

Mammal Histological Tissues According to Recent Knowledge

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The aspiration for a more accurate classification of the diversity of cell communities in the organism is aimed at a better study of their structural and functional specification. It is underlying the attempt for their precise classification as every such effort reflects the level of scientific knowledge of the time in which it has been attempted.

The tissue classification of Leidig (1853) — Kölliker (1863) of 4 main tissues forming the organism — epithelial, connective, muscle and nervous tissues — quite rightly gives rise to dissatisfaction among a number of scientists both in Bulgaria and abroad. Current multiple research micromorphology methods and techniques show a number of discrepancies, incompleteness and groundless claims for the pertinence of certain tissues to some of the basic tissues, as was stated in it. Such tissues are genital tissue, blood tissue, cartilage tissue and bone tissue.

Looking back to Haeckel (1885) but applying contemporary argumentation and rationalization, Krustev [10, 12] substantiates the existence of 7 basic tissues of the organism — epithelial, genital, connective, blood, adminiculo-mechanical, muscle and nervous. Sharing his classification in present study we determine also these forming tissues and their subdivisions.

A classification of the basic tissues is presented in this research. It is also specified all the divisions, subdivisions, varieties and types of tissues where we came across such like.

Mammal tissue diversity is a fact which needs to be reflected in a present classification. It will help to improve the concept of the organ structure and to understand how the interrelations of the tissues in them, as a whole, form the integrity of the body. A well grounded, detailed tissue classification is necessary for pathology and clinic. It will also make the study and teaching of morphology more precise for future human and veterinarian medics.

Key words: mammals, tissue, classification.

The aspiration for a more accurate classification of the diversity of cell communities in the organism is aimed at a better study of their structural and functional characteristics and is underlying the attempts for their precise classification as every such effort reflects the level of achievement of scientific knowledge of the time it has been attempted. Retrospection on this matter confirms that.

After anatomist Bichat (1801 — who gives 28 basic tissues) and Mayer (1819 — respectively 19), the morphologists Leydig [3] and Kölliker [2] reduced them and present arguments for the real existence of 4 basic tissues — epithelial, connective, muscle and nervous. This classification has survived until the present time almost 150 years. During that time research techniques and methods in the field of micro-

morphology developed greatly and this revealed a number of discrepancies, incompletenesses and ill-grounded reasoning of the pertinence of certain tissues to some of the basic tissues.

After Leydig and Kölliker a number of authors grounded classification charts in their efforts to determine the existence of other basic tissues and have indicated them.

Haeckel [1] advanced and defended the existence of 8 basic histological tissues in the organism — embryonic, covering, glandular, adminiculo-mechanicus, filling, blood, muscle, nervous. After him a number of scientists abroad expressed satisfaction from Leydig and Kölliker's classification. These authors [2, 6, 8, 24] did not list the genital tissue, on the one hand, and the blood, cartilage and bone tissues, on the other hand, under the epithelial tissue and respectively to the connective tissue. The accumulated structural and functional data had given sufficient and conclusive grounds for their opinion.

Similar dissatisfaction was shared by Bulgarian morphologists who substantiate the treatment of genital and blood tissues as a basic classified tissues [7, 9, 13, 14, 16, 17, 19, 20, 21, 22, 23, 25, 26].

Krustev [10, 11, 12] advanced extensive and conclusive arguments for the objective existence of 7 basic tissues — epithelial, connective, blood, adminiculo-mechanicus, muscle, nervous, genital. This is reverting to Haeckel but with contemporary arguments and reasons. He pointed out that even with the current achievement and knowledge as to the tissue characteristics we could hardly correct substantially his classification. The only change that can be made is for Haeckel's glandular tissue, which now could be classified as a kind tissue belonging to the epithelial tissue.

We accept the existence of 7 basic tissues as advanced and argued by Krustev. The aim of the current article is an attempt to exemplify the tissues (Table 1) under each basic category in more detail in accordance with accepted Latin terminology as per *Nomina histologica* [5]. The different kinds of tissues belonging to a basic tissue differentiate from one another having their own specific functional and structural features, at the same time keeping the specific characteristics of the basic tissue.

The genital tissue is presented by characteristic cell communities. These are generations of genital cells with unique qualities, on the one hand, and community of satellite cells which function, as a tropho-metabolic mediator and have protective and supportive function, on the other hand. Their epithelial-like arrangement is by no means grounds for affiliation to epithelial tissue.

Grounds for treating blood tissue as a separate basic tissue have existed quite objectively since Haeckel, Hadzhiolov, Vilee, Krustev, what is more they have been enriched over the years.

The cartilage and bone tissue are related to the adminiculo-mechanicus tissue. These are avascular, philogenetically connected with a dominating extracellular matrix and specific cell composition which are natural for each one of them. They both take part in the building of the skeleton, the limbs and the shaping of the body. In some parts of the body where there is mobility the cartilage tissue is present. Both tissues have clear structural and functional specific features.

Tissue variety in the organism is a fact and we need an up-to-date classification to reflect it. This will help to improve the picture of organ structure and it will enable us to understand their integrity in the organism. This classification is necessary and can also come to the aid of pathological and clinical subjects. In addition it will make the teaching and study of morphology science more precise for the future human and veterinarian medics.

Tissue classification

Table 1

Basic tissue	Kind tissue	Subdivision tissue	Variety tissue	Type tissue
1.	1.1.	1.1.1.	1.1.1.1.	1.1.1.1.1.

1. TEXTUS EPITHELIALIS (EPITHELIUM)

1.1. Epithelium superficiale

1.1.1. Epithelium simplex

1.1.1.1. Epithelium simplex squamosum

1.1.1.1.1. Endothelium

1.1.1.1.2. Mesothelium

1.1.1.1.3. Epithelium respiratorium

1.1.1.2. Epithelium simplex cuboideum

1.1.1.3. Epithelium simplex columnare

1.1.1.4. Epithelium pseudostratificatum

1.1.2. Epithelium stratificatum

1.1.2.1. Epithelium stratificatum squamosum

1.1.2.1.1. Epithelium stratificatum squamosum noncornificatum

1.1.2.1.2. Epithelium stratificatum squamosum cornificatum

1.1.2.2. Epithelium stratificatum cuboideum

1.1.2.3. Epithelium stratificatum columnare

1.1.2.4. Epithelium transitionale (Urothelium)

1.2. Epithelium glandulare

1.3. Epithelium sensorium

1.4. Epithelium pigmentosum

2. TEXTUS CONNECTIVUS

2.1. Textus connectivus embryonalis

2.1.1. Mesenchyma

2.1.2. Textus connectivus mucosus

2.2. Textus connectivus fibrosus

2.2.1. Textus connectivus collagenosus laxus

2.2.2. Textus connectivus fibrosus compactus

2.2.2.1. Textus connectivus collagenosus compactus irregularis

2.2.2.2. Textus connectivus collagenosus compactus regularis

2.2.2.3. Textus connectivus compactus elasticus

2.3. Textus connectivus reticularis

2.4. Textus adiposus

2.4.1. Textus adiposus albus

2.4.2. Textus adiposus fuscus

2.5. Textus connectivus pigmentosus

3. TEXTUS ADMINICULO-MECHANICUS

3.1. Textus cartilagineus

3.1.1. Textus cartilagineus hyalinus

3.1.2. Textus cartilagineus elasticus

3.1.3. Textus cartilagineus collagenosus

3.2. Textus osseus

3.2.1. Textus osseus reticulofibrosus

3.2.2. Textus osseus lamellaris

4. TEXTUS SANGUINIS

5. TEXTUS MUSCULARIS

5.1. Textus muscularis nonstriatus

5.2. Textus muscularis striatus

5.2.1. Textus muscularis striatus skeletalis

5.2.2. Textus muscularis striatus cardiacus

6. TEXTUS NERVOSUS

7. TEXTUS GENITALIS

7.1. Textus genitalis masculinum

7.2. Textus genitalis femininum

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