

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE

SYLLABUS

CYTOLOGY, HISTOLOGY AND EMBRYOLOGY
(English course)

Accepted by the Department Council – 01.06.2020

Approved by the Faculty of Medicine

MEDICAL UNIVERSITY – PLOVDIV

FACULTY OF MEDICINE

Name of medical discipline:

“Cytology, histology and embryology”

Type of medical discipline:

Obligatory

Educational and qualification degree:

Master of Science /M/

Educational types:

Lectures, seminars, self – preparing

Duration of training in FM:

one semester

Curriculum:

45 hrs lectures, 45 hrs seminars

Equipment used in the course of study:

Light microscopes, sets of microscopical preparations, electron microphotographs, videofilms, multimedia presentations, atlases, native specimens of placenta and fetuses, discussion, Practicum of Cytology, Histology and Embryology, Handbook in Cytology, Histology and Embryology, CD interactive atlas of Cytology, Histology and Embryology.

Control and assessment:

Current assessment, preliminary examination in Cytology, tests during the semester, identifying microscopical preparations and electron microphotographs.

Final evaluation:

The grade from the preliminary examination in Cytology (Cytology Colloquium) and the current average grade for the semester.

Aspects for the assessment:

A preliminary exam attending, test solving, participation in discussions.

End-of-semester exam:

Yes /four stages/: 1. A. Practical examination (identifying microscopical preparations and electron microphotographs in Cytology), B. Practical examination (identifying microscopical preparations and electron microphotographs in Histology and Embryology); 2. MCQ Test in

Cytology, Histology and Embryology; 3. Writing examination on two topics on Histology and Embryology; 4. Oral examination.

Term tests:

1. Cytology Colloquium – 60 points
2. Test on epithelial and connective tissues – 40 points
3. Test on blood, muscle and nerve tissues – 50 points

Total score points for the semester – 150

Evaluation

143 – 150 p. – 6,00
135 – 142 p. – 5,50
127 – 134 p. – 5,00
120 – 126 p. – 4,50
113 – 119 p. – 4,00
105 – 112 p. – 3,50
90 – 104 p. – 3,00
< 90 p. – 2,00

EXEMPTION

Cytology Colloquium:

Students with **90% from practical part (18 points) and 90% from MCQ test (36 points)** exempt the Cytology section (practical and MCQ) from the final Cytology, Histology and Embryology exam.

Total score points (Cytology + Histology points):

Students with **90% of the maximum semester score (135 points or more)** exempt both practical and MCQ test on Cytology, Histology and Embryology from the final exam. They sit only for essay and oral part of the final exam.

Students with **less than 90% (< 135 p.)** of the maximum semester score sit for the entrance test (practical and MCQ test) of the final exam. If they pass the practical and MCQ test, they sit for the essay and oral part.

State exam:

No.

Lecturer:

A habilitated lecturer from the Department of Anatomy, Histology and Embryology.

Department:

Department of Anatomy, Histology and Embryology.

ANNOTATION

The course in "Cytology, Histology and Embryology" is a mandatory propaedeutic step in teaching the fundamental discipline Human Anatomy. Students acquire knowledge on the basic structural elements in the human body: cells, tissues. The material is studied in three sections. The Cytology provides knowledge on the structure of the eukaryotic cells - cell membrane, cell organelles, inclusions, nucleus, cytophysiology. General Histology - provides knowledge on the main structural, ultrastructural, histochemical and functional characteristics of the tissues and their histogenesis. Embryology – provides knowledge on the human embryonal and fetal development (fertilization, early and late gastrulation), primitive organs, extra-embryonic layers, twins, anomalies in the human embryonal development).

THE MAIN OBJECTIVE

The main objective is to gain knowledge of the main morphological structures of the human body: cells, tissues, stages of the embryonal development (fertilization, early and late gastrulation, histogenesis, differentiation).

Cytology – studying the structure of the eukaryotic cells:

- Plasma membrane (plasmalemma) - structural, ultrastructural and chemical organization, cell contacts, specialization the cell surface - cilia, flagella, microvilli, basolateral folds, transport of the substances through the cell membrane.
- Cell organelles – types, structural, ultrastructural and functional characteristics.
- Specialized cell organelles - structural, ultrastructural and functional characteristics.
- Nucleus in interphase – structural, ultrastructural and functional characteristics.
- Cell division. Mitosis – phases.

General Histology – studying the main tissues of the human body – histogenesis, lightmicroscopical, electronmicroscopical, histochemical and functional characteristics:

- Epithelial tissue
- Connective tissue
- Blood tissue
- Muscle tissue
- Nervous tissue
- Reproductive tissue

General Embryology – studying the embryonal development and the initial stages of the fetal period, twins, anomalies in the human embryonal development.

EXPECTED RESULTS

After completing the Cytology, Histology and Embryology course, students should have the following knowledge and practical skills:

- deep knowledge of the structure of the eukaryotic cells - cell membrane, structural, ultrastructural and chemical organization, cell contacts, specialization the cell surface - cilia, flagella, microvilli, transport of the substances through the cell membrane - endocytosis and exocytosis
- deep knowledge of the cell organelles and metabolic inclusions in the cell
- deep knowledge of the tissues - structural, ultrastructural and functional characteristics - epithelial tissue, connective tissue, blood tissue, muscle tissue, nervous tissue, reproductive tissue.
- deep knowledge on General Embryology – the embryonal development and the initial stages of the fetal period, formation and structure of placenta, twins, anomalies in the human embryonal development.

CURRICULUM

Discipline	Exam	Hours			Hours per wears per semesters						
	Semester	Total	Lectures	Seminars	IV	V	VI	VII	VIII	IX	X
Cytology, Histology and Embryology	II	90	45	45							

SCHEDULE OF LECTURES

I course, II semester

№	TOPIC	HOURS	DATE
1.	Introduction to Cytology, Histology and Embryology. The cell.	3 hrs.	

2.	Cell organelles.	3 hrs.	
3.	Cytoplasm.	3 hrs.	
4.	Nucleus in interphase. Mitosis.	3 hrs.	
5.	Cytophysiology.	3 hrs.	
6.	Tissues – classification, properties. Epithelia.	3 hrs.	
7.	Connective tissue. Fibrous connective tissue.	3 hrs.	
8.	Connective tissue with solid intercellular substance. Blood tissue.	3 hrs.	
9.	Blood tissue.	3 hrs.	
10.	Muscle tissue.	3 hrs.	
11.	Nerve tissue.	3 hrs.	
12.	Reproductive tissue. Early human embryonal development.	3 hrs.	
13.	Early human embryonal development.	3 hrs.	
14.	Extra-embryonic layers.	3 hrs.	
15.	Twins. Anomalies in the human embryonal development.	3 hrs.	

Total: 45 hrs.

SCHEDULE OF SEMINARS

I course, II semester

№	TOPIC	HOURS	DATE
1.	General Methods of Investigation in Histology. The cell – morphology.	3 hrs.	
2.	Cytoplasm. Cell organelles.	3 hrs.	
3.	Nucleus in interphase. Mitosis.	3 hrs.	
4.	Cytoplasm. Cell inclusions. Cytophysiology.	3 hrs.	
5.	Epithelia. Unilayered epithelia.	3 hrs.	
6.	Colloquium in Cytology.	3 hrs.	
7.	Epithelia. Multistratified epithelia. Secretory epithelia.	3 hrs.	
8.	Fibrous connective tissue.	3 hrs.	
9.	Connective tissue with solid intercellular substance.	3 hrs.	
10.	Blood tissue.	3 hrs.	

11.	Muscle tissue.	3 hrs.	
12.	Nerve tissue.	3 hrs.	
13.	Reproductive tissue.	2hrs.	
14.	General embryology. Gastrulation.	3 hrs.	
15.	Extra-embryonic layers.	3 hrs.	

Total: 45 hrs.

LECTURES - TOPICS

LECTURE № 1 – 3 hrs

Introduction in Cytology, Histology and Embryology. Relationship with other medical and biological sciences.

1. Introduction in Cytology, Histology and Embryology..
 - Subject
 - Development
 - Relationship with other medical and biological sciences.
 - General methods of investigation in Histology.
2. The cell
 - Cell membrane (plasmalema)
 - Biomembranes – transport of substances through the cell membrane
 - Specializations of the cell surface, cell contacts
 - Compartmentalization of cytoplasm
 - Cell organelles - endoplasmatic reticulum, ribosomes

LECTURE № 2 – 3 hrs

Cell organelles.

1. General organelles - structural, ultrastructural and functional characteristics.
 - 1.1. Endoplasmatic reticulum
 - 1.1. Mitochondria
 - 1.2. Goigi apparatus (complex)
 - 1.3. Lysosomes

LECTURE № 3 – 3 hrs

Cytoplasm.

1. Cytoskeleton - structural, ultrastructural and functional characteristics.
2. Specialized organelles – structural, ultrastructural and functional characteristics.
3. Cell inclusions.

LECTURE № 4 – 3 hrs

Nucleus in interphase and mitosis.

1. Nucleus in interphase and mitosis - structural, ultrastructural and functional characteristics.
 - nuclear components
 - nuclear membrane
 - chromatin, nucleolus
2. Nucleus in mitosis - phases

LECTURE № 5 – 3 hrs

Cytophysiology.

Metabolism. Phagocytosis, Synthesis, secretion, moving, aging.

LECTURE № 6 – 3 hrs

Tissues. Epithelial tissue.

1. Definition
2. Histogenesis
3. Classification.
4. Unistratified epithelia. Structural, ultrastructural and functional characteristics.
5. Multistratified epithelia. Structural, ultrastructural and functional characteristics.
6. Gland epithelia. Structural, ultrastructural and functional characteristics.

LECTURE № 7 – 3 hrs

Connective tissue. Fibrous connective tissue.

1. Definition
2. Histogenesis
3. Classification
4. Structural, ultrastructural and functional characteristics.
 - connective tissue cells
 - intercellular substance

LECTURE № 8 – 3 hrs

Connective tissue with solid intercellular substance.

1. Connective tissue with solid intercellular substance.
 - 1.1. Cartilage
 - 1.2. Bone

LECTURE № 9 – 3 hrs

Blood tissue.

1. Definition.
2. General characteristics
3. Classification.
4. Structural, ultrastructural and functional characteristics
 - Erythrocytes
 - Granulocytes
 - Blood platelets (thrombocytes)

LECTURE № 10 – 3 hrs

Muscle tissue.

1. Definition
2. Histogenesis
3. General characteristics
4. Classification.
5. Structural, ultrastructural and functional characteristics.

LECTURE № 11 – 3 hrs

Nervous tissue.

1. Definition
2. Histogenesis
3. General characteristics
4. Classification.
5. Structural, ultrastructural and functional characteristics – neurons, neuroglia, nerve fibers, myoneural synapse.

LECTURE № 12 – 3 hrs

Reproductive tissue.

1. Reproductive tissue.
 - 1.1. Definition
 - 1.2. Histogenesis
 - 1.3. General characteristics
 - 1.4. Structural, ultrastructural and functional characteristics.
 - Oocytes
 - Spermatozoa.

LECTURE № 13 – 3 hrs

Early human embryonal development

1. Fertilization, clivage
2. Segmentation
3. Blastocysts, implantation
4. Gastrulation
- 5 Primitive organs.

LECTURE № 14 – 3 hrs

Extra-embryonic layers

1. Chorion, amnion, yolk sack, alantoic diverticulum
2. Umbilical cord
3. Fetal sack
4. Placenta

LECTURE № 15 – 3 hrs

Twins. Anomalies in the human embryonal development.

1. Multiple pregnancy.
 - fraternal twins and identical twins
2. Anomalies in the human embryonal development – embryotoxic factors

SEMINARS – TOPICS

SEMINAR № 1 – 3 hrs

General Methods of Investigation in Histology. The cell – morphology.

1. Discussion

2. Light microscopic observation
3. Video film

Microscopical preparations:

1. Squamous epithelial cells
2. Pyramidal neurons
3. Spherical cells

SEMINAR № 2 – 3 hrs

Cytoplasm. Cell organelles.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Nissl substance (granules)
2. Mitochondria
3. Golgi complex
4. SDH activity

Electron microphotographs:

1. Rough endoplasmatic reticulum
2. Smooth endoplasmatic reticulum
3. Ribosomes
4. Mitochondria
5. Golgi complex
6. Centrosome

SEMINAR № 3 – 3 hrs

Nucleus in interphase. Mitosis.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Nucleus in interphase
 - 1.1. H-E staining
 - 1.2. Feulgen staining
2. DNA synthesis (histoautoradiography)
3. Mitosis in cells of pea radix

Electron microphotographs:

1. Interphase nucleus

SEMINAR № 4 – 3 hrs

Plasmalema. Cell inclusions. Cytophysiology.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Lipid drops
2. Glycogen granules in hepatic cells
3. Pigment inclusions
4. Acid phosphatase activity

5. Phagocytosis
6. Secretion (secretory granules)
7. Moving of cilia – demonstration

Electron microphotographs:

1. Cell membrane
2. Microvilli
3. Basal foldings
4. Desmosomes
5. Interdigitations
6. Protein granules
7. Glycogen granules
8. Lipid droplets
9. Lysosomes
10. Secretory granules
11. Cilia
 - 11.1 Longitudinal section
 - 11.2. Transverse section

SEMINAR № 5 – 3 hrs

Epithelia. Unilayered epithelia.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Simple squamous epithelium
2. Cuboidal epithelium
3. Columnar epithelium
4. Unilayered (pseudostratified) ciliated columnar epithelium
5. Henle's epithelium

SEMINAR № 6 – 3 hrs

Colloquium

(preliminary examination)

1. Practical part – 7 microscopical preparations, 6 - electron microphotographs
2. Theoretical part – test

SEMINAR № 7 – 3 hrs

Epithelia.

Multistratified epithelia. Secretory epithelia.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Stratified squamous epithelium
2. Stratified squamous keratinizing epithelium
3. Secretory epithelia
 - 3.1. Simple tubular glands
 - 3.2. Serous, mucous and compound alveolar (acinar) glands

SEMINAR № 8 – 3 hrs

Fibrous connective tissue.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Loose connective tissue
2. Collagenous fibrous tissue
3. Elastic tissue
4. White adipose tissue
 - 4.1. Sudan III staining
 - 4.2. H-E staining

Electron microphotographs:

1. Multilocular adipocyte
2. Macrophage
3. Fibroblast
4. Mast cell
5. Plasma cell
6. Collagen fibers

SEMINAR № 9 – 3 hrs

Connective tissue with solid intercellular substance.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Hyaline cartilage
2. Elastic cartilage
3. Compact bone – decalcinated
4. Compact bone – Shliff
5. Osteogenesis

Electron microphotographs:

1. Osteocyte
2. Osteoclast

SEMINAR № 10 – 3 hrs

Blood tissue.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations
4. Test and preparations on Epithelial and Connective tissues.

Microscopical preparations:

1. Blood smear - examination

Electron microphotographs:

1. Neutrophil granulocyte
2. Eosinophil granulocyte
3. Lymphocyte
4. Platelets

SEMINAR № 11 – 3 hrs

Muscle tissue.

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Smooth (visceral) muscle tissue
2. Striated skeletal muscle tissue
3. Striated cardiac muscle tissue
4. Impulse conductive cardiac muscle tissue

Electron microphotographs:

1. Smooth muscle cell
2. Myofibril – skeletal
3. Cardiomyocyte – myofibril
4. Intercalated disc

SEMINAR № 12 – 3 hrs**Nerve tissue.**

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Multipolar neurons
2. Pear-like neurons
3. Pyramidal neurons
4. Myelinated nerve fibers

Electron microphotographs:

1. Myelinated nerve fiber

SEMINAR № 13 – 3 hrs**Reproductive tissue.**

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations
4. Video film

Microscopical preparations:

1. Oocyte
2. Spermatozoa

Electron microphotographs:

1. Oocyte
2. Spermatozoon

SEMINAR № 14 – 3 hrs**General embryology. Gastrulation.**

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations
4. Test and preparations on blood, muscle and nerve tissues.

Microscopical preparations:

1. Early gastrulation

2. Late gastrulation

SEMINAR № 15 – 3 hrs

Extra-embryonic layers

1. Discussion
2. Light microscopic observation
3. Drawing pictures from the microscopic preparations

Microscopical preparations:

1. Umbilical cord of newborn baby
2. Placenta
3. Fetal sack

Textbooks

1. Basic Histology, I.C. Janqueira, Springer
2. Human embryology, I. Singh, 6th edition
3. Clinical and Functional Histology for Medical Students, Richard S. Snell
4. Histology, R. Henrikson
5. Histology – A Text and Atlas, M. Ross, Sixth edition
6. Practicum of Cytology, Histology and Embryology with CD, P. Atanassova, I. Koeva, E. Petrova, N. Penkova, V. Trichkova
7. Handbook in Cytology, Histology and Embryology, I. Koeva, ИК-БАП, ISBN 978-954-8326-33-9.

SYLLABUS **in Cytology, General Histology and Embryology**

CYTOLOGY

1. Cell. Microscopic and ultrastructural components of the cell.
2. Biomembranes - structural, ultrastructural and chemical organization.
3. Plasma membrane (plasmalemma) - structural, ultrastructural and chemical organization.
4. Cell contacts - ultrastructure and function.
5. Specialization the cell surface - cilia, flagella, microvilli, basolateral folds.
6. Transport of the substances through the cell membrane. Endocytosis and exocytosis.
7. Endoplasmic reticulum – types, structural, ultrastructural and functional characteristics. Ribosomes.
8. Golgi apparatus (complex) - structural, ultrastructural and functional characteristics.
9. Mitochondria - structural, ultrastructural and functional characteristics.
10. Membrane bound vesicles. Lysosomes. Peroxisomes.
11. Cytoskeleton - microtubules. Centrioles. Cytocenter.
12. Cytoskeleton - microfilaments, intermediate filaments.
13. Specialized cell organelles. Structural, ultrastructural and functional characteristics.
14. Metabolic inclusions in the cell. Types, structural, ultrastructural and functional characteristics.
15. Nucleus in interphase.
16. Cell division. Mitosis.
17. Synthesis and secretion in the cell.
18. Movement in the cell- role of the cilia, flagella and miofibrils.

GENERAL HISTOLOGY

1. Tissues- general characteristics. Histogenesis and classification.
2. Epithelial tissue. Histogenesis. General characteristics. Classification.
3. Unistratified epithelia. Structural, ultrastructural and functional characteristics. Examples.
4. Multistratified epithelia .Structural, ultrastructural and functional characteristics. Examples.
5. Gland epithelia. Structural, ultrastructural and functional characteristics. Examples.
6. Connective tissue. Histogenesis. General characteristics. Classification.
7. Intercellular substance of the connective tissue. Fibres - structural, ultrastructural, chemical and functional characteristics.
8. Ground substance of connective tissue. Structural, chemical and functional characteristics.
9. Histogenesis of the intercellular substance of the connective tissue – biosynthesis of collagen.
10. Connective tissue cells. Types, structural, ultrastructural and functional characteristics.
11. Fibrous connective tissue. Types, structural, ultrastructural and functional characteristics.
12. Cartilage. Types, structural, ultrastructural and functional characteristics.
13. Bone. Structural, ultrastructural and functional characteristics.
14. Osteogenesis (ossification). Types and structural characteristic.
15. Specialized connective tissue: adipose tissue, reticular tissue, pigmentous tissue.
16. Blood tissue. General characteristics. Classification.
17. Histogenesis of blood tissue. Scheme of the histogenesis.
18. Erythrocytes – structural, ultrastructural and functional characteristics. Erythropoiesis.
19. Granulocytes – types, structural, ultrastructural and functional characteristics. Granulocytopoiesis.
20. Agranulocytes – types, structural, ultrastructural and functional characteristics. Lymphocyto - and monocytopenoiesis.
21. Blood platelets (thrombocytes) - structural, ultrastructural and functional characteristics. Thrombocytopoiesis.
22. Interstitial (reactive blood) cells. Types, histogenesis. Structural, ultrastructural and functional characteristics.
23. Muscle tissue. Histogenesis. General characteristics. Classification.
24. Smooth muscle tissue. Structural, ultrastructural, chemical and functional characteristics.
25. Cardiac striated muscle tissue. Structural, ultrastructural, chemical and functional characteristics.
26. Skeletal striated muscle tissue. Structural, ultrastructural, chemical and functional characteristics.
27. Nervous tissue. Histogenesis. General characteristics. Classification.
28. Nervous fibres. Types, structural, ultrastructural, chemical and functional characteristics.
29. Neuroglia. Types, structural, ultrastructural, and functional characteristics. Histogenesis.
30. Reproductive tissue. Spermatogenesis. Spermatozoa.
31. Reproductive tissue. Oogenesis. Oocytes.

GENERAL EMBRYOLOGY

32. Insemination. Fertilization. Factors that influence the processes.

33. Initial development of human embryo. Segmentation. Blastocysts. Morulla. Embryoblast. Trophoblast.
34. Implantation. Structural, ultrastructural and functional characteristics of the uterine endometrium during proliferative phase.
35. Early development (gastrulation) of human embryo. Formation of the germ layers. Embryonic disc. Chorion.
36. Late development (gastrulation) of human embryo. Formation of the mesoderm and the mesenchyme. Primitive organs.
37. Germ layers and their derivatives.
38. Yolk sac. Chorion. Alantoic diverticulum. Vitelline haemopoiesis. Vitelline circulation.
39. Umbilical cord. Formation. Fetal circulation.
40. Placenta. Formation, structure, functions and blood circulation. Blood - placental barrier (placental membrane).
41. Amnion. Amniotic cavity. Amnio-chorionic membrane.
42. Twinning. Monozygotic. Dizygotic.
43. Abnormalities in the embryonic development. Teratogenic factors.

SELF STUDY GUIDE

POINT THE RIGHT ANSWER

1. The umbilical cord of the newborn baby contains two arteries and one vein.

YES	NO
-----	----
2. The cells that are formed after cleavage are called blastomers.

YES	NO
-----	----
3. Lisosomes can be observed with light microscope.

YES	NO
-----	----
4. The decreased number of erythrocytes in the blood sample is called erythrocytosis.

YES	NO
-----	----
5. Exocytosis is a transport through the cell membrane.

YES	NO
-----	----

CHOOSE ONE CORRECT ANSWER

6. Goblet cells are:
 - a/ absorbing (resorbing) cells
 - b/ secreting cells
 - c/ covering cells
 - d/ stem cells
7. Somites are derivatives of:
 - a/ ectoblast
 - b/ endoblast
 - c/ mesoblast
 - d/ mesenchyme
8. The cells that possess microvilli are:

- a/ resorbing cells
- b/ secreting cells
- c/ covering cells
- d/ stem cells

9. The nerve tissue originates from:

- a/ ectoblast
- b/ endoblast
- c/ mesoblast
- d/ mesenchyme

10. The time of implantation is:

- a/ 1st day after fertilization
- b/ 6-7 days after fertilization
- c/ 10 days after fertilization
- d/ 1st month after fertilization

11. Unilocular adipocytes are typical for:

- a/ white adipose tissue
- b/ blood tissue
- c/ brown adipose tissue
- d/ long bones

WRITE “RIGHT” (R) OR “WRONG” (W)

12. Typical for Golgi complex is:

- a/ synthesis of proteins
- b/ synthesis of lipids
- c/ cis and trans zone
- d/ made of cisternae, vacuoles and vesicles
- d/ can be seen with the light microscope

13. Typical for the lymphocytes is:

- a/ small nucleus
- b/ large nucleus
- c/ beam-shaped nucleus
- d/ basophilic cytoplasm
- e/ granules in the cytoplasm

DEFINE AND FILL IN THE CORRECT ANSWERS

14. Count the layers of the multistratified keratinizing epithelium:

- a.....
- b.....
- c.....
- d.....
- e.....

15. The phases of the mitosis are:

- a.....

- b.....
- c.....
- d.....

WRITE THE CORRECT ANSWER

16. With the light microscope, H-E staining, an epithelium with several rows of nuclei and cilia at the cell's surface is seen.
Which is this epithelium?

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/Head of the Department of Anatomy, Histology and Embryology/