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LATIN MEDICAL TERMINOLOGY

Textbook

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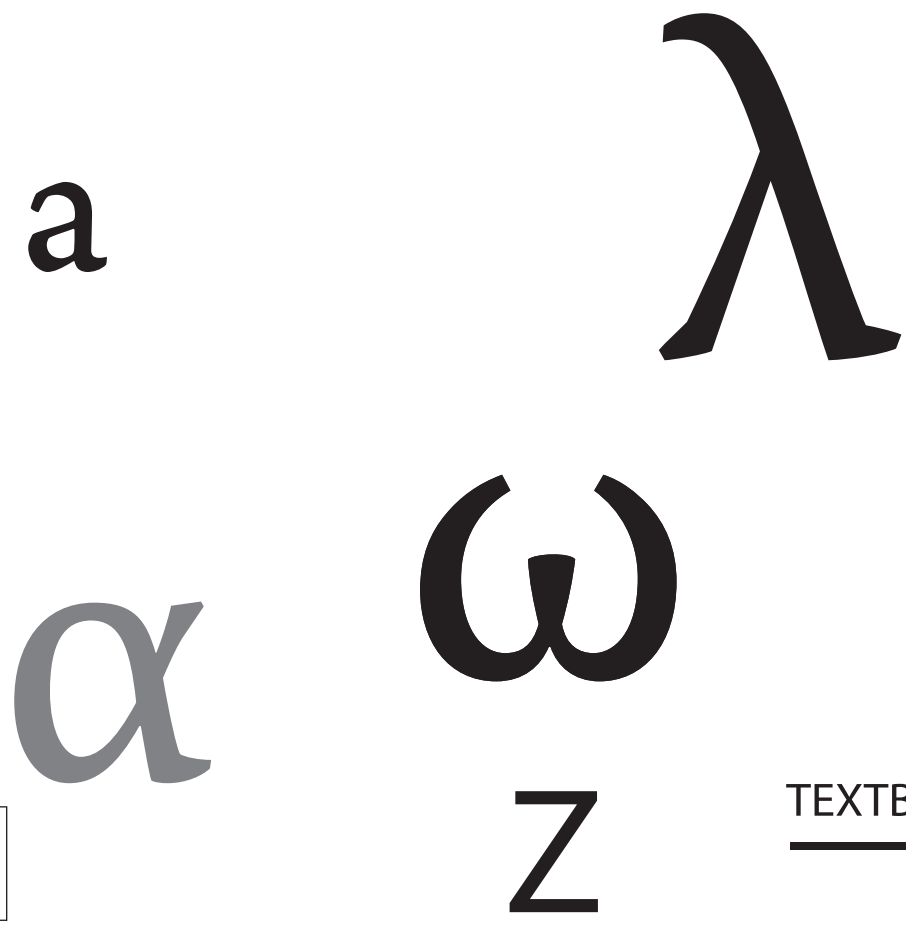


TEXTBOOK

ИЗТОК ЗАПАД

Abbreviations

Abl. (Ablativus) – Ablative
Acc. (Accusativus) – Accusative
adj. (adjectivum) – adjective
Anat. – anatomical nomenclature
Bulg. – Bilgarian terminology
Clin. – clinical terminology
Dent. – dental terminology
E.g. (Exempli gratia) – for example
Engl. – English terminology
f (genus femininum) – feminine gender
Gen. (Genitivus) – Genitive
gr. comp. (gradus comparativus) – comparative form
gr. superl. (gradus superlativus) – superlative form
m (genus masculinum) – masculine gender
n (genus neutrum) – neuter gender
Nom. (Nominativus) – Nominative
numer. (numerale) – numeral
part. (participium) – participle
Pharm. – pharmaceutical nomenclature
pl. (pluralis) – plural
praep. (praepositio) – preposition
sg. (singularis) – singular
subst. (substantivum) – substantive, noun

Anatomical abbreviations

a. – arteria – artery
aa. – arteriae – arteries
art. – articulatio – joint
artt. – articulationes – joints
fasc. – fasciculus – fascicle
fascc. – fasciculi – fascicles
for. – foramen – opening
forr. – foramina – openings
gl. – glandula – gland
gll. – glandulae – glands
lig. – ligamentum – ligament
ligg. – ligamenta – ligaments
m. – musculus – muscle
mm. – musculi – muscles
n. – nervus – nerve
nn. – nervi – nerves
nucl. – nucleus – nucleus
nucll. – nuclei – nuclei
proc. – processus – process
procc. – processus – processes
r. – ramus – branch
rr. – rami – branches
tr. – tractus – tract
trr. – tractus – tracts
vag. – vagina – sheath
vagg. – vaginae – sheaths
v. – vena – vein
vv. – venae – veins

Contents

A Brief History of the Latin Language

Legend has it that Rome was founded in 753 BC by Romulus, who along with his twin brother Remus was raised by a she-wolf after being thrown from their grandfather in the Tiber River to find their death. According to the archeological findings this place was inhabited by the tribe of Latins who had separate settlements. North of them lived the Etruscans and in Lombardy lived Gallic tribes. In VIII century BC the Latins founded a colony for protection from the Etruscans and called it Rome, also known as „the city of seven hills." In the following centuries the Etruscans gradually assimilated among the Romans and the other tribes of on the peninsula were conquered by the Romans. The establishing state passed from the reign of the so-called "Kings" to republican government with a Senate and consuls elected annually.

From the beginning of second century BC the Roman Republic carried out a broad policy of conquest in the western end of the Mediterranean, and later in the east. In 211 BC the Romans finally conquered Carthage, their main rival in the field of trade, and later also the eastern and southern coast of the Iberian Peninsula. Over the next two centuries they conquered Macedonia and Greece, the areas in the northern part of the Balkan Peninsula, Syria and Egypt, Gaul, and a part of Britain. After the assassination of *Gaius Iulius Caesar* in 44 BC and the coming to power of *Octavianus Augustus* (27 BC) the republican government was replaced in practice by government of an emperor and that was the beginning of the imperial period in the history of the Roman state. During the reign of Emperor *Traianus* (98–117 AD) the empire reached its largest size.

On the territory of the Roman state the official language was Latin, and after the conquest of Greece (146 BC) the Greek language became the second official language and its literary proficiency was a sign of high culture and prestige. After this period in the Latin Language entered Greek borrowings both in everyday speech and in the scientific vocabulary. The borrowings received endings characteristic of the Latin words, a very small number retained some Greek endings. The scientific terminology was based on both languages. Between I century BC and I century AD the literary Latin began to separate more and more from the colloquial and turned into a linguistic norm. This was the time of the greatest prosperity in the Roman literature called "Golden Age"

After the fall of the Western Roman Empire under the blows of the barbarians in 476 AD, the Latin colloquial language ceased to be used, but became the basis of the Romance languages: Italian, Romanian, French, Spanish, Portuguese. The English language that is a Germanic language was heavily influenced by the Latin as early as the Roman rule. Later Latin words entered through the French language after the conquest of England by William the Conqueror in 1066, and the last transfer of Latin borrowings was during the Renaissance, when was shaped the terminology in the scientific fields.

In the Middle Ages the Latin language remained the language of the Catholic Church, the science, the law and the diplomacy. It was also taught in it in the universities, which arose after XI cen-

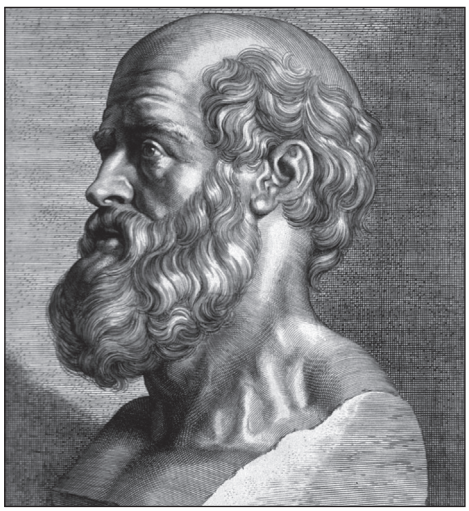
tury, and the first European university was the University of Bologna founded in 1088. Later were established the universities in Paris, Oxford, Cambridge and others. From IX century originates the medical school in Salerno (Italy) and in XII century was established the Medical University in Montpellier (France).

In XIV century began the Renaissance, a period of turbulent change in science, literature and arts, which marked the progress in all spheres of life. After the invention of printing by Johannes Gutenberg (1400–1468) began the publishing of numerous works in various scientific fields, translations of ancient treatises and literary essays. The tradition of the scientific essays to be written in Latin remained until the middle of XIX century which required excellent command of the language.

To this day the scientific terminology consists of vocabulary created on the basis of the Greek and Latin languages and the newly created terms follow this tradition because "the dead languages" do not undergo changes and are suitable for use as a neutral international terminology.

HISTORICAL OVERVIEW OF THE DEVELOPMENT OF MEDICINE AND MEDICAL TERMINOLOGY

The first evidence for the European medicine are associated with the Minoan civilization of Crete from circa 2000 BC, when thanks to the relations with Egypt and West Asia, were laid the foundations of the ancient healing art by using observation and study of nature and people. The Greeks believed in the god of medicine Asclepius and visited its temples to receive healing for serious illnesses. The most famous temples were in Epidaurus, Pergamum and on the island of Kos. This tradition remained until the end of antiquity. At the end of VI century BC in Greece were differentiated competing medical centers with schools in the Greek colonies in Crotone in Southern Italy, in Cyrene in Northern Africa and in Knidos in Asia Minor. The historian *Herodotes* (484–425 BC) described the medical schools in Cyrene and Rhodes as extremely famous in his day.



Hippocrates (ca. 460-370 BC)

Honored as the father of European medicine, *Hippocrates* (ca. 460–370 BC) from the island of Kos become famous through the centuries as a physician and philosopher, and the oath of the Hippocratic corpus is considered the basis of medical ethics. He received undying glory because of the skill in the treatment, the creation of his own school and the written essays.

During the Hellenism Alexandrian scholars gathered around 60 early Greek medical works in *Corpus Hippocraticum*. Several centuries later they were cataloged in Rome under Nero and were finally revised by *Claudius Galen* (129–216 AD). The scientists from Alexandria noticed conflicting medical content in the individual works as well as the different styles of expression. According to later researchers the core of the corpus belongs to *Hippocrates* himself and his contemporaries from the school on the island of Kos, and other treatises were added later from various sources.

Hippocrates is the creator of the humoral theory that the body contains four fluids: blood, bile, black bile and phlegm, and the health and illness depend on their ratio. The heart, the stomach, the liver and the spleen were the reservoirs of the four liquids moving between them. The blood from the heart creates the warmth, the the phlegm from the brain creates the cold, the bile coming from the liver creates the dryness and the black bile from the spleen and the stomach creates the moisture.

Among the merits of *Hippocrates* and his school is the formulation of a healthy lifestyle, examining the environment as a factor in emerging diseases, the development of treatments with food, natural remedies, phytotherapy, hydrotherapy and others.

Age of Hellenism marks the next flourishing in practicing medicine. The schools in Knidos and Kos werre still very popular, as well as those in *Magna Graecia* and *Sicily*, which developed the theories of *Pythagoras* (ca. 570–490 BC) and *Empedocles* (ca. 495–435 BC). *Empedocles* from Agrigentum, Sicily, is the creator of the theory of the four elementscalled by him „roots:“ land, air, fire and water. In Alexandria worked in succession *Herophilus* (335–280 BC) from Chalcedon, a settlement on the Bosporus, the father of descriptive anatomy and *Erasistratus* (315–240 BC), the father of physiology, who first performed dissections of convicted criminals. Thanks to the performed dissections *Herophilus* described the liver, the pancreas, the duodenum, parts of the brain with the meninges, showed the beginning and the path of the nerves of the brain and the spinal cord, but mistakenly thought that the sensory nerves come out from the heart

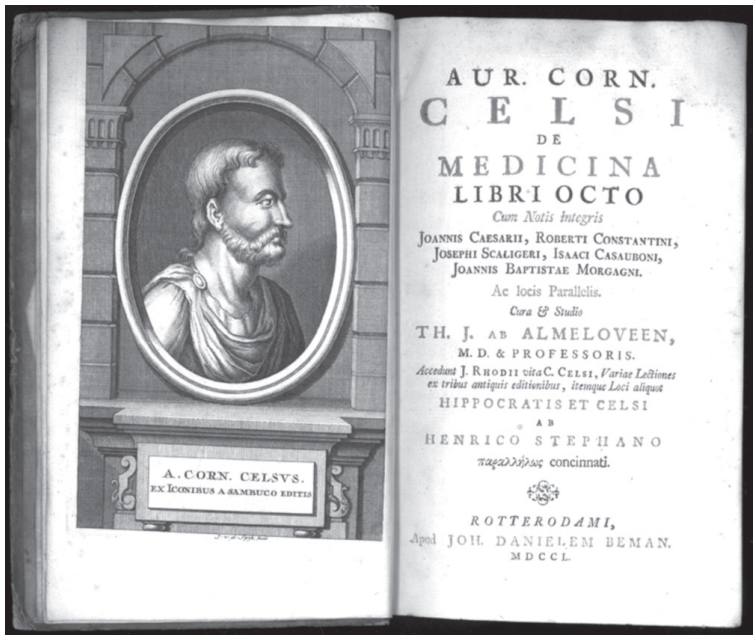
Erasistratus continued the systematic research of *Herophius*, dealing mostly with the brain and the nervous system. A merit of the Alexandrian physicians is the discovery of nerves, the brain ventricles, the chambers and valves of the heart, the parts of the eye, the ovaries and other structures, which they described.They studied the respiration, digestion, heart rate, reproduction, nerve and muscle activity. During the reign of *Ptolemeus*, when began the persecution of the Alexandrian scholars, many of them settled in Asia Minor, Ionia and Syria, where opened schools and trained known physicians.

In the Greek colony Crotone in South Italy at the end of VI century BC was established and developed a medical school training Greeks and Romans. At the time of the Roman Republic the medicine was practiced mostly by Greeks, slaves or freed slaves. Only in III century BC freed Greeks and Romans devoted themselves to the healing arts. Until then basic medical knowledge had *patres familias* (heads of the families), who cared for relatives and slaves, as well as for animals on the farm by using treatment methods mostly inherited from the Etruscans.

The History of *Titus Livius* (59 BC-17 AD) *Ab urbe condita* tells the story of how the Romans adopted the cult of the god *Asclepius* at the recommendation of the Sibylline books at the end of III century BC, in order to stop plague sent by the gods. According to the myth in the ship that arrived from Greece with the statue of the deity, there was a snake that crawled out on the island in the Tiber River and there was later erected a shrine to the healer.

The Greek physician *Archagates* from *Peloponess* was the first to receive official permission in 218 BC to heal in Rome. Because he had authority of a specialist treating wounds the Romans provided him with room for treatment purchased with public funds. After him in Rome came the famous physician *Asclepiades* from Bythinia, author of more than 20 medical works. He said that the duty of the physician is to treat his patients “swiftly, safely, and sweetly”.

At the beginning of I century AD *Aulus Cornelius Celsu*s presented to his contemporaries the medical treatise in eight books *De medicina* (About medicine), a part of the encyclopedia *Artes* (Arts) created during the reign of the Emperor *Tiberius* (14–37 AD), dedicated to agriculture, medicine, warfare, rhetoric, philosophy and law. Outside the historical overview of the development of medicine and the short anatomical notes on the internal organs and the musculoskeletal system, the treatise presents all aspects of health, diseases and their treatments. The last two books are devoted to surgery and have specialized expertise focus. Celsus convincingly argues that medicine is not only a practical activity, but also needs a developed theory.



Aulus Cornelius Celsus (25 BC-50 AD)

The most famous Roman physician and scientist was *Claudius Galen* (129–216 AD) was born in the Asia Minor city of Pergamum. Galen created an era in the sphere of the European medicine and not accidentally in the Middle Ages was considered the second greatest doctor after Hippocrates and indisputable authority in the science. He wrote treatises on philosophy, logic and philology. He dealt with various aspects of the theory and practice of the healing art, anatomy and physiology, scientific methodology, and clinical pharmacology, as the works of his predecessors. He preserved and codified the best of the Greek and Roman medical literature. He wrote in ancient Greek language, since he considered himself descendant of of the ancient Greeks, although his most active years were passed in Rome.

Claudius Galen (129-216 AD)

The works of *Galen* had a different fate through the centuries. The manuscripts were translated after V century from ancient Greek into Arabic, Hebrew and Latin, and later in various European languages, and become canon for studying in the medical universities in the East and in Western Europe. In the sixteenth century new manuscripts were discovered and some of the essays were translated back to Latin. Between 1821 and 1833 *Karl Gottlob Kühn* issued in Leipzig *Opera omnia Claudii Galeni* in the original in ancient Greek language and with translation in Latin made in the Renaissance.

Among the Arab scientists in the medical field stands out *Ibn Sina* (980–1037) known by its Latin name *Avicenna*, the author of the famous treatise in five books *Canon Medicinae* (Canon of Medicine), translated in XII century in Latin and became one of the main works studied in the medieval medical universities.

In the Renaissance a turning point in the progress of the anatomy became the drawings of *Leonardo da Vinci* (1452–1519), in which the artist explored in detail the structure and function of bones, muscles, internal organs, brain and others.

The birth of modern anatomy was made by the Flemish *Andreas Vesalius* (1514–1564) with the release in 1543 of the extremely thorough, systematic and richly illustrated treatise *De Humani Corporis Fabrica* (On the Fabric of the Human Body), the result of the dissections, which he performed as a professor of anatomy in Padua, Bologna and Pisa. In the treatise he showed the errors that previously no one had rebutted because of the prestige of *Claudius Galen*. *Vesalius* also reformed the anatomical terminology turning to classical Latin language.

Namely the dissections, which took place in the sixteenth century in the purpose-built anatomical theaters in Europe – in Padua, Bologna, Leiden, Prague, Amsterdam etc. gave impetus to the study of medicine. The anatomy at the time was considered a "branch of natural philosophy".

The Anatomical theater in Bologna (1649)

In seventeenth century the anatomists began to study more accurately the already known organs and tissues to receive a more accurate idea of the organization of the human body. William Harvey's work on the circulation of blood is fundamental to modern understandings of the role of the heart in the body. His work *Exercitatio anatomica de motu cordis et sanguinis in animalibus* (An Anatomical Exercise on the Motion of the Heart and Blood in Living Beings) was published in 1628.

Hippocratic Oath

I swear by Apollo Physician and Asclepius and Hygieia and Panaceia and all the gods and goddesses, making them my witnesses, that I will fulfil according to my ability and judgment this oath and this covenant:

To hold him who has taught me this art as equal to my parents and to live my life in partnership with him, and if he is in need of money to give him a share of mine, and to regard his offspring as equal to my brothers in male lineage and to teach them this art – if they desire to learn it – without fee and covenant; to give a share of precepts and oral instruction and all the other learning to my sons and to the sons of him who has instructed me and to pupils who have signed the covenant and have taken an oath according to the medical law, but no one else. I will apply dietetic measures for the benefit of the sick according to my ability and judgment; I will keep them from harm and injustice.

I will neither give a deadly drug to anybody who asked for it, nor will I make a suggestion to this effect. Similarly I will not give to a woman an abortive remedy. In purity and holiness I will guard my life and my art.

I will not use the knife, not even on sufferers from stone, but will withdraw in favor of such men as are engaged in this work.

Whatever houses I may visit, I will come for the benefit of the sick, remaining free of all intentional injustice, of all mischief and in particular of sexual relations with both female and male persons, be they free or slaves.

What I may see or hear in the course of the treatment or even outside of the treatment in regard to the life of men, which on no account one must spread abroad, I will keep to myself, holding such things shameful to be spoken about.

If I fulfil this oath and do not violate it, may it be granted to me to enjoy life and art, being honored with fame among all men for all time to come; if I transgress it and swear falsely, may the opposite of all this be my lot.*

* Translation from the Greek by Ludwig Edelstein. From The Hippocratic Oath: Text, Translation, and Interpretation, by Ludwig Edelstein. Baltimore: The Johns Hopkins Press, 1943.

TERMINOLOGY
Anatomical, clinical and pharmaceutical terminology.

The terminology presents a specific lexical layer in the language in which there is a precise semiotic relation between signifier and signified. The terms have definite function by naming scientific concepts in a particular area. In semantic aspect the term must have: a) accuracy in the name of the scientific concept; b) definitivity reflecting the outcome of the scientific understanding of the object called with the given term; c) uniformity within the scientific field. In formal aspect the term should correspond to the norms of language while exhibiting its nominative character. The semantic definiteness is achieved through the definition and the role of the specialized context characteristic of the scientific field. The terms can be separate lexemes or be connected in terminological phrases with relevant scientific definition.

Nomenclature is standardized system of precisely defined terms, assented by a special commission and used in the communication among specialists all over the world.

ANATOMICAL NOMENCLATURE

In 1895 was created the first international anatomical nomenclature, the so-called *Basiliensia Nomina Anatomica (BNA*), which contained almost 4500 terms. In 1933 the Anatomical Society of Great Britain and Ireland published its own norm called *Birmingham Revision* with English equivalents. In 1935 the society of German anatomists issued a new nomenclature, *Jenaiensia Nomina Anatomica (JNA)*. Twenty years later in 1955 the *International Anatomical Nomenclature Committee (IANC)* published the first version of the Latin anatomical nomenclature – *Parisiensia Nomina Anatomica (PNA).* Subsequently it came to be called in short *Nomina Anatomica (NA)* and underwent six editions (1961, 1966, 1970, 1977, 1983, 1989). The principles of *NA* were that the terms preferably should derive from Latin, therefore 2/3 of the substantive terms are Latin in origin, each organ should be named by a single term, the phrases should be short and the ephonyms should be avoided. The terms are 5640, 4268 borrowed from *BNA,* 886 modified and 468 new terms. The last revision of *NA* is from 1989 and the number of the terms was 6400.

In 1990 began an elaboration of another nomenclature by a new commission – *International Federation of Associations of Anatomists (IFAA). Terminologia Anatomica (TA)* was published in 1998 and was subtitled *International Anatomical Terminology (Terminologia Anatomica, International Anatomical Terminology. Stuttgart: Thieme, 1998).* It was based on the Latin-English equivalents and had 7635 terms, which were considered as standardized. *Nomina Anatomica* divides the body into seven systems, *TA – i*n thirteen systems.

HISTOLOGICAL NOMENCLATURE

Histological terminology is a system of terms used in the field of histology. In 1970 was edited the first Latin histological and embryological nomenclatures – *Nomina Histologica and Nomina Embryologica.* In 2011 *Terminologia Histologica (TH)* was published online by the *Federative International Programme on Anatomical Terminologies*. It was intended to replace the *Nomina Histologica.*

CLINICAL TERMINOLOGY AND INTERNATIONAL CLASSIFICATION OF DISEASES

The Latin clinical terminology is based on terms and compound terms of mostly Greek origin. The terminology is constantly evolving and changing as new terms are being coined for new discoveries, procedures, techniques and therapies. Other terms become obsolete and stop being used, therefore every terminology is like an organism that is constantly changing.

The contemporary terminology is influenced by modern languages, especially English. It has more than 30 000 eponyms and recently formed terms are predominantly hybrid.

- ✓ *English terms: bypass; shock; shunt; lavage etc.*
- ✓ *New hybrid terms (with Greek and Latin term elements): abdominoplasica; valvuloplastica;*

Anatomical term (Lat.) – oculus, i, m – eye

Clinical terminology (Gr.) – ophthalmologia, ae, f – ophthalmology, the medical science specializing in the health of eyes and vision

ophthalmoscopia, ae, f – ophtalmoscopy, instrumental examination of eye

ophthalmia, ae, f – ophthalmia, inflammation of eye etc.

In 1993 was approved the *Tenth Revision of the International Statistical Classification of Diseases and Related Health Problems (ICD)* of the World Health Organisation (WHO).

PHARMACEUTICAL PHARMACOPOEIA

The botanical nomenclature of medical drugs, chemical nomenclature and Latin names of the medical substances are widely used in the pharmaceutical terminology. In Europe functions *European Pharmacopoeia (Ph.Eur*.) with its last revision of 2014, that defines requirements for the quantitative and qualitative composition of medicines, active substances, excipients, preparation of human, animal, herbal or chemical origin, antibiotics, homoeopathic preparations etc.

FIRST SECTION:

LATIN DECLENSIONS

Alphabet and Pronunciation

I. ALPHABET

The origins of the Latin alphabet can be found in the Greek alphabet introduced by colonists from the Greek island of Euboea who settled on the island of modern Ischia before 750 BC. This early Greek alphabet has 26 letters like its contemporary variant and is known as the Euboean Greek Cumaean alphabet. The scholars still argue whether the source of this Latin alphabet is Greek or Etruscan as both used the exact same 26 letters and were formed in the same period; however, most agree that both could be traced back to the Phoenican alphabet going back before 1050 BC.

The first Latin alphabet consisted of 21 letters, but in the 2nd century BC. the Romans began to use U for the sound [u] except the letter V and in the 1st century BC. the letters Y and Z were adopted to represent the Greek letters Υυ and Ζζ.

Table № 1: The Latin alphabet

A a	G g	N n	T t
B b	H h	O o	U u
C c	I i /J j	P p	V v
D d	K k	Q q	X x
E e	L l	R r	Y y
F f	M m	S s	Z z

II. PRONUNCIATION

The rules of pronunciation of some Latin letters in the different periods of existence were distinctive like the contemporary pronunciation differ due to traditional spelling in the countries. In Bulgaria we use the socalled *Erasmian pronunciation*, introduced in the book of Renaissance humanist *Desiderius Erasmus* (1466–1536) *"De recta Latini Graecique Sermonis Pronunciatione"*, (Basle, 1528) ("On the Correct Pronunciation of Latin and Greek"). The effort of Erasmus was to restore the correct pronunciation of the ancient Greek and Latin. His system of pronunciation was accepted in Northern Europe and was different from pronunciation of Latin by Italians and in the Catholic church.

1. Vowels and diphthongs

The vowels in the Latin alphabet are **"a", "e", "i", "o", "u"** and **"y".** They can be long and short depending on their time of pronunciation.

- The semivowel **"j"** is a variant of "i" and is used after the 14-th century to represent **"i"** between vowels and at the beginning of a word before a vowel:
  maior (major) [maior], **maius** (majus) [maius] – bigger (major – for masculine and feminine, majus – for neuter gender); **iuvenilis** (juvenilis) [iuvenilis] – juvenile;
- The vowel **"y"** is pronounced [i]:
  hypertonia [hipertonia] – hypertony, high blood pressure; **hypotonia** [hipotonia] – hypotony, low blood pressure.

The diphthongs are two vowels that are pronounced as one sound:

- "Ae" and "oe" are pronounced [e], but with dots over **e**: "aë" and "oë" are pronounced separately:
  arteriae [arterie] – arteries; **foetus** [fetus] – fetus; **oedema** [edema] – oedema, swelling;
  apnoë [apnoe] – apnoea, lack of breathing;
- "Au" and "eu" are pronounced the same in all Latin words, but in the Bulgarian medical terminology words with Greek origin are preferably pronounced [av] and [ev]:
  auris [auris] – ear; **audiometria** [audiometria] – audiometry, measuring of the hearing;
  but: **trauma** [travma] – trauma, injury; **pleura** [plevra] – pleura, **neuritis** [nevritis] – neuritis, inflammation of a nerve.

2. Consonants and digraphs

- The letter **"C"** is pronounced [ts] before **"e", "i"** and **"y";** before **"ae", "oe"** and **"eu". "C"** is pronounced [k] before **"a", "o", "u", consonant** and **at the end of words**:
  cerebrum [tserebrum] – brain, forebrain (anat.); **acidum** [atsidum] – acid;
  caput [kaput] – head; **scapula** [skapula] – scapula, shoulder blade; **costa** [kosta] – rib; **fractura** [fraktura] – fracture, breaking.

- Double **"cc**" is pronounced [k], when after the second "c" there is **"a"** and is pronounced [kts], when there are **"e", "i"** and **"ae"**:
  bucca [buka] – cheek; **musculus buccinator** [muskulus buktsinator] – buccinator muscle, muscle, expanding the cheek; **os occipitale** [os oktsipitale] – occipital bone; **vaccinum** [vaktsinum] – vaccine.
- The letter **"K"** is rarely used in Latin, but is used in medical terminology in Greek words:
  skeleton [skeleton] – skeleton; **leukaemia** [levkemia] – leukaemia.
- The consonant **"S"** between vowels and next to **"l", "m", "n", "r"** is pronounded [z].
  incisura [intsizura] – incisure, notch; **diagnosis** [diagnozis] – diagnosis; **laesio** [lezio] – lesion; **dorsum** [dorzum] – back; **tonsilla** [tonzila] – tonsil; **pulsus** [pulzus] – pulse.
- Double **"ss"** between vowels is pronounced [s]:
  processus [procesus] – process, projection; **ossa** [osa] – bones; **fossa** [fosa] – fossa, pit.
- The double consonant **"X"** is pronounced [ks] and in some special cases as [kz]:
  apex [apeks] – tip; **radix** [radiks] – root; **larynx** [larinks] – larynx, voice box; **exitus** [ekzitus] – exit.
- The double consonant **"Z"** is pronounced [z] in Greek words and [ts] in words from other languages:
  zona [zona] (Greek) – zone; **influenza** [influentsa] (Italian) – influenza, flu.

The digraphs "ch", "ph", "rh" and **"th"** were invented in the Latin alphabet for the transliteration of the Greek letters **Χ χ, Φ φ, Ρ ρ** and **Θ θ** to help with the Latin respresentation of Greek words:

- "ch" →[h]: **bronchus** [bronhus] – bronchus;
- "ph" → [f]: **pharynx** [farinks] – pharynx;
- "rh" → [r]: **haemorrhagia** [hemoragia] – haemorrhage, bleeding;
- "th" → [t]: **thorax** [toraks] – thorax, chest.

3. Letter groups

- **"Qu"** is pronounced [kv]:
  aqua [akva] – water; **liquor** [likvor] – fluid.
- **"Ti"** between vowels and not preceeded by **"s", "t", "x"** is pronounced [tsi]:
  operatio [operatsio] – surgery, operation; **substantia** [substantsia] – substance; **sectio** [sektsio] – section; **combustio** [combustio] – combustion, burning; **ostium** [ostium] – orifice, entrance.
- **"Sch"** is pronounced [sh] in Greek words, but [sch] in words from another origin:
  nervus ischiadicus [nervus ishiadikus] – ischiadic nerve, sciatic nerve; **ischaemia** [ischemia] – ischaemia; **leischmaniosis** [leischmaniozis] – leischmaniosis; **shock** [schok] – shock.
- **"Ngu"** is pronounced [ngv] between vowels:
  lingua [lingva] – tongue; **sanguis** [sangvis] – blood.

4. Stress

The Latin vowels are **short** and **long**. The long vowels are marked in the dictionaries by a stroke over the letter: **ā, ē, ō, ī, ū** and the short vowels are marked by a small bow: **ă, ĕ, ĭ, ŏ, ŭ**. One syllable consists of a vowel or a diphthong with or without one or more consonants. The syllables count vice versa and the stress never falls on the first syllable from the end.

> **RULE**: The stress falls on the *second-to-last syllable*, when it is long; when it is short, the stress falls on the *third-to-last syllable*.

➢ **The stress falls on the** *second-to-last syllable***, when:**

✓ it containes *diphthong*:
gan-gr**ae**-na – gangrene;

✓ the vowel stands before *two consonants or double consonants (x, z):*
ma-x**i**l-la – upper jaw; hy-po-gl**o**s-sus – hypoglossal; re-fl**e**-xus – reflex;

✓ has a naturally long vowel in certain *suffixes*:
-ālis, e; -āris, e;
-ānus, a, um; -ātus, a, um;
-īnus, a, um; -īvus, a, um;
-ōsus, a, um; -ūrus, a, um
-ōsis, is, f; -ōma, atis, n;
-ēsis, is, f; -ītis, itidis, f etc.

They are suffixes of nouns and adjectives.
co-l**u**m-na ver-te-br**a**-lis – vertebral column; di-a-gn**o**-sis – diagnosis; frac-t**u**-ra – fracture.

➢ **The stress falls on the** *third-to-last syllable,* **when:**

✓ after the vowel of the *second-to-last syllable* there is another *vowel, h or digraph*:
f**o**-ve-a – pit; in-f**e**-ri-or – inferior;

In ancient Greek there was no such rule that the vowel before vowel becomes short. That's why in these terms the stress could be put on the *second-to-last syllable:*
pe-ri-to-n**e**-um – perotoneum; tra-ch**e**-a – trachea, windpipe;

✓ it is before combination of the consonants *b, p, t, d, c, g + r, l* (the combination counts as *one* consonant):
v**e**r-te-bra – vertebra; c**e**-re-brum – brain; p**o**-da-gra – gout;

✓ has naturraly short vowel in certain suffixes:
-ŏlus, a, um; -ŭlus, a, um; -ĭcus, a, um; -ĭdus, a, um; -bĭlis, e:
a-c**u**s-ti-cus – auditory, sc**a**-pu-la – scapule; bron-ch**i**-o-lus – bronchiole.

EXERCISE

1. Read the terms:
   - ✓ **insula** – island, islet; **injectio** – injection; **juvenilis** – juvenile; **vena jugularis** – jugular vein;
   - ✓ **tympanum** – eardrum; **polydactylia** – more than five fingers or toes; **myologia** – anatomic study for muscles; **condylus** – condyle; **poliomyelitis** – inflammation of grey matter of spinal cord;
   - ✓ **auscultatio** – auscultation; **praenatalis** – before birth; **migraena** – migraine; **oedema** – edema, accumulation of fluid in tissue spaces; **haematoma** – hematoma; **leucocytus** – leucocyte, white blood cell; **pneumonia** – inflammation of lungs: **pleura** – pleura; **neuritis** – inflammation of nerve; **apnoea** – lack of breathing;
   - ✓ **carcinoma** – carcinoma; **collum** – neck; **cutaneus** – cutaneous; **bucca** – cheek; **os occipitale** – occipital bone;
   - ✓ **septum** – dividing wall; **status** – state; **vesica biliaris** – gallbladder; **pulsus** – pulse; **tussis** – cough; **osseus** – osseous;
   - ✓ **flexio** – flexion; **maxilla** – upper jaw; **fornix** – vault; **radix** – root; **exogenes** – exogenous; **xerostomia** – dry mouth; **os zygomaticum** – zygomatic bone; **zoonosis** – zoonosis;
   - ✓ **liquor** – fluid; **squama** – scale; **musculus quadratus** – quadrate muscle; **musculus quadriceps** – four-headed muscle; **quadriplegia** – paralysis of four limbs;
   - ✓ **lingua** – tongue; **glandula sublingualis** – sublingual gland; **unguis** – nail; **vasa sanguinea** – blood vessels; **unguentum** – ointment;
   - ✓ **tibia** – tibia; **substantia compacta** – compact bony substance; **amputatio** – amputation; **insufficientia** – insufficiency; **solutio** – solution; **ostium** – entrance; **combustio** – combustion;
   - ✓ **erythrocytus** – erythrocyte, red blood cell; **brachium** – arm; **nodus lymphaticus** – lymph node; **epithelium** – epithelium; **phalanx** – phalanx; **thymus** – thymus; **ductus choledochus** – common bile duct; **erythema** – redness of skin; **aphonia** – lack of voice; **pneumothorax** – air in the pleural cavity;
   - ✓ **nervus ischiadicus** – sciatic nerve; **insultus ischaemicus** – ischemic brain stroke; **uranoschisis** – cleft palate.

2. P**ut the correct stress:**

   processus – process; **intestinum** – intestine; **vasa lymphatica** – lymphatic vessels; **os parietale** – parietal bone; **cavitas oris** – oral cavity; **linea nuchae superior** – superior nuchal line; **lamina cribrosa ossis ethmoidalis** – cribriform plate of ethmoid bone; **angulus inferior scapulae** – inferior angle of scapula; **margo anterior fibulae** – anterior border of fibula; **medulla ossium rubra** – red bone marrow; **membrana interossea antebrachii –** interosseous membrane of forearm; **os triquetrum** – triquetrum bone; **pars ossea septi nasi** – bony part of nasal septum; **sutura frontomaxillaris** – frontomaxillary suture; **palpebra superior** – upper eyelid.

Parts of speech in the Latin Terminology

The parts of speech in the terminology are: **substantives (nouns), adjectives, participles, numerals, comparative forms, prepositions and conjunctions.** The general part of the terminology are the *nouns,* which function as **substantive terms**.

> **RULE:** In the Latin medical terminology there are only **phrases**, because a finite verb lacks.

I. NOMEN SUBSTANTIVUM (SUBSTANTIVE, NOUN)

The nouns have **gender, number and cases**.

1. Genus (gender). The genders are three:

Genus masculinum (m) – masculine gender

Genus femininum (f) – feminine gender

Genus neutrum (n) – neuter gender

The gender of nouns is *natural* (according to the sex): **femina, ae, f** – woman; **vir, viri, m** – man; **mater, tris, f** – mother; and *grammatical*, determined by the ending of *Nominative singular*: **uterus, i, m** – uterus, womb; **status, us, m** – state etc. All nouns ending in **–um** are allways neuter gender.

2. Numerus (number)

The numbers are **two:** *singular (numerus singularis)* and *plural (numerus pluralis).*

nerv**us** spinal**is** – spinal nerve (sg.)

nerv**i** spinal**es** – spinal nerves (pl.)

3. Casus (cases)

Latin is an **inflected language**. That means that the words stand in different cases and have specific flexions (or endings) in accordance to their function in the sentence.*

> **RULE:** The **case** is the form of a noun (adjective, participle, numeral, comparative form, pronoun) according to its **function** in a sentence or in a phrase.

There are six cases in Latin: **Nominativus, Genitivus, Dativus, Accusativus, Ablativus, Vocativus** (*English names*: Nominative, Genitive, Dative, Accusative, Ablative, Vocative). But in the medical terminology only four are used: Nominative, Genitive and Accusative and Ablative after the certain prepositions. The function of the four cases in the anatomical and pharmaceutical phrases is strictly defined.

4. Declinatio (declension)

The declension is the **change** of noun (adjective, participle, numeral, comparative form, pronoun) **in case and number**. According to **the ending sound of their stem,** all nouns are divided into **five declensions – five groups of nouns**. **Every declension has its own endings**.

> **NB! Root and stem of words**
> A stem is the *root* of a word, together with any derivational affixes, to which inflectional affixes are added. The root indicates the *meaning* of the word and was probably a monosyllable. The Latin nouns have stems with **vocal ending** *(-a-, -o-, -i-, -u-, -e-)* or **consonant ending**, but the vocal from the stem was mixed with the flexions for the cases therefore we will talk about the **case endings and practical stem. The practical stem is determined after detaching the ending for Genitive singular.**

The obligatory representative form of the noun is the **dictionary form**. The dictionary form of nouns consists of:

- ✓ **the form of Nominative singular;**
- ✓ **Genitive singular ending. It denotes the declension**, so we could put the endings for the correct declension.
- ✓ **the gender (m, f, n);**
- ✓ **translation.**

* *Example*: **Finis coronat opus.** The end crowns the case. [**Finis** is the subject, **opus** is the object in the sentence; **coronat** is the predicate for 3 p.praes.sg. We understand the function of the nouns from the endings.]

Table № 2: Dictionary forms, morphological and practical stems

Dictionary form	Morphological stem	Practical stem
costa, ae, f – rib	**costa-**	**cost-**
musculus, i, m – muscle	**musculo-**	**muscul-**
basis, is, f – base	**basi-**	**bas-**
ductus, us, m – duct	**ductu-**	**duct-**
facies, ei, f – face; surface	**facie-**	**faci-**

Table № 3: Declensions and dictionary forms of nouns

Declension	Gender	Stem characteristic	Genitive singular	Dictonary form
Declinatio prima (First declension)	*Feminine (f)*	-a-	-ae	**vertebra, ae, f** – vertebra
Declinatio secunda (Second declension)	*Masculine; neuter (m; n)*	-o-	-i	**nervus, i, m** – nerve **ligamentum, i, n** – ligament
Declinatio tertia (Third declension)	*Masculine, feminine, neuter (m; f; n)*	consonant; -i-	-is	**ren, renis, m** – kidney **corpus, oris, n** – body **diagnosis, is, f –** diagnose **os, ossis, n** – bone
Declinatio quarta (Fourth declension)	*Masculine; neuter (m; n)*	-u-	-us	**processus, us, m** – process **genu, us, n** – knee
Declinatio quinta (Fifth declension)	*Feminine (f)*	-e-	-ei	**facies, ei, f** – face, surface

Table № 4: Latin and Greek endings for nouns in Nominative singular

Latin endings	Meaning	Endings for terms with Greek origin	Meaning
-a/-ia/-ina, ae, f	concrete or abstract noun	-is, is, f; -is, idis, f	concrete noun
-ura, ae, f	result	-asis/ -esis/ -osis/ -iasis/ -ysis, is, f	action
-cula/-ola/-ella/-illa/-ula, ae, f	diminutive	-as, antis, m	concrete noun

Latin endings	Meaning	Endings for terms with Greek origin	Meaning
-tas, tatis, f	concrete noun	-e, es, f; -es, ae, m	concrete noun
-trix, icis, f	concrete noun	-nx, ngis, m	concrete noun
-tio, onis, f	action	-on, i, n/-ion, ii, n	concrete noun
-ter, tris, f	concrete noun	-ma, matis, n	concrete noun
-go, inis, f	concrete noun		
-es, ei, f	concrete noun		
-us/-eus/-ius, i, m	concrete noun		
-olus/-ulus, i, m	diminutive		
-tus, us, m	verbal noun		
-ax, acis, m	concrete noun		
-er, eris, m	concrete noun		
-en, enis, m	concrete noun		
-es, edis, m	concrete noun		
-ex, icis, m	concrete noun		
-is, is, m	concrete noun		
-o, onis, m	concrete noun		
-or, oris, m	concrete noun		
-tor, oris, m	agens		
-men, inis, n	result		
-um/-ium/, ii, n	concrete noun		
-mentum, i, n	place		
-arium, ii, n	place		
-ellum/-olum/-culum, i, n	diminutive		
-us, uris, n	concrete noun		
-us, oris, n	concrete noun		
-us/-ur, oris, n	concrete noun		
-ut, itis, n	concrete noun		
-u, us, n	concrete noun		

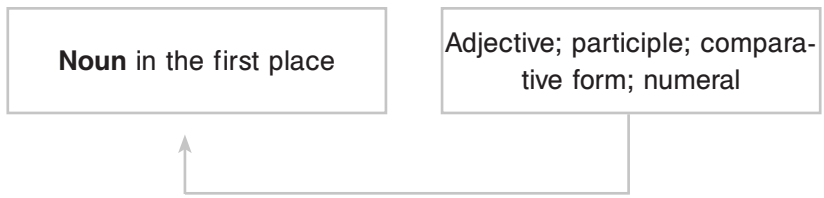
II. NOMEN ADJECTIVUM (ADJECTIVE)

The adjectives function in the medical terminology as **an attribute (modifier) in the noun phrase (Noun + Adjective N+A).** They agree in **gender, number and case with the noun.** There are **two groups of adjectives: adjectives in I and II declension and adjectives in III declension.**

RULE 1: The noun (substantive term) in terminology stands **before the adjective** (participle, comparative form, numeral) because the noun is more important than its modifier.

RULE 2: The adjective (participle, comparative form, numeral) **agrees with the noun when it adopts the same gender, number** and **case**, e.g. if the noun is masculine Nominative singular, the adjective which is to describe it must be also masculine Nominative singular.

Figure № 1: **Attributive phrase (Noun + Adjective N+A)**



1. Adjectives in I and II declension

The three genders have their own forms. The endings for masculine Nominative singular can be **–us** or **–er** like in nouns.

latus (masculine – m), lata (feminine – f), latum (neuter – n) – broad

dexter (m), dextra (f), dextrum (n) – right

The dictionary form consists of a masculine form, a feminine ending and a neuter ending (or with the end of stem + gender ending for adjectives in –er).

Dictionary form: **latus, a, um – broad**
dexter, tra, trum – right

RULE: The adjective in **feminine** gender is declined in **I declension**, the adjectives in **masculine** and **neuter** are declined in **II declension** like nouns.

Examples:

Lat. **fascia lata** → *Engl.* **broad fascia**

The noun "fascia" is *feminine Nominative singular,* the adjective "lata" is *feminine Nominative singular*. The rules applied are:

- ✓ Rule 1: The noun stands before the adjective.
- ✓ Rule 2: The adjective is in the same gender, number and case like the noun.

Lat. **musculus latus** → *Engl.* **broad muscle**

The noun "musculus" is *masculine Nominative singular,* the adjective "latus" is *masculine Nominative singular*.

Lat. **ligamentum latum** → *Engl.* **broad ligament**

The noun "ligamentum" is *neuter Nominative singular,* the adjective "latum" is *neuter Nominative singular.*

2. Adjectives in III declension:

- ✓ **Adjective with three forms** for masculine, feminine and neuter gender:
  celer (m), celeris (f), celere (n) – fast
  The dictionary form consists of masculine form, end of the stem + feminine and neuter endings.
  Dictionary form: **celer, eris, ere – fast**

- ✓ **Adjectives with two forms**: one form for masculine and feminine, and one form for neuter gender:
  communis (m, f), commune (n) – common
  The dictionary form consists of a masculine and feminine form and a neuter ending.
  Dictionary form: **communis, e – common**
  temporalis, e – temporal

Lat. **regio temporalis** → *Engl.* **temporal region**

The noun "regio" is *feminine Nominative singular,* the adjective "temporalis" is *feminine Nominative singular*.

Lat. **os temporale** → *Engl.* **temporal bone**

The noun "os" is *neuter Nominative singular,* the adjective "temporale" is *neuter Nominative singular.*

- ✓ **Adjectives with one form** for masculine, feminine and neuter gender:
  multiplex (m, f, n), multiplicis (Genitive singular) – multiple
  The dictionary form consists of Nominative singular form and Genitive singular stem + ending.

Dictionary form: **multiplex, icis – multiple**

biceps, ipitis – biceps, two-headed

Lat. **musculus biceps** → *Engl.* **biceps muscle, two-headed muscle**

The noun "musculus" is *masculine Nominative singular,* the adjective "biceps" is *masculine Nominative singular*.

RULE: These adjectives are declined in **third declension, vocal type**.

II. PARTICIPLES, NUMERALS, PRAEPOSITIONS, CONJUNCTIONS

1. **The participles** are adjectives derived from a verb. The participles in the terminology are: *present active participle and past perfect participle*.

- *Dictionary form* for **present active participle:**
  fluctuans, ntis – floating [fluctuans (m, f, n), fluctuantis – Genitive singular]

  Lat. **costae fluctuantes** → *Engl.* floating ribs (pl.)

- *Dictionary form* for **past perfect participle:**
  circumflexus, a, um – circumflexed [circumflexus (m), circumflexa (f), circumflexum (n) – Nominative singular]

  Lat. **arteria circumflexa** → *Engl.* circumflex artery

2. **The numerals** in terminology are the ordinal numerals:

primus, a, um – first	*sextus, a, um* – sixth
secundus, a, um – second	*septimus, a, um* – seventh
tertius, a, um – third	*octavus, a, um* – eighth
quartus, a, um – fourth	*nonus, a, um* – ninth
quintus, a, um – fifth	*decimus, a, um* – tenth

3. **The prepositions** combine with a noun or a noun phrase to form **prepositional phrases**. There are prepositions only with Accusative and Ablative or prepositions with Accusative and Ablative with different meaning.

Lat. **post mortem** → *Engl*. after death

Lat. **in regione** → *Engl*. in the region

Lat. **in situ** → *Engl*. in the place

4. **The conjunctions** join two or more elements: **et** – with; **sive** – or.

5. **The comparative forms** in the anatomical nomenclature are 9 comparative grades (*gradus comparativus)* and 9 superlative grades *(gradus superlativus)*. They denote the **size** and **place** of the different anatomical entities. The comparative grades usually form antonyms couples.

Lat. **musculus pectoralis major// musculus pectoralis minor** – greater pectoral muscle// lesser pectoral muscle

Lat. **musculus longissimus capitis** – longest muscle of head

EXERCISE

1. Determine the declension of the nouns and translate:

Noun	*Declension*	*Translation*
cranium, ii, n		
margo, inis, m		
pes, pedis, m		
auris, is, f		
pars, partis, f		
fossa, ae, f		
ductus, us, m		
ramus, i, m		
canalis, is, m		
cornu, us, n		
cavitas, tatis, f		
facies, ei, f		

2. Put the endings for Genitive singular in different declensions and translate:

Nom. sg.	Gen. sg.	Declension	Translation
maxilla	maxill-	I	
antebrachium	antebrachi-	II	
auris	aur-	III	
radix	radic-	III	
angulus	angul-	II	
femur	femor-	III	
processus	process-	IV	
caries	cari-	V	
os	oss-	III	
sinus	sin-	IV	
nucleus	nucle-	II	

3. Write the dictionary form of nouns:
   glandula .....
   sternum .....
   ovarium .....
   uterus (II decl.) .....
   ren .....
   dens.....
   aditus (IV decl.) .....
   oculus (II decl.) .....