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THE ROLE OF CHRONIC GASTRITIS AMONG PRECANCEROUS DISEASES OF THE STOMACH

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The purpose of the study is to statistically analyze the condition of the gastric mucosa affected by *Helicobacter pylori* in young people engaged in sports. Studies of chronic gastritis type B in student volunteers involved in sports. In 92% of cases, chronic gastritis were *Helicobacter pylori*-associated. Between the degree of contamination of the mucous membrane of *Helicobacter pylori* and the degree of leukocyte infiltration of the mucous membrane, the Pearson correlation coefficient r_{xy} is 0.935, the correlation is very strong, the determination coefficient is $D=r_{xy}^2=0.874$, the critical value of the correlation coefficient with a probability of 0.95–0.2732, the critical value of the correlation coefficient with a probability of 0.99–0.3511, comparing the correlation coefficient r_{xy} with a critical r_{cr} value for a significance of 0.95– $r_{xy}>r_{cr}$, comparing the correlation coefficient r_{xy} with a critical r_{cr} value for a significance of 0.99– $r_{xy}>r_{cr}$ to the covariance coefficient is 521.641, this makes it possible to conclude a statistically significant dependence with a probability of 0.99. Thus, chronic atrophic *Helicobacter pylori*-associated gastritis is a common disease of young people engaged in sports, and is central among precancerous diseases of the stomach.

Key words: *Helicobacter pylori*, gastritis, leukocyte infiltration, gastric mucosa

The work is a fragment of the research project "Realization of health savings technologies in physical education in the conditions of European integration of Ukraine", state registration No. 0117U003236.

Recently, diseases of the digestive system occupy a leading place not only in Ukraine, but throughout the world (70%). Sports are often accompanied by the risk of chronic gastritis. It should be emphasized that excessive and irrational training loads can be one of the important factors in the occurrence of chronic gastritis, especially if they are combined with a violation of diet. The most common disease of gastroenterology is chronic gastritis. It takes the second place in athletes after cardiovascular diseases. Chronic gastritis can occur: type A (autoimmune), type B (bacterial) and type C (chemical reactive reflux gastritis) [12]. Chronic type B gastritis is an infectious inflammation of the gastric mucosa, the etiological factor of which is *Helicobacter pylori*. The latter is transmitted by the alimentary route and is present in 6 out of 10 people. Many people are infected with it since childhood [2]. Its pathogenic effect is the partial neutralization of the acidic environment of the stomach, destruction of the integumentary epithelium and the epithelium of its glands [15]. The leading factor in chronic gastritis is heredity, and the genetic tendency to the disease itself [5].

Athletes are quite vulnerable to this disease, because they are constantly under the influence of endogenous and exogenous factors that contribute to the defeat of *Helicobacter pylori* [9]. These include: violation of the principle of rational nutrition (irregular and large intervals between meals, especially during competitions, bad habits in the form of overeating, alcohol consumption, smoking, prolonged use of drugs, the presence of food additives in food, poor environmental situation, poor quality food) [7].

There is the problem of food allergies (type A gastritis is autoimmune), which is characterized by a change in the body's response to protein intake, the immune system takes for an antigen. An example of such a product can be meat, fish, eggs, which are integral components of sports nutrition [8]. Daily athlete's body is subject to great physical exertion; it may be one of the factors of gastritis. Excessive physical exertion inhibits the functioning of the stomach and leads to secretory insufficiency. Type C gastritis is of a chemical nature and may be caused by the use of certain non-steroidal anti-inflammatory drugs [11]. Thus caused, duodenogastric reflux leads to the defeat of the gastric mucosa, mainly antrum, bile acids, their salts, pancreatic enzymes, lysolecithin and other components of the duodenum [1].

Despite frequent medical examinations of an athlete, it is difficult to detect chronic gastritis in him. Athletes often hide the symptoms of chronic gastritis, enduring even pain, is one of its symptoms [10]. Most often, a person feels discomfort in the vertex or pylori-duodenal region, nausea after eating, heartburn, intestinal upset, existing yellow-white plaque on the tongue [6]. Diagnosis is carried out in the form of gastroscopy, gastro biopsy [13].

Elimination of chronic gastritis in athletes is carried out by clinical nutrition, vitaminization, a local effect on the gastric mucosa. It is recommended to refuse training.

The purpose of the study was to provide a statistical analysis of the state of the gastric mucosa of the affected *Helicobacter pylori* in young people involved in sports.

Materials and methods. The work put the results of the study of chronic gastritis of type B in students of our university volunteers. The study was attended by students of 1–4 courses aged 17 to 25 years, only 25 people. Among the latter were 13 men and 12 women. In them, by agreement, gastrobiopsies were taken in the endoscopy room of the regional hospital for further study. Ethics and bioethics were respected.

Ethics Commission of the Petro Mohyla Black Sea National University noted that the study was carried out without violations by the students studied. The latter were fully aware of the methods and scope of the study. The study has been conducted voluntarily and anonymously in accordance with the requirements and standards, model regulations on ethics issues of the Ministry of Health of Ukraine No. 690 of September 23, 2009.

The colonization of *Helicobacter pylori* infection to the condition of the gastric mucosa was studied on semi-thin sections made of epoxy blocks (EPON 812). Gastrobiopsies of the gastric mucosa for the study were taken from the pyloric region of the lesser curvature and body of the stomach.

The fixative was a 10% neutral formalin solution or 4% cold glutaraldehyde solution in phosphate buffer at pH 7.4. The quality assessment of the obtained samples was carried out using a stereoscopic microscope. After a leak in the epoxy resin, the tissue blocks were placed in a capsule filled with resin, where the material was polymerized gradually at a temperature of 35°, 45° and 60°C - 24 hours each.

With paraffin or epoxy units of different topografoanatomic parts of the gastric mucosa in a microtome MPS-2 received slices, which were placed in a tray for slices and stained with haematoxylin and eosin and toluidine blue (to *Helicobacter infection pylori* study) by conventional schemes and placed in Canada balsam.

In the remaining stained sections, except for the epithelial components, the dye allows to detect the bacteria *Helicobacter pylori*.

When establishing the forms of chronic gastritis, classification of chronic gastritis, adopted at the 9th International Congress of Gastroenterologists in Sydney (1990). The following morphological forms of chronic gastritis were distinguished:

- 1) by etiology: an autoimmune associated with pyloric helicobacterium (HP); special form (eosinophilic, granulomatous);
- 3) according to the degree of morphological signs: no changes; flat erosive; atrophic; hyperplastic;
- 4) the nature of gastric secretion: with preserved or increased secretion; with secretory insufficiency.

To quantify the degree of contamination of the gastric mucosa of *Helicobacter pylori*, bacteria were counted in a field of view $\times 600$. There are weak (up to 20 bacteria), moderate (up to 50 bacteria) and high (more than 50 bacteria) degree of contamination. In this field of view, a semi-quantitative assessment of the degree of leukocyte infiltration of the gastric mucosa was also performed. When rare disseminated polymorphonuclear leukocytes were found in inflammatory infiltrates and in the layer of pathogenic epithelium, the degree of leukocyte infiltration was assessed as poorly expressed and, in the form of fields, as expressed.

The results obtained from morphometric studies were statistically processed using standard methods of variation statistics. The significance of differences in the average compared indicators was evaluated by the criteria (t) of the Student. The difference between comparable values was considered significant if the permissible error (p) was less than 0.05.

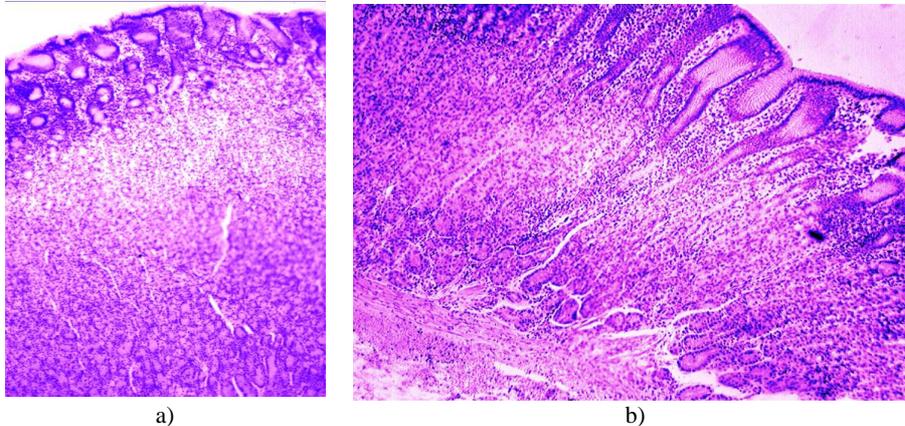


Fig.1: a) Superficial gastritis. Coloring hematoxylin-eosin. Mag. 180; b) Initial atrophic gastritis. Inflammatory infiltration is common below the foveolar layer. Coloring hematoxylin-eosin. Mag. 180.

Results of the study and their discussion. In 92% of chronic gastritis were *Helicobacter pylori*-associated, among them one form or another prevailed.

Mainly superficial gastritis (fig. 1a), the initial atrophic gastritis (fig. 1b) were found in the body of the stomach.

In other parts of the stomach, pronounced atrophic gastritis (fig. 2a) prevailed, with varying degrees of severity in the pyloric region being $95.2 \pm 4.1\%$, in the minor curvature $88.3 \pm 6.2\%$ and in the body

58.8±8.5% of all observations. The expressed forms in the listed departments respectively amounted to 42.1±8.6%; 32.4±8.1%; 41.2±8.6%.

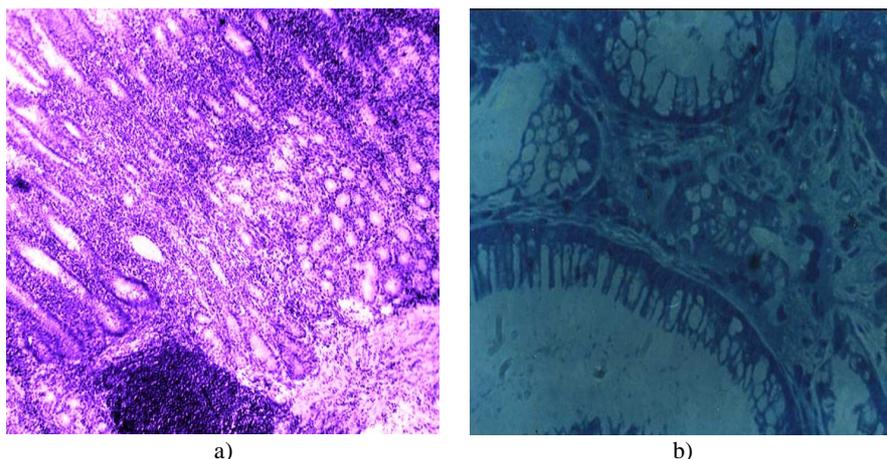


Fig.2: a) Pronounced atrophic gastritis. Atrophy of the glands. Lymphoid accumulations in the form of a follicle. Coloring hematoxylin-eosin. Mag. 180; b) Helicobacter pylori bacteria in the gastric mucosa. Semi-thin cut. Staining toluidine blue. Mag. 600.

The bacteria *Helicobacter pylori* were located within the pathogenic epithelium on the tops of the ridges, their lateral surface and deep in the pits. Often they were introduced between epithelial cells, violating the integrity of their layer (fig. 2b).

At these sites, the number of polymorphonuclear leukocytes of varying severity, based on the rollers in the general infiltrate that has lympho-

plasmacytic character, varied in the degree of severity.

Bacteria were found in all parts of the stomach, but a high degree of seeding was more often observed in the mucous membrane of the pyloric department and the lesser curvature of the stomach, compared with the mucous walls of the body of the stomach (42.2 ± 9.1 and 16.0 ± 6.0 ; $p < 0.05$).

Conversely, a low degree of infection of *Helicobacter pylori* was more often in the mucous membrane of the walls of the body of the stomach, compared with the mucous membrane of the pyloric department and the lesser curvature of the stomach (41.0 ± 10.1 and 15.0 ± 6.1 ; $p < 0.05$). A moderate degree of dissemination of *Helicobacter pylori* of the gastric mucosa in all its parts was evenly distributed.

The intensity of leukocyte infiltrate correlates with the degree of seeding of *Helicobacter pylori* of the gastric mucosa (fig. 3–4).

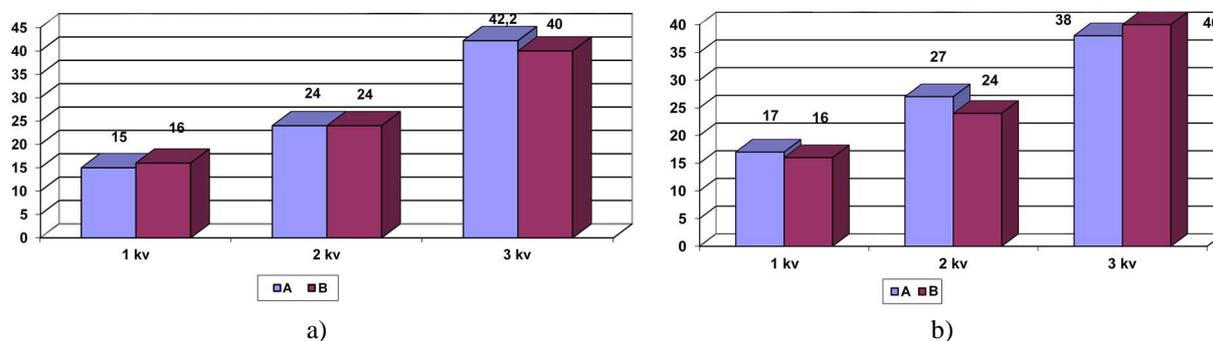


Fig. 3. a) Pyloric. A) The frequency of the various degrees of contamination of *Helicobacter pylori* of the gastric mucosa; B) Frequency of varying degrees of leukocyte infiltration: 1 kv–low, 2 kv–moderate, 3 kv–high degree in percent (%).

b) Small curvature. A) The frequency of the various degrees of contamination of *Helicobacter pylori* of the gastric mucosa; B) Frequency of varying degrees of leukocyte infiltration: 1 kv–low, 2 kv–moderate, 3 kv–high degree in percent (%).

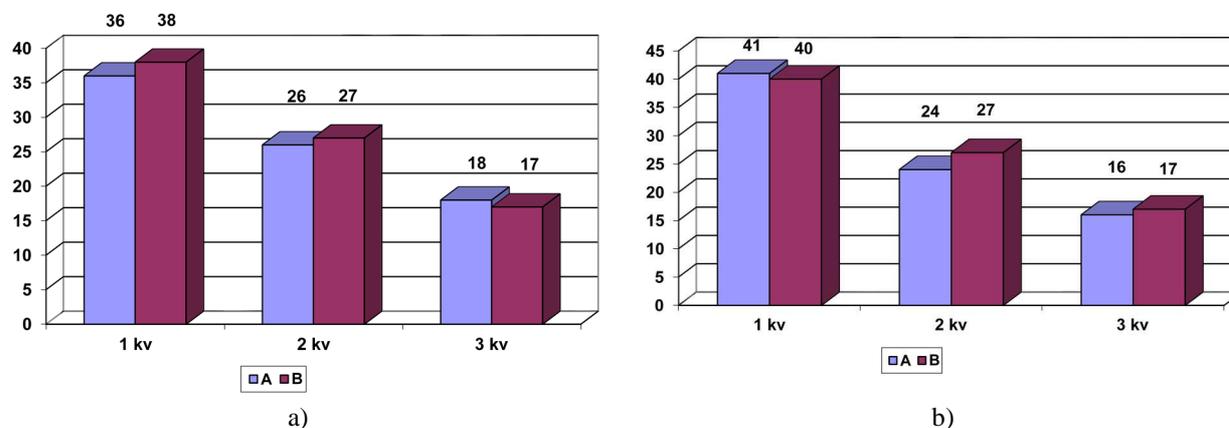


Fig. 4. a) The front wall of the body. A) The frequency of the various degrees of contamination of *Helicobacter pylori* of the gastric mucosa; B) Frequency of varying degrees of leukocyte infiltration: 1 kv–low, 2 kv–moderate, 3 kv–high degree in percent (%);

b) Rear wall of the body. A) The frequency of the various degrees of contamination of *Helicobacter pylori* of the gastric mucosa. B) Frequency of varying degrees of leukocyte infiltration: 1 kv–low, 2 kv–moderate, 3 kv–high degree in percent (%).

A decrease in the degree of bacterial contamination of the gastric mucosa from the pyloric region and the lesser curvature to the body walls was revealed. The degree of leukocyte infiltration decreases with a decrease in bacterial contamination.

Between the degree of contamination of the mucous membrane of *Helicobacter pylori* and the degree of leukocyte infiltration of the mucous membrane, the Pearson correlation coefficient r_{xy} is 0.935, the correlation is very strong, the determination coefficient is $D=r_{xy}^2=0.874$, the critical value of the correlation coefficient with a probability of 0.95–0.2732, the critical value of the correlation coefficient with a probability of 0.99–0.3511, comparing the correlation coefficient r_{xy} with a critical r_{cr} value for a significance of 0.95– $r_{xy} > r_{cr}$, comparing the correlation coefficient r_{xy} with a critical r_{cr} value for a significance of 0.99– $r_{xy} > r_{cr}$ to the covariance coefficient is 521.641, this makes it possible to conclude a statistically significant dependence with a probability of 0.99.

We consider it expedient, in discussing the results of our own research, to make a short theoretical discussion of this problem on the material of literary sources.

The central place among the pretumor diseases of the stomach is assigned to chronic gastritis, against the background of which and in connection with which precancerous changes occur [3]. One of the etiological factors of chronic gastritis, peptic ulcer and gastric cancer is *Helicobacter pylori*. According to the recommendations of the WHO special committee, we distinguish between precancerous conditions and precancerous changes. Precancerous conditions are diseases that increase the risk of cancer. But since 1994, *Helicobacter pylori* infection has been included in precancerous conditions [14].

Chronic gastritis is often found, especially among the population of young and working age, and represents an independent disease, or creates a background against which other diseases of the stomach develop, or accompanies them. A study by epidemiologists showed that gastric cancer in *Helicobacter pylori* infected people is more common than in uninfected [4].

Cellular update is regulated on the basis of negative feedback on the loss of part of the population. It is responsible for the increased neoplasm of cells and the acceleration of their migration. The reasons for reducing the population of epithelial cells can be their death on the spot and desquamation in the stomach cavity. As chronic gastritis progresses, more and more cells become in the S-phase, they even reach the tops of the rollers and can come into contact with carcinogens from the stomach cavity. *Helicobacter pylori* have the ability to stimulate cell renewal directly and by stimulating lymphocytes to synthesize relevant agents. In addition, *Helicobacter* gastritis usually leads to hypergastrinemia, which increases the proliferation of the epithelium of the stomach.

In countries with a high risk of gastric cancer, the impression of the *Helicobacter pylori* epithelium of the gastric mucosa occurs already in early childhood, and this suggests that a long-term infection may be the cause of the progression of chronic gastritis to gastric cancer [7].

Conclusion

In the gastric mucosa, pronounced forms of chronic atrophic gastritis associated with HP were found, respectively, 92% of cases. The degree of bacterial contamination correlates with the degree of leukocyte infiltration of the gastric mucosa. Chronic atrophic *Helicobacter pylori*-associated gastritis is a common disease of people at a young age involved in sports, and is central to pretumor diseases of the stomach.

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Реферати

РОЛЬ ХРОНІЧНОГО ГАСТРИТУ СЕРЕД ПЕРЕДРАКОВИХ ЗАХВОРЮВАНЬ ШЛУНКА

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Метою дослідження є статистичний аналіз стану слизової шлунка, враженого *Helicobacter pylori*, у молодих людей, які займаються спортом. Проведені дослідження хронічного гастриту типу В у студентів-добровольців, які займаються спортом. У 92% хронічні гастрити були *Helicobacter pylori*-асоційовані. Між ступенем обсіменіння слизової оболонки *Helicobacter pylori* і ступенем лейкоцитарної інфільтрації слизової оболонки коефіцієнт кореляції Пірсона $r_{xy} = 0,935$, тіснота зв'язку – дуже сильна, коефіцієнт детермінації $D = r_{xy}^2 = 0,874$, критичне значення коефіцієнта кореляції з вірогідністю 0,95–0,2732, критичне значення коефіцієнта кореляції з вірогідністю 0,99–0,3511, порівнюючи коефіцієнт кореляції r_{xy} з критичним значенням r_{cr} для значущості $0,95 - r_{xy} > r_{cr}$, порівнюючи коефіцієнт кореляції r_{xy} з критичним значенням r_{cr} для значущості $0,99 - r_{xy} > r_{cr}$. до коефіцієнта коваріації становить 521,641, це дозволяє зробити висновок про статистично значущу залежність з імовірністю 0,99.

Таким чином, хронічний атрофічний гастрит, асоційований з *Helicobacter pylori*, є поширеним захворюванням молодих людей, що займаються спортом, і є центральним серед передракових захворювань шлунку.

Ключові слова: *Helicobacter pylori*, гастрит, лейкоцитарна інфільтрація, слизова оболонка шлунка.
Стаття надійшла 30.09.2019 р.

РОЛЬ ХРОНИЧЕСКОГО ГАСТРИТА СРЕДИ ПРЕДРАКОВЫХ ЗАБОЛЕВАНИЙ ЖЕЛУДКА

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Целью работы является статистический анализ состояния слизистой оболочки желудка пораженной *Helicobacter pylori* у молодых людей, которые занимаются спортом. Проведены исследования хронического гастрита типа В у студентов-добровольцев, которые занимаются спортом. В 92% хронические гастриты были *Helicobacter pylori*-ассоциированные. Между степенью обсеменения слизистой оболочки *Helicobacter pylori* и степенью лейкоцитарной инфильтрации слизистой оболочки коэффициент корреляции Пирсона

$r_{xy} = 0,935$, плотность связи – очень сильная, коэффициент детерминации $D = r_{xy}^2 = 0,874$, критическое значение коэффициента корреляции с вероятностью 0,95–0,2732, критическое значение коэффициента корреляции с вероятностью 0,99–0,3511, сравнимая коэффициент корреляции r_{xy} с критическим значением r_{cr} для значимости $0,95 - r_{xy} > r_{cr}$, сравнимая коэффициент корреляции r_{xy} с критическим значением r_{cr} для значимости $0,99 - r_{xy} > r_{cr}$. к коэффициенту ковариации составляет 521,641, это позволяет сделать вывод о существовании статистически значимой зависимости с вероятностью 0,99.

Таким образом хронический атрофический *Helicobacter pylori*-ассоциированный гастрит является распространённым заболеванием людей в молодом возрасте, которые занимаются спортом, и занимает центральное место среди предопухолевых заболеваний желудка.

Ключевые слова: *Helicobacter pylori*, гастрит, лейкоцитарная инфильтрация, слизистая оболочка желудка.
Рецензент Старченко І.І.

DOI 10.26724/2079-8334-2020-3-73-242-247

UDC 616.314.17-008.1-02.001.57:(615.356+546.27):599.323.4

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STUDY ON THE EFFECT OF THE VITAMIN AND MINERAL COMPLEX CONTAINING ZINC L-ASPARTATE ON THE PERIODONTAL CONDITION OF RATS IN THE PRESENCE OF PERIODONTITIS MODELING

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The purpose of the study was to study the effect of the vitamin and mineral complex containing zinc L-aspartate on the state of the periodontal tissues of rats under conditions of modeling periodontitis using exogenous collagenase. The vitamin and mineral complex containing zinc L-aspartate had a positive effect, to a greater extent, on the periodontal bone tissue. The complex has shown periodontal protection, anti-inflammatory, antioxidant properties.

Key words: zinc L-aspartate, periodontitis modeling, collagenase, collagen, glycosaminoglycans, gums, periodontal bone tissue, rats.

The study is a fragment of the research project "The effect of hypoxia on the processes of collagen formation and mineralization in models of dental pathology and correction of these disorders", state registration No. 0118U006963.

Extracellular matrix (ECM) of the connective tissue is defined by a complex system formed by multicellular structural macromolecules: proteoglycans, collagens, and elastins, which maintain its structural integrity. ECM consists of three essential components – a gelling medium, collagen and elastin fibers, and provides a rapid diffusion of substances and "construction" materials between blood and cells.