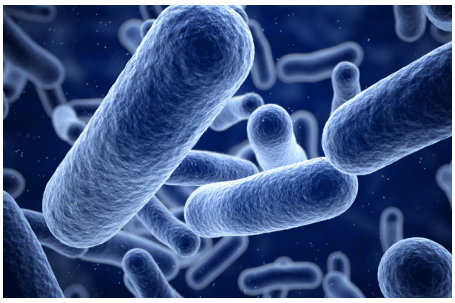
BOOK 4

HEALTH FITNESS AND SPORT

SECTION 2
FIGHTING DISEASE

MICROORGANISMS

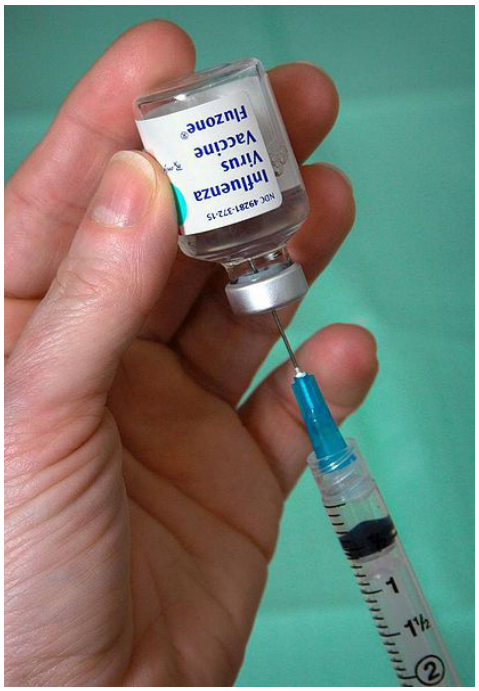
Microorganisms are very tiny (microscopic) living things. They are so small that you need a microscope to see them. Microorganisms are all around us; in the air, in our bodies and in water. Some microorganisms are harmful to us, but others are helpful to us.
There are three types of microorganism:

Bacteria	Viruses	Fungi
		
bacteria spawns / Getty Images	**virus** Baris Simsek	**fungi** EYE OF SCIENCE/SCIENCE PHOTO LIBRARY

Microorganisms that cause diseases are called pathogens.

Some diseases, like chickenpox, are caused by viruses. Diseases caused by viruses usually spread easily from one person to another. Vaccines are often used to provide protection against certain viruses.

A vaccine is usually an injection of dead or inactive virus. Once in the body it causes an immune response. The immune system produces antibodies which protect against the virus in the future.



MMR vaccine
Jim Gathany

The treatment for bacterial infections is through antibiotics. Penicillin is an antibiotic that was originally produced by fungi.

Fungicides treat fungal infection. These are often creams which treat localised infections.

Not all microorganisms are harmful however, some microorganisms are beneficial. Some bacteria and fungi are used to produce food products. Using bacteria we can produce yogurts and cheeses. Fungi are used to produce meat alternatives. Some bacteria and viruses are used to produce medicines, such as insulin.

ACTIVITY

In groups, research a disease caused by a microorganism and present your work to your class.

Some suggestions:

Bacteria

- Tetanus
- Whooping cough
- Leprosy

Viruses

- Measles
- Mumps
- Rubella

DRUGS

All drug treatments for infections have obvious positive effects, but can also have negative side effects. Often, the side effects are not serious, or even obvious with a very low frequency of occurrence. Due to low occurrence, side effects don't show up until a lot of people take the treatment. For example aspirin – the benefits of taking this drug include relief from pain, reduction of fever and inflammation, and when taken regularly in low doses it can reduce the likelihood of suffering a heart attack or stroke. However, the side effects can be quite severe - feeling sick (nausea) and vomiting, irritation of the gut which

may lead to ulcers and bleeding, difficulty breathing or an asthma attack, and a toxic effect on the liver leading to jaundice (yellowing of the eyes and skin). Often doctors prescribe this medication because they have judged that the benefits outweigh the risk of side effects. Many people using this medication do not have serious side effects.

PROTECTION FROM INFECTION

The body has many defences to prevent pathogens from getting into the body, because once inside the body the pathogens have the perfect environment to reproduce.

THE SKIN

The skin covers the whole body. It protects the body from physical damage, microbe infection and dehydration. The skin has a dry, dead outer layer of cells which are difficult for microbes to penetrate.

NASAL HAIRS, MUCUS AND CILIA

The respiratory system is protected in several ways. Nasal hairs keep out dust and larger microorganisms. Sticky mucus traps dust and microbes. These are then carried away by cilia, which are tiny hairs on the cells that line the respiratory system.

TEARS

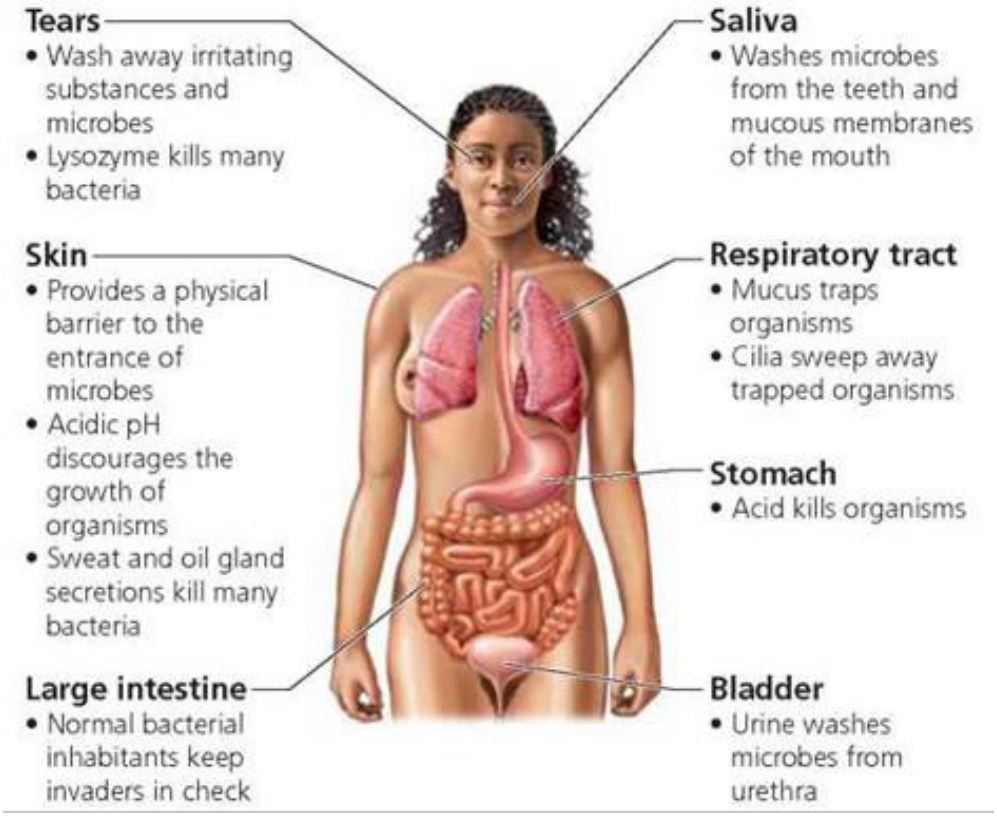
Tears, saliva and mucus contain an enzyme called lysozyme that destroys microorganisms.

SCABS

If microorganisms get into the body through a cut in the skin, the most important thing is to quickly close the wound so more microorganisms cannot enter. A scab does just that. Blood contains tiny structures called platelets, and a protein called fibrin. A scab is platelets stuck in a fibrin mesh.

WHITE BLOOD CELLS

As a wound heals, nearby blood vessels widen to allow more blood to reach the area. This causes inflammation where the damaged area becomes swollen, hot and red. White blood cells called phagocytes move into the area, and destroy bacteria by engulfing and digesting them, and by releasing chemicals called antitoxins.



Body defences
Body defence mechanisms, http://bit.ly/2gbHuX0