmissible disease

The ways that transmissible diseases transmit.

» direct contact

rabies

tetanus

AIDS

direct contact 直接接触
rabies 狂犬病

Pathogens and immunity

Transmissible disease

The ways that transmissible diseases transmit.

》 direct contact

》 indirect contact

- > through the respiratory passages — tiny droplets contain cold and influenza viruses
- > in food or water
- > be vectors (dogs and bats are vectors for the rabies virus)



indirect contact 间接接触
vector 携带者, 载体



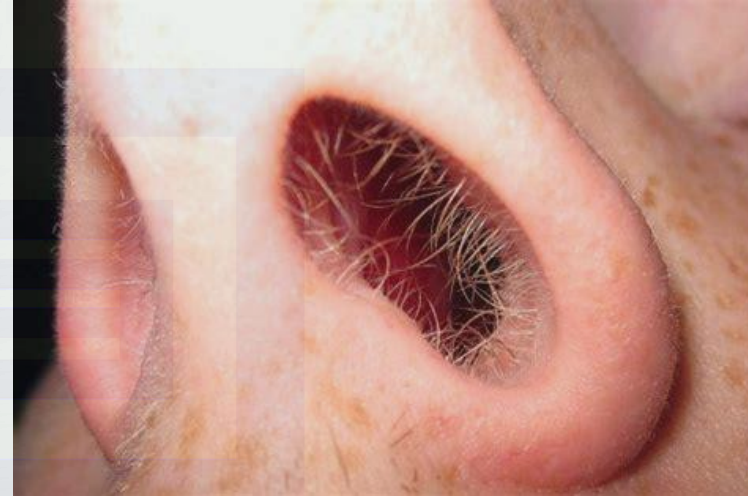
Pathogens and immunity

Body defences

Barriers of body defences

» mechanical barriers

- > skin
- > hairs in nostrils



mechanical barrier 机械性防线

Pathogens and immunity

Body defences

Barriers of body defences

- » mechanical barriers
- » chemical barriers
 - > mucus (respiratory system)—— trap pathogens
 - > hydrochloric acid
 - > antibodies

mechanical barrier机械性防线

Pathogens and immunity

Body defences

Barriers of body defences

- » mechanical barriers
- » chemical barriers
- » cell barriers
 - > lymphocyte/ phagocyte

this barriers can be enhanced by vaccination against a particular disease

Vaccination 接种



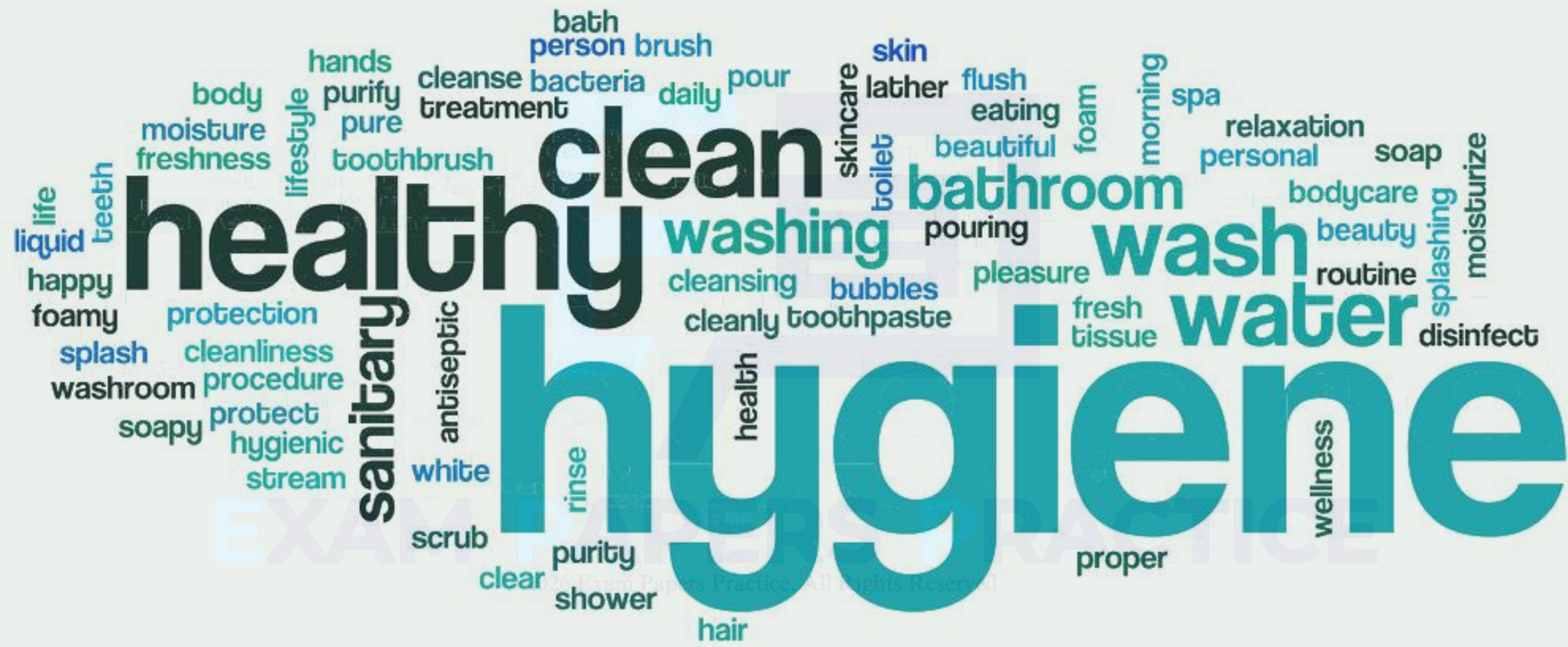
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HOW TO MAKE WE MORE SAFE?

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Pathogens and immunity

Control spread of diseases

Control spread of diseases

》 food hygiene

- > keep your own bacteria and viruses away from food
- > keep animals away from food
- > do not keep foods at room temperature for a long period
- > keep raw meat away from other foods

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hygiene 保健卫生
hygienic 保健的, 卫生的

Pathogens and immunity

Control spread of diseases

» food hygiene

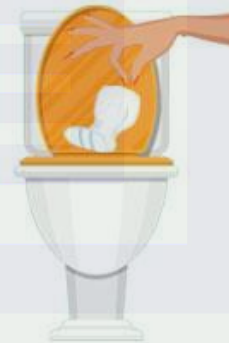
» personal hygiene

Control spread of diseases

Personal *Hygiene Mistakes* You Need to Stop Making



NOT COVERING YOUR MOUTH WHEN COUGHING OR SNEEZING



IMPROPERLY DISPOSING OF FEMININE HYGIENE PRODUCTS



NOT CLEANING COMMONLY USED HOUSEHOLD OBJECTS



EXCESSIVELY BATHING AND HANDWASHING



AVOIDING POST-GYM SHOWERING



NOT FLOSSING YOUR TEETH



NOT WASHING YOUR HANDS AFTER USING THE WASHROOM



EXFOLIATING YOUR SKIN TOO OFTEN

Pathogens and immunity

Control spread of diseases

Control spread of diseases

- 》 food hygiene
- 》 personal hygiene
- 》 waste disposal



disposal 处理

Pathogens and immunity

Control spread of diseases

Control spread of diseases

- » food hygiene
- » personal hygiene
- » waste disposal
- » sewage treatment



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sewage 污水



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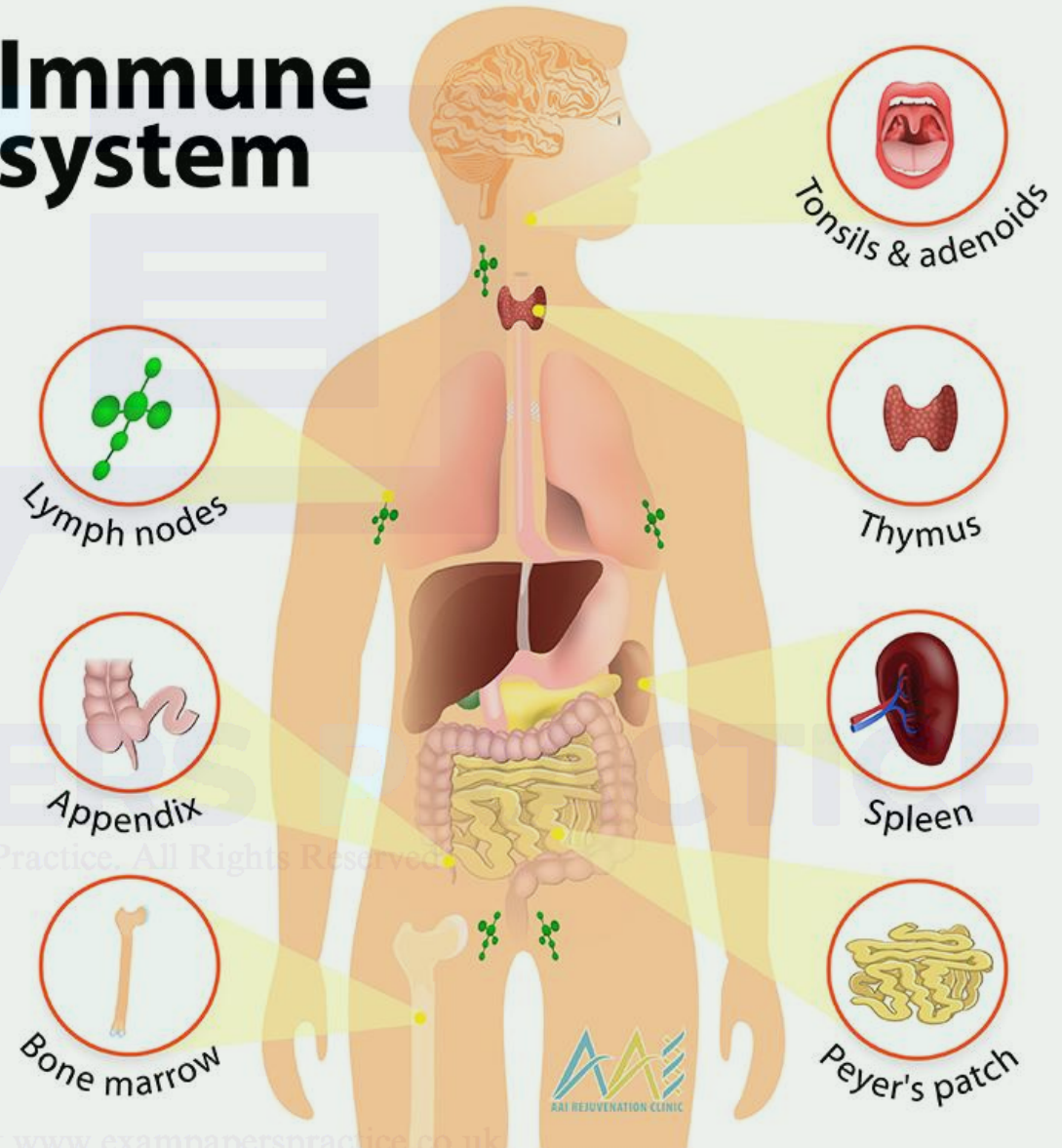
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Pathogens and immunity

The immune system

Immune system



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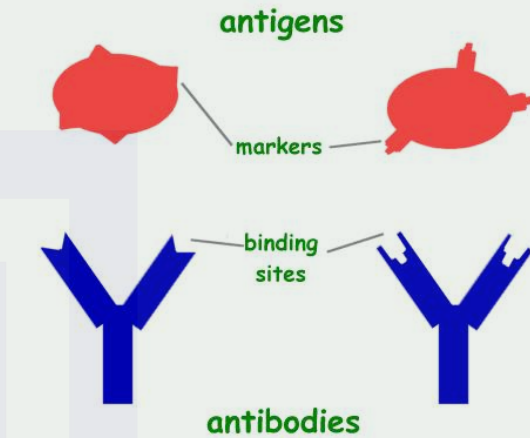
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Pathogens and immunity

antibodies

- * Produced by lymphocytes
- * have particular shape

—— one antibody can **fit** into a particular **antigen** on the outside of the **pathogen**



When antibody molecules lock onto the pathogen, they kill the pathogen. There are **some ways** in which they do this

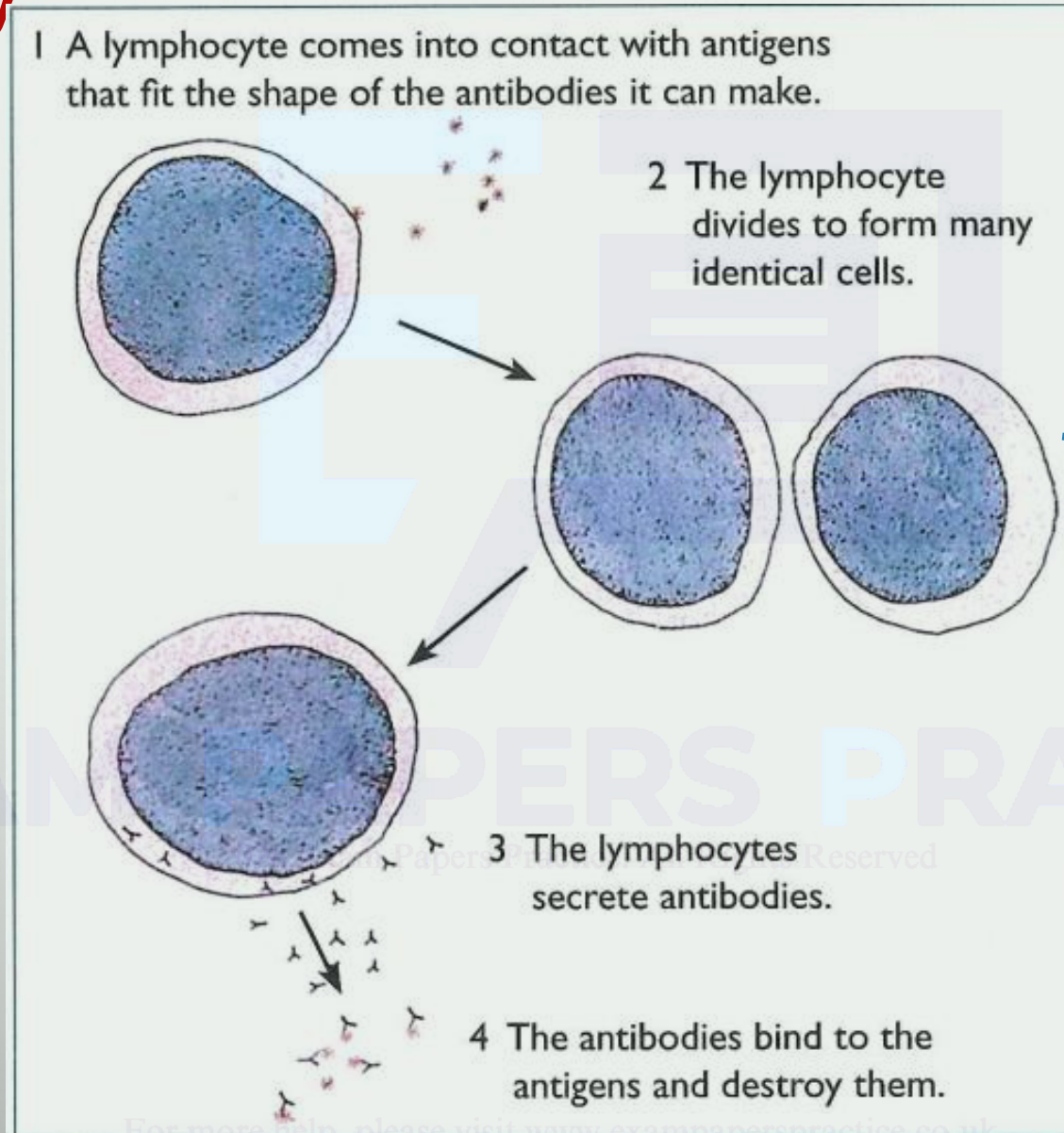
- > To immobilise the pathogens and alert phagocytes to destroy them.
- > To start off a series of reactions in the blood which produce enzymes to digest the pathogens.

antigen 抗原

Pathogens and immunity

The immune system

How do the antibodies be produced ?



Some of them simply remain in blood and other parts of the body, living for a very long time. They are called **memory cells**.

memory cell 记忆细胞

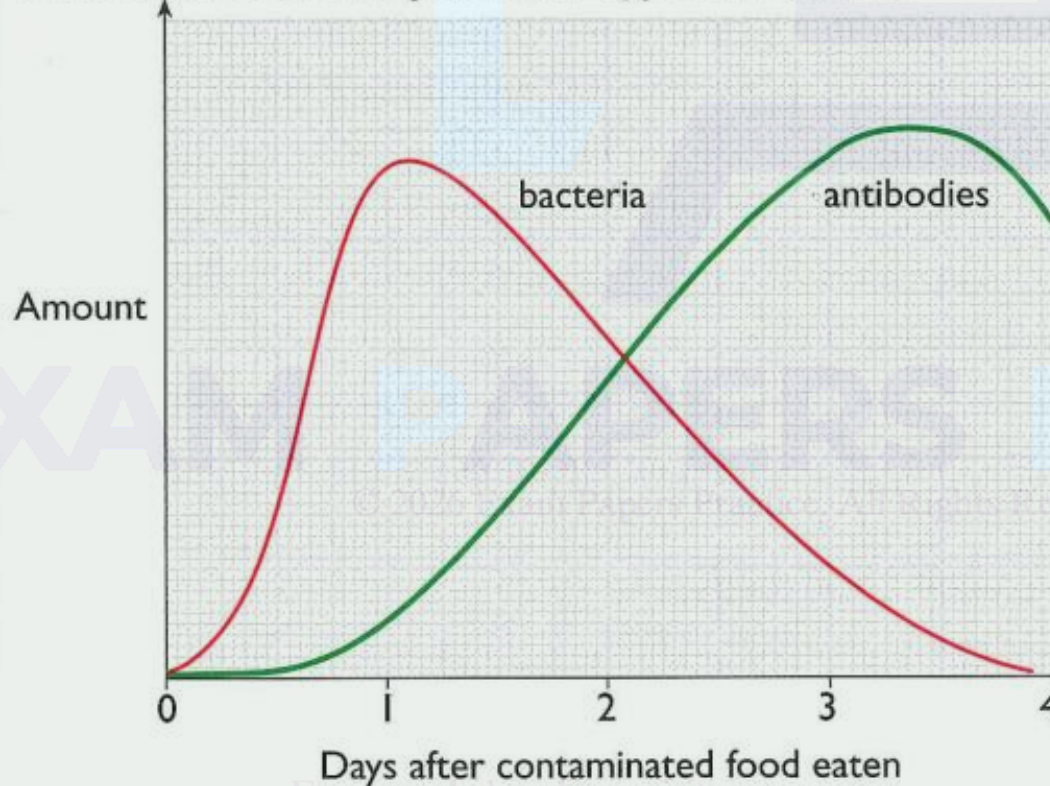
Pathogens and immunity

The immune system

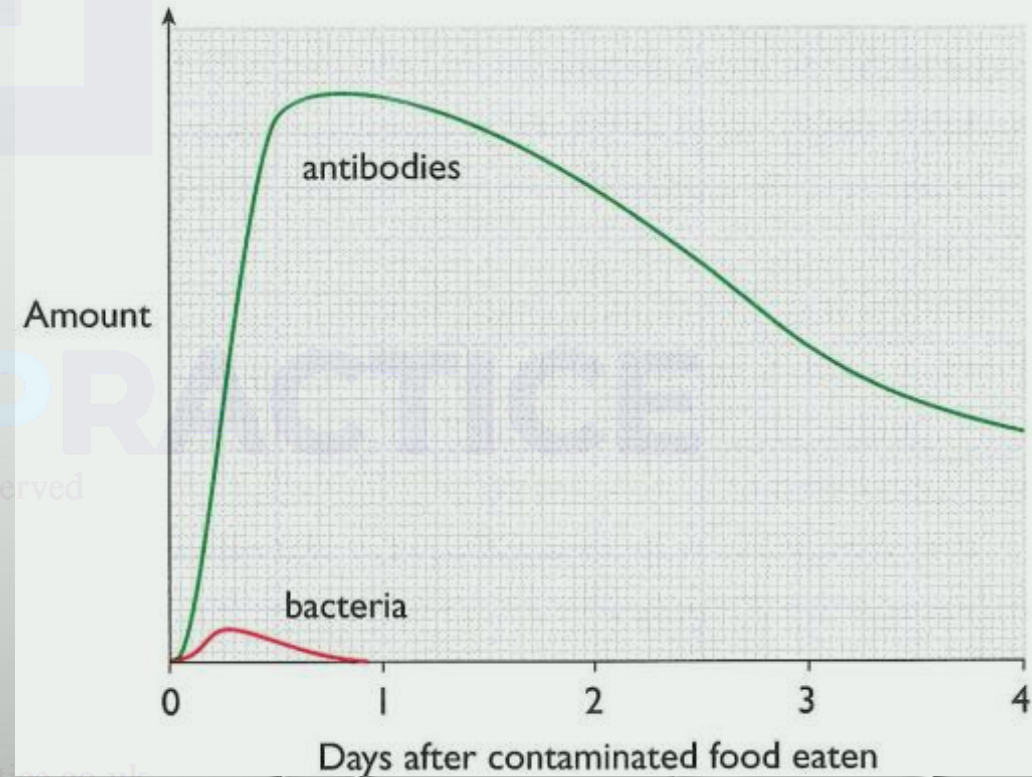
memory cells

→ Shorten the time of producing large amount of antibodies

First infection with a particular type of bacteria.



Second infection with the same type of bacteria



Pathogens and immunity

The immune system

vaccination

* A **vaccine** contains weakened or dead viruses or bacteria.
(they have **same antigens** as the 'normal' ones, but they can not cause disease)

Examples : smallpox; poliomyelitis

vaccination 接种
vaccine 疫苗

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Pathogens and immunity

Active immunity

*definition: defence against a pathogen by **antibody production in the body**

* Can produce memory cells, so it can last for long term.

passive immunity

*definition: defence against pathogens by **antibodies acquired from another individual**

*Can not produce memory cells, so it can last for short term.

Active immunity 主动性免疫
Passive immunity 被动性免疫

The immune system

Active immunity

Immunity is developed after contacting pathogens inside the body.



in an infection



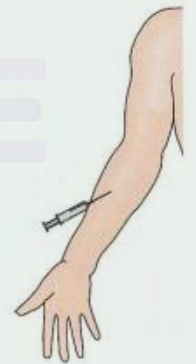
by injection of live or dead pathogen

Passive immunity

Immunity is provided by antibodies from outside the body.



antibodies from a mother in breast milk or across the placenta during pregnancy



by injection of antibodies

Pathogens and immunity

The immune system

Auto-immune diseases

* Type 1 diabetes

diabetes 糖尿病

Beta cell 疫苗

Auto-immune disease 自身免疫病

Autoimmune disease

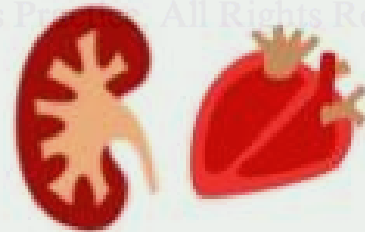


Beta-cells are destroyed by immune system

No insulin

High blood glucose

Complications





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