



KAROLINUM

**ENGLISH
FOR MEDICAL
STUDENTS**

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English for Medical Students

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PŘEDMLUVA

Nová učebnice English for Medical Students je koncipována pro studenty prvního ročníku lékařské fakulty s pokročilou znalostí anglického jazyka. Její prioritou je seznámit studenty s anglickou odbornou terminologií, a to zejména na základě anatomických popisů jednotlivých tělních systémů. Texty jsou doplněny cvičeními, která slouží k zvládnutí a upevnění odborné slovní zásoby a k shrnutí témat jednotlivých lekcí.

K jednotlivým kapitolám přiřazujeme Language, Reading and Grammar spots. Language spots se zabývají lingvistickými jevy souvisejícími s odbornou lékařskou angličtinou (např. zkratky, sufixy pro choroby), Reading spots poskytují studentům informace z lékařské praxe (např. metody vyšetření pacienta, anamnéza), Grammar spots obsahují vybrané kapitoly z anglické gramatiky v lékařském kontextu. Tyto kapitoly jsou provázány s naším dvoudílným elektronickým kurzem Selected Chapters from English Grammar in Medical Context.

Učební texty jsme doplnili o poslechová cvičení a textový materiál vztahující se k probíraným odborným tématům. Tento materiál obsahuje také kontrolní cvičení.

Na konci učebnice je zařazen anglicko-český slovník a přehled nejužívanějších zkratk. Český překlad slovní zásoby se vztahuje pouze k použitým odborným textům, proto nejsou uvedeny všechny možné významy slov. K označení výslovnosti je užito formy mezinárodní fonetické transkripce v hranatých závorkách. Znaky použité v přepisu výslovnosti odpovídají znakům běžně užívaným při přepisu výslovnosti v českých slovnících.

Nahrávky k části Listening materials jsou k dispozici na www.karolinum.cz.

Učebnice English for Medical Students je určena zejména posluchačům Lékařské fakulty Univerzity Karlovy v Plzni. Mohou ji však využít také studenti ostatních lékařských fakult i odborná veřejnost.

Děkujeme recenzentkám za cenné připomínky a ilustrátorce za zdařilé obrázky. Poděkování patří také rodilým mluvčím Sarah Leupenové a Darylu Yoderovi za kvalitní nahrávky.

Autorky

You have become students of the Faculty of Medicine of Charles University in Pilsen. Our faculty was founded in October 1945 as a branch of the Prague Medical Faculty and in 1953 it became an independent faculty of Charles University. During its existence the Faculty has educated about 10,000 doctors. Its study programme uses similar curriculum as most European medical faculties and the credit system corresponds with the ECTS (European Credit Transfer System), according to which every subject is assigned a certain number of credits. Students receive training for the medical profession as well as for research in medical science. Studying at the Faculty of Medicine requires high intellectual abilities and good moral qualities.

Since the academic year 2022/2023 all the departments and workplaces including the Dean's office are located in the state-of-the-art campus close to the University Hospital Pilsen. At the moment the Faculty offers courses in General Medicine (six years) and Dentistry (five years) in both Czech and English study programmes. The academic year consists of two terms (semesters), of approximately 13 weeks each. The winter term begins in October and ends in January. The summer term begins in February and ends in May.

In the first two years undergraduate students of General Medicine get acquainted mostly with the theoretical disciplines, such as: Anatomy, Medical Biology and Genetics, Biophysics, First Aid, Histology and Embryology, Medical Chemistry and Biochemistry, Physiology, Microbiology, Pathological Physiology, Pharmacology and Clinical Propedeutics. A new subject Basics of Clinical Medicine has been introduced recently. Besides these specifically medical subjects students attend classes on Medical Terminology – Latin, Medical Terminology – English/German/Czech, Basics of IT and Physical Training. During the third year preclinical subjects, namely, Pathological Anatomy, Immunology and Pharmacology are studied together with Internal Medicine, Medical Psychology and Ethics, Simulation Medicine and Surgical Propedeutics. The following three years of medical studies are fully devoted to clinical courses such as: Surgery, Neurology and Neurosurgery, Medicine, Infectious Diseases, Radiology and Nuclear Medicine, Urology, Dermatovenereology, Pneumology, Stomatology, Forensic Medicine, Palliative Medicine and Geriatrics, Otorhinolaryngology (E.N.T.), Ophthalmology, Orthopaedics and Traumatology, Anaesthesiology and Intensive Medicine, Obstetrics and Gynaecology, Paediatrics and Neonatology, Psychiatry, Public Health and Health Promotion (Epidemiology, Sports Medicine, Rehabilitation, Occupational Medicine) and Clinical Biochemistry, Clinical Oncology, Clinical Genetics, Clinical Microbiology.

The University awards the degree, Doctor of Medicine – MUDr. (from the Latin *Medicinae Universae Doctor*) or Doctor of Dental Medicine – MDDr. (from the Latin *Medicinae Dentium Doctor*) upon successful completion of 6/5 academic years of study in the classrooms and laboratories of the Faculty of Medicine and in the wards and departments of its affiliated teaching hospital. The graduation ceremony is held in the Carolinum Hall in Prague.



COURSES OF INSTRUCTION

Courses of instruction for medical students include lectures, seminars, lab practical classes, individual consultations and of course vacational and term practice in public health institutions (nursing practice in the second year, medical and surgical practice in the fourth year). **Lectures** adhering to the programme of study are intended to supplement and deepen the students' preparation from textbooks and use various means such as flip charts, overhead projectors, PowerPoint presentations, video or film projections, etc. Lecturing is efficient in transferring knowledge and concepts to large groups of students. Lectures can be used to stimulate interest, provide core knowledge, and direct students' learning. Large group teaching tends to encourage passive learning while teaching small groups in **seminars** and **lab classes** enables students to participate actively (e.g. group discussion, student's own presentation, laboratory procedures, skill based learning, feedback). Traditional teaching is effectively combined with web based learning (e-learning). The development of modern medicine is closely connected with the development of new technologies which are being implemented in the education process as well. For example anatomy classes greatly benefit from the most technologically advanced virtual dissection table, dental students work with dental phantom head models, clinical subjects make use of ultrasound simulators.

Clinical teaching which is focused on, and usually directly involving, patients and their problems, lies at the heart of medical education that is why the medical faculties tend to give their students as much clinical exposure as possible.

Answer these questions.

1. What can you study at this faculty?
2. How is the study organized?
3. Which courses are designed for the freshman?
4. Which courses are offered after preclinical subjects?
5. Do you get practical experience on these subjects at the same time?
6. What degrees are students awarded after completing their studies?
7. Name some typical courses of instruction at the Faculty of Medicine.
8. Was it easy to pass the entrance exam and become medical students?
9. Are you a residential student or do you have private lodgings?
10. What branch of medicine would you like to specialize in?

■ LANGUAGE SPOT: INTRODUCTION TO ENGLISH MEDICAL TERMINOLOGY AND PRONUNCIATION

Medical terminology is a special vocabulary used by health care professionals for effective and accurate communication. Because it is based mainly on Greek and Latin words, medical terminology is consistent and uniform throughout the world. **English medical terminology** has been adapted to the needs of English. That is why you should pay special attention to the accurate acquisition of borrowed Latin expressions which in the course of time and under the influence of English have often lost their original forms (e.g. L: **pulmo** × E: **lung**, L: **clavicula** × E: **clavicle**, L: **columna vertebralis** × E: **vertebral column**, etc.).

The pronunciation of both original and anglicized medical terms in most cases differs from the original **Latin/Greek (L/G) pattern**.

a) Spelling and pronunciation focus on letters: th, ch, ph, x, ae/oe

- **th** in words of Greek origin is always pronounced as [θ] therapy
- **ch** in words of Greek origin is pronounced as [k] bronchus
- **ph** is pronounced as [f] phobia
- **x** is pronounced as [z] xiphoid

- **ae/oe** in words of Latin origin is *usually* pronounced as [i:] caecum, oedema **but** haemorrhage [heməridʒ] !

b) Silent letters: gn, pn, ps, pt, rh

Silent letters are those which are not pronounced. You can meet with them in general English vocabulary as well as in adapted L/G terminology.

- **gn:** [n] gnathic
- **pn:** [n] pneumonia
- **ps:** [s] psoriasis
- **pt:** [t] ptyalin
- **rh:** [r] rhinal

c) Letters c and g

- c followed by a, o, u is pronounced as [k] colon
- c followed by e, i, y is pronounced as [s] cerebrum
- g followed by a, o, u is pronounced as [g] gallbladder
- g followed by e, i, y is pronounced as [dʒ] vagina

d) Other examples of frequently used L/G words in medical terminology:

- muscle [məsl] but muscular [məskjulə]
- column [koləm] but columnar [kə'ləmnə]
- diaphragm [daɪəfræm]

Ex. 1. Find some other examples of medical terminology with English pronunciation in the article The Study of Medicine.

e.g. chemistry

e) One of the keys to English pronunciation is stress – emphasis.

Most English words have the primary stress on 1st syllable. Words of foreign origin including L/G ones may have the primary stress on other than 1st syllable. In these cases the stress is indicated by a main stress mark ['].

- Words ending in **-ary** have stress on 4th syllable from the end of the word.
e.g.: 'secondary, genito'urinary
- Words ending in **-logy, -graphy, -metry, -phony, -pathy, -scopy, -tomy, -ity, -esia, -aemia, -uria, -ical** have stress on 3rd syllable from the end of the word.
e.g.: bi'ology, angi'ography, op'tometry, radi'ophony, hae'mopathy, bron'choscopy, tonsi'llectomy, ex'tremity, a'tresia, leu'kaemia, poly'uria, bio'logical
- Words ending in **-(a)tion, -ion, -itis, -ician, -osis, -oma, -ic, -ial** have stress on 2nd syllable from the end of the word.
e.g.: fertili'zation, pro'duction, in'cision, bron'chitis, paedia'trician, tubercu'losis, carci'noma, he'patic, arti'ficial

Ex. 2. Read with correct word stress and pronunciation.

Ability, orthopaedics, biology, capillary, pathology, abnormality, hydrolysis, psychology, atherosclerosis, sarcoma, hydrotherapy, phlebitis, cheiloplasty, angiographic, xerosis, haemophobia, rheumatology, oesophagus, gnathoplegia, lymphotrophy, pseudotumour, urethral, geriatrician, rhinoscopy, dilatation, structure, deterioration, chondroxiphoid, photosynthesis, albuminuria, intoxication, gnoseology, psychophysical, pyelography, extragenital, zygomatic, viscerotrophic, saturation, lactaciduria, dyspepsia, nucleolus.

- There are three possible patterns for three syllable words:
 1. **car**-di-ac
 2. ex-**am**-ine
 3. pre-ma-**ture**

Ex. 3. Read these conversations. Find all three syllable words and classify them by their pronunciation.

Dialogue 1

- What do you recommend?
- Well, first of all: cut down on fatty foods.
- Is that all?
- No. Regular exercise, no smoking and keep alcohol to a minimum.

Dialogue 2

- What's the problem?
- I went to give him his injection and I saw that he'd started to haemorrhage.
- We'll have to operate. Make sure all the equipment's prepared.
- I'll go down to the theatre and check.

Dialogue 3

- So, is it serious?
- Don't worry. It's probably just an allergic reaction.
- Are you just saying that to reassure me?
- You're fine. Look, I'm going to give you a prescription for some painkillers.

Dialogue 4

- Have you got the test results yet?
- Well, they're still incomplete, but it's clear that it's positive.
- Any idea when infection took place?
- Probably four weeks ago. Do you want to see her medical history?

■ There are four possible patterns for four syllable words:

1. res-pi-ra-tor
2. psy-cho-lo-gy
3. in-flu-en-za
4. en-tre-pre-neur

Ex. 4. Underline the four syllable words and decide which pronunciation is correct.

1. Bell's Palsy causes facial paralysis.
2. She had an operation to replace the hip.
3. The patient was given a general anaesthetic before the surgeons began to work.
4. A diet high in saturated fats increases the risk of heart disease.
5. Tests confirmed the malignancy of the growth.
6. Autistic children do not communicate.
7. The nervous system is independent of the consciousness.
8. They pretended to misunderstand my complaint.

■ READING SPOT: IMPORTANT TRACES IN MODERN MEDICINE

Task: Read and translate the following text. Look for singular and plural forms of nouns.

- The world of medicine was influenced greatly by the Arab world. The Arabs were the first to use alcohol to treat illnesses.
- The development of effective anaesthetics in the 19th century was an important factor in successful surgery. Before anaesthesia patients had to be awake during operations. New drugs stopped feelings of pain so the operations became easier for doctors and less painful for patients.
- Realization that germs carried on the hands of physicians could transmit lethal infections to women in labour by Ignaz Semmelweis in Vienna in 1847 became the accepted germ theory of disease. At the end of the 19th century, infection caused 30% of deaths while by the end of 20th century it caused less than 4%.
- Louis Pasteur created the first vaccine for rabies in 1885. Vaccines have saved millions of lives over the last century and will continue to do so for years to come.
- In 1928 Alexander Fleming accidentally discovered that penicillin kills bacteria. This had an enormous impact on medicine. Infections could be treated properly. Antibiotics were first produced on a massive scale during World War 2.
- The structure of DNA was discovered in 1950s by two scientists, a British physicist

F. Crick and an American ornitologist J. Watson. The discovery of DNA has helped to identify many diseases and has changed modern medicine. Newborn babies are now screened for genetic diseases and all surgical patients have their blood group analysed.

- New technologies have brought about far-reaching structural changes in the provision of health care internationally. New medication, new treatments like stem cell therapy, new procedures like keyhole surgery are all leading to a brave new world in medicine.

Q.: Do you know other important people or discoveries in medicine?



■ GRAMMAR SPOT: LATIN/GREEK PLURALS

Pluralization of L/G based nouns is a complicated field due to a consistent development of the English language. Most L/G nouns used in medical context still use their original plural forms. Some L/G words have only English plurals e.g. viruses; some of them may have both plurals e.g. carcinomata /carcinomas, vertebrae/vertebras.

Notice the singular and plural endings in words of L/G origin.

Singular	Plural	Singular	Plural
-a [ə]	-ae [i:]	gingiva	gingivae
-um[əm]	-a [ə]	ovum	ova
-us [əs]	-i [ai]	uterus	uteri
-is [is]	-es[i:z]	testis	testes
-es[i:z]	-es[i:z]	species	species
-ix [iks] /-ex [eks]	-ices [isi:z]	apex	apices
-oma [əumə]	-omata [əumətə]	adenoma	adenomata
-ema[imə]	-emata[imətə]	enema	enemata
-erma[ə:mə]	-ermata[ə:mətə]	sperma	spermata
-us[əs]	-ora,-era [ərə]	genus	genera
-is[is]	-ides[idi:z]	epididymis	epididymides
-inx[iŋks]	-inges[iŋdʒi:z]	meninx	meninges
-anx[æŋks]	-anges [ændʒi:z]	phalanx	phalanges
-on [ən]	-a [ə]	phenomenon	phenomena

Ex. 5. Read the nouns in the singular form and transfer them into the plurals.

Formula, digitus, varix, series, fibroma, datum, viscus, zygoma, basis, bursa, cervix, serum, epididymis, fungus, analysis, vertebra, labium, carcinoma, virus, mucosa, focus, ulcus, septum, hypothesis, criterion, diagnosis, ilium, papilla, apex, lamina, radius, stratum.

Ex. 6. Transform the nouns in the brackets into the plural.

1. (Bacterium) can be shaped like rods (bacillus), like balls (coccus) or have a spiral form.
 2. (Mass) of grey matter at the bottom of each cerebral hemisphere are called basal (nucleus).
 3. The (testis) are located in the scrotum.
 4. There are several (type) of lung (carcinoma).
 5. The brain is protected by cranial (bone) and cranial (meninx).
 6. The (larva) of (butterfly) and (moth) are called (caterpillar).
 7. Some tiny (fungus) can live and spread on (human).
 8. Before (doctor) can make (prognosis), they have to make (diagnosis).
 9. (Forceps) are used to pull out (tooth) from the (socket).
-

The human body consists of several levels of structural organization that are associated with one another.

The **chemical level** includes all substances needed to maintain life. Chemicals are made up of atoms, the smallest units of matter, and certain of these, such as carbon (C), hydrogen (H), oxygen (O), nitrogen (N), calcium (Ca), potassium (K), and sodium (Na), are essential for maintaining life. Atoms combine to form molecules, two or more atoms joined together. Familiar examples of molecules are proteins, carbohydrates, lipids, and vitamins.

Molecules, in turn, combine to form the next higher level of organization – the **cellular level**. Cells are the basic structural and functional living units of an organism.

The following higher level of the structure of the human body is the **tissue level**. Tissues are groups of similar cells that usually have a similar origin in an embryo and perform specialized functions. The four basic types of tissues in the body are epithelial tissue, muscle tissue, connective tissue, and nervous tissue.

When different kinds of tissues are joined together they form the next level of organization – the **organ level**. Organs are structures that are composed of two or more different types of tissues, have specific functions, and usually have recognizable shapes. Examples of organs are the heart, liver, lungs, brain and stomach.

The fifth highest level of structural organization in the body is the **system level**. A system consists of related organs that have a common function. An organ can be part of more than one system. The pancreas, for example, is part of both the digestive system and the endocrine system.

The highest level of the structure of the human body is the **organismic level**. All the body systems functioning with one another constitute the total organism – one living individual.

THE CELL

The **cell** (from Latin *cella*, meaning “small room”) is the basic living, structural and functional unit of the body. Cells are composed of characteristic parts, the work of which is coordinated in a way that enables each type of a cell in the body to fulfil a unique biochemical or structural role.

The body of an average adult human is composed of more than 10 trillion (10^{13}) cells, but all of these cells can be classified into about 200 different cell types. The sizes and shapes of various body cells are related to the functions they perform. In order to see the smallest cells of the body, high-powered microscopes are necessary. The largest cell, a single ovum (the female reproductive cell), is just about visible to an unaided eye. The sizes of cells are measured in units called **micrometers**. The shapes of cells vary from round to oval, flat, cube-shaped, column-shaped, elongated, star-shaped, cylindrical, etc.

The structure of a cell is also related to its function. For example sperm cells have long whiplike tails that they use for locomotion, disc-shaped red blood cells provide a large surface area to transport and exchange oxygen and carbon dioxide or nerve cells have long extensions that permit them to transmit nerve impulses over great distance. Muscle cells have complex internal protein structures that permit them to contract, they are long and thin.

The **generalized cell** is a composite of many different cells in the body. For ease of study, we can divide a cell into three principal parts:

- 1) **Cell (plasma) membrane** – an outer membrane separating the cell’s internal components from the extracellular materials.

- 2) **Cytoplasm** – a general term for all cellular contents located between the cell membrane and the nucleus.
- 3) **Organelles** – highly organized structures with characteristic shapes that are highly specialized for specific cellular activities (nucleus, ribosomes, endoplasmic reticulum, Golgi apparatus, lysosomes, mitochondria).

The **nucleus (kernel)** is usually a spherical or oval organelle and is the largest structure in the cell. It contains the hereditary units of the cell called genes, which are arranged in a single file along structures called chromosomes. The genes determine cellular structure and direct many cellular activities. Most body cells contain a nucleus, although some, such as mature red blood cells, do not. Skeletal muscle cells contain several nuclei.

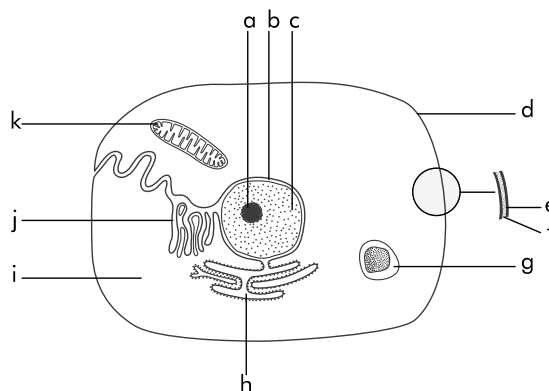
The branch of science concerned with the study of cells is called **cytology**.

EXERCISES

1. Answer these questions or explain.

1. What are the structural levels of the human body?
2. Name some chemicals essential for maintaining life.
3. What does a system consist of?
4. Define a cell. How is cell structure related to cell function?
5. How many cells are there in the human body?
6. Describe the different shapes of the cells.
7. What are the principal portions of a cell?
8. What is the nucleus?
9. Which branch of science deals with the study of cells?

2. Study the generalized human cell and label the diagram. Then check it with listening.



3. Complete the following sentences.

1. Familiar examples of molecules are , carbohydrates, , and vitamins.
2. The four basic types of tissues are , , and

- 3. Body structures known as are composed of two or more different , have specific , and usually have recognizable
- 4. The pancreas is part of both the system and the system.
- 5. The sizes of cells are measured in
- 6. The cell membrane is composed of two main chemical components: a bilayer of and protein.

4. Say if the sentences are true or false. Correct the false ones.

- 1. The human body has about a billion cells.
- 2. Nerve cells have long extensions.
- 3. A cell's nucleus is outside the membrane.
- 4. Red blood cells are irregular in shape.
- 5. An organ can be part of two systems.
- 6. The cytoplasm protects a cell.

■ LANGUAGE SPOT: VERBS DESCRIBING THE STRUCTURE OF THE HUMAN BODY

Verbs used to describe the structure of something, e.g. the human body, are more often used in a passive voice than in an active form.

Ex. 1. Find words in the text that mean something like “be formed by” and make both active and passive forms.

Active form	Passive form
1.	
2.	
3.	
4.	

Ex. 2. Find other verbs that somehow describe the structure and explain their meaning.

e.g. join = bring together