

MICROBIOLOGY

Since the beginning people live in a microbial biosphere composed of innumerable micro-organisms of different types, variants, strains and species.

Organisms that are not harmful are called **non-pathogenic organisms** and are normally present in or on certain parts of the body: nose, mouth, skin, intestines etc. The persistent findings of micro-organisms are also in blood.

On the other hand in a human body there are also usually **sterile areas as larynx, trachea, bronchi and alveoli**, where the various **defence mechanisms** of these organs remove occasional micro-organisms quickly and efficiently. But these areas may be **heavily colonized** as well, **if diseased**. Organisms that can cause the disease are called **pathogens or infectious agents** and include **bacteria, viruses, fungi, protozoa and parasitic worms**. **Bacteria** (e.g. cocci, bacilli) are **living small organisms which can be seen only under a microscope** and require specific conditions for growth, otherwise they do not reproduce or they die. They are cultivated on special culture media that can enhance their growth. Most bacteria do not cause disease, and if they do, they can be damaged by antibiotics. **Some bacteria protect themselves by a covering called a spore**. The spore can resist many antiseptic procedures, such as disinfection, drying and even boiling. For instance, **tetanus** is caused by spore-forming organisms. Spores are present in the dirt, in the dust of a room, and **are not destroyed by ordinary laundering, so they can be transferred even by clean sheets and towels**. **Viruses cannot be seen under an ordinary microscope, they are injected to a laboratory animal to develop certain symptoms. They survive only in living tissues so they can be transmitted by direct contacts (touching, secretion from mouth, nose or urine, sexual contact etc.)**. There are many varieties or strains of viruses and their intracellular location within the host. This has made effective therapy and control more difficult. Examples of viral disease are the common cold, influenza, measles, mumps, or AIDS. **Fungi** are multicellular organisms that cause a disease called mycosis. Thrush, ringworm and histoplasmosis are examples of mycotic diseases. **Protozoa** are single-celled organisms that belong to the animal kingdom and can cause such diseases as malaria or amoebic dysentery and some others.

The most common **parasitic worms** which can cause an infection are the roundworm, pinworm and tapeworm. The **clinical microbiologist** has been charged with the responsibility to the clinician and to the patient **of identifying micro-organisms in a clinical specimen** as quickly and accurately as possible and making a decision which of the micro-organisms isolated from the clinical specimen are involved in the disease.

The invasion, establishment and growth of a specific pathogenic organism in the tissues are defined as the **infection**. It leads to the process called the **inflammation**. Fever (of a raised body temperature) is the most common manifestation of the inflammatory response and a signal response in an infectious disease.

The infectious diseases are those caused by such micro-organisms and capable of being transmitted to another person by direct or indirect contact. Infection results, if the body's defence barriers do not prevent pathogens from entering the body, especially when the **immune system** is broken. Infection may be classified in various ways:

1. **A local infection** is when the pathogens are confined to one area.
2. **A general infection** is one in which pathogens are spread throughout the body (for example through blood).
3. **An acute infection** is manifested by severe symptoms usually connected with high fever.
4. **A chronic infection** is one that has less severe symptoms and usually lasts over a period of weeks or months.

Besides, the infection may occur as the secondary one - if it is caused by a different organism than the one causing the primary infection, for example pneumonia may be a complication of influenza which was the **primary infection** but not treated properly.

If the body's system is in order, it produces substances called **antibodies**, which are in the blood and attack things foreign to the body such as micro-organisms. The substances which force the body to make antibodies are known as antigens (proteins). When the body meets an infective organism, it produces antibodies against it which protect the person, so that the next time he/she comes across the same organism, he/she will not be infected by it. The immune system prevents the person from getting infection.

There are two types of immunisation: active and passive.

Passive immunisation means that a person is injected with antibodies against a disease that are taken from someone else. It gives immediate protection.

Active immunisation is also called vaccination. It involves injecting a person with harmless substances that stimulate the body to produce antibodies against harmful organisms. It takes longer to work than passive immunisation but its effects last much longer, too.

There are **three types of vaccination**:

1. You can use a weakened form of the infective agent, such as with measles and tuberculosis,
2. You can use killed organisms, this is what is done with influenza
3. This type is for bacteria that cause harm by producing poisons. A person is injected by a weakened form of the poison, such as with tetanus.

Various disorders of the immune system are now very common, especially in children, e.g. **allergies**. They are caused by the immune system's over-reacting to the presence of some type of foreign substance (e.g. hypersensitivity to the pollen, house dust, some food, drugs or bacteria).

The most typical allergic diseases are:

1. **Erythema** - a rash and redness of the skin which is an allergic reaction to some food or drugs.
2. **Rhinitis** - also called hay fever, which is an inflammation of nasal mucus and causes redness of the eyelid and "watery eyes".
3. **Anaphylaxis** - which is a serious allergic reaction that can reach a critical state in some minutes. It can be a reaction to drugs (penicillin), insect bites, or vaccines.

VOCABULARY

antibody [æntibodi]	protilátka
antigen [æntidʒən]	antigen
bacillus, pl. bacilli [bə'siləs]	bacil, bacily
bacterium, pl. bacteria [bæk'tiəriəm]	baktérie
colony [koləni]	kolonie
cultivation [kalti'veiʃn]	kultivace
cutaneous [kju:'teiniəs]	kožní
coccus, pl. cocci [kokəs, koksai]	kokus, kulovitá baktérie
diphtheria [dif'θiərə]	záškrt
dysentery [disəntəri]	úplavice
indigenous [in'didʒənəs]	domorodý
infection [in'fekʃn]	infekce
inoculation [inəkju'leiʃn]	očkování
intranasal [intrə'neizl]	do nosu
measles [mi:zlz]	spalničky
microorganism [maikrə'o:gənimz]	mikroorganismus
mumps [mamps]	příušnice
nutrient [nju:triənt]	živý
per os [pe:'os]	ústý
poisoning [poizəniŋ]	otrava (jedem)
poliomyelitis (polio) [pəuliəu]	dětská obrna
proliferate [prə'lifereit]	bujet, rozmnožovat
rabies [reibi:z]	vzteklina
salmonella [sælmə'nelə]	salmonela
saline [seilain]	fyziologický roztok
small-pox [smo:lpoks]	pravé neštovice
species též pl. [spi:ʃi:z]	druh
stain [stein]	histologické barvivo
strain [strain]	1. napětí, vypětí; 2. kmen bakterií
typhoid fever [tai'foid fi:və]	břišní tyfus
virus [vaiərəs]	virus
worm [wə:m]	červ
pinworm [pinwə:m]	roup dětský
roundworm [raundwə:m]	škrkavka
tapeworm [teipwə:m]	tasemnice