

PATHOGENESIS OF ATHEROSCLEROSIS: CURRENT VIEWS. REVIEW.**Shagulyamova K.L.****Don A.N.****Turdaliev K.***Tashkent State Dental Institute, Tashkent, Uzbekistan**E-mail: andrey.don.60@inbox.ru <https://orcid.org/0000-0002-3140-2278>*

Abstract. *Atherosclerosis and associated cardiovascular diseases are still an urgent problem of modern medicine. The WHO Global Health Estimates show, that they are the leading cause of death and have been the leading cause of death globally for 20 years. Patterns of atherosclerosis pathogenesis are requiring further development, because understanding the mechanisms of disease development has one goal: to find effective treatment in terms of targeting important parts of pathogenesis.*

Keywords: *atherosclerosis, pathogenesis, theories.*

Introduction. Researchers worldwide continue to consider atherosclerosis as a priority problem. The reason for this fact is that cardiovascular diseases associated with it, according to the WHO Global Health Estimates, are the first leading causes of death in the world. Also, heart and vascular diseases have continued to lead among the causes of death in the world's population for 20 years [1].

The economic component of this issue is very important, as cardiovascular disease usually affects people of a mature age. They have a great potential in terms of social opportunities. It may be added that, for the most part, these diseases, which lead to high mortality rates, are also responsible for the loss of many years of healthy life. Disability and mortality in this group of society have a negative effect on the human resources for economic development [2, 3].

In Uzbekistan, the problems of morbidity and mortality from cardiovascular disease were brought to the attention of the President of Uzbekistan, Sh.M. Mirziyoyev, at a videoconference held on 9 November 2021 on the troubling issues of morbidity and mortality from this pathology, which has reached a value of 53% of total mortality [3, 4].

In 2021, 174,500 people died in Uzbekistan. Of these, more than 60% died of diseases of the cardiovascular system. This is based on data from the State Statistics Committee [5]. The timeliness and relevance of researchers' attention to this topic are very clear.

The problems of etiopathogenesis of atherosclerosis demand in-depth scientific study, as understanding the current mechanisms of disease development has a single goal: the search for effective treatment in terms of targeting important links in pathogenesis. Scientific work in this area of medicine worldwide is very active and varied, as is the heated discussions on the various mechanisms of the atherosclerotic process [6, 7, 8, 9, 10, 11, 12, 13].

Based on the aforesaid, it seemed important and hopefully useful for the interested reader to describe the current views on the pathogenesis of atherosclerosis, using the literature of recent years.

Materials and methods.

The material for this article is the numerous and various scientific papers, posted in the open access of a large number of Internet resources of scientific platforms, journals, collections, monographs. An analytical review of these scientific papers is presented in this article.

Results and discussion.

Turning to the main purpose of the article, to describe the current views, theories, hypotheses of atherosclerosis pathogenesis, it is necessary to briefly describe the state of the issue in the historical aspect. This research path has its anniversary dates. For example, in medical circles, it was celebrated the 100-th anniversary of the cholesterol or infiltration theory of atherosclerosis, which is considered to be one of the major, and has not lost its relevance to the present day. It was put forward by the outstanding scientist Anichkov N.N. in 1913, who in collaboration with Khalatov S.S., by adding pure cholesterol to the food of rabbits, caused atherosclerotic vascular changes [14, 15, 16, 17].

The suggested theory is by no means the only one among others, as scientists have not received answers to the questions, including those concerning the appearance of atherosclerosis in the absence of cholesterol. The main postulate of the cholesterol theory: "no cholesterol, no atherosclerosis" does not always work. Naturally, other hypotheses and theories about the development of this dangerous disease began to appear [18, 19, 20, 21, 22, 23].

To understand the content of each of the following theories, it can be noted that, as a rule, the name contains a key word that reflects the proposed mechanism of development. Thus, the lipid theory proposed by prominent pathologists R. Virchow in 1865 and the thrombosis theory proposed by K. Rokitansky in 1884 can be considered as milestones. No less significant is the theory of I.V. Davydovsky, who considered atherosclerosis not as a disease, but as a manifestation of age and, thus, a problem of gerontology [24, 25, 26, 27].

An interesting theory is that atherosclerosis, on the other hand, is a childhood disease, that manifests itself at a later age. Proponents of this theory have shown, that the first signs of atherosclerosis in children's blood vessels appear before the age of 10, and by the age of 13-15 atherosclerotic plaques have formed [28, 29].

To this day, it is generally accepted, that the main cause of atherosclerosis and associated cardiovascular diseases is dyslipidemia [30, 31,], which leads to impaired liver function, which, in turn, leads to atherogenic dyslipidemia, which is a classic "vicious pathological circle". [32, 33].

On the point about modern attitudes. What does contemporary science have to offer? The answer to this question is that each of the theories, both those articulated in historical perspective and those not mentioned but still in existence today, has received further impetus for research in depth and breadth, through the emergence of new and diverse

methods and tools for scientific development of issues, including at the molecular, atomic and nanolevels [34].

The introduction of the highest digital capabilities in the research field can be regarded as a technological advance in the study of the etiology and pathogenesis of atherosclerosis [35].

The current moment is characterized by the fact, that there are such theories as lipid, in the new version presented as the pathology of essential polyenic fatty acids [36], endothelial damage [37], inflammatory [38, 39], oxidative stress [40,41], infectious [42, 43], monoclonal, metabolic [44], hormonal, viral, chlamydial [45, 46], genetic [47, 48], cytokine [49].

At the same time, the comments, that the wide variety of theories is due to the fact, that none of them fully explains the contradictions, that are opening: the standard morphology of the atherosclerotic process regardless of the type of dyslipidemia, the focality of the event, the appearance of atherosclerosis in normal lipid metabolism parameters, subendothelial location of atherosclerotic plaques and others seem welcome within the discussion of the data, obtained from the search.

Another feature of the existing theories of atherosclerosis I would like to highlight from the philosophical point of view of the relationship between the general, the whole and the particular, the individual, the relationship between the organism as a whole and in organ parts. If we remember, that atherosclerosis pathogenesis can be considered through the prism of the integrity of the whole organism, with all the variety of systems and mechanisms clearly working in harmonic interaction, a certain blurring of boundaries between the theories under consideration becomes understandable [50, 51].

Thus, for example, if one refers to the rather common inflammatory theory, its consolidation with the immune, or more precisely, autoimmune theory becomes obvious. The different variants of lipid metabolism disorders are closely related to changes in the liver. The metabolic theory is closely related to metabolism. The involvement of the neuroendocrine system in all this is legitimately uncontroversial.

Conclusion.

This series of examples could go on for a very long time. To conclude this part of the article, I would like to mention the biotechnologies for studying the human genome, which open up almost limitless horizons for studying, not only atherosclerosis, but all existing diseases in general, bearing in mind the genetic determinism of the existence of the human body itself, its cells and tissues [52, 53, 54].

This review of the literature is not intended to be complete in the field, as it is likely that the world's storehouse of knowledge on this complex and interesting disease, atherosclerosis, is being further enriched at this point in time.

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