9. MOLECULAR-GENETIC AND ENVIRONMENTAL MECHANISMS OF MYOPIA

Author: Moldovanu Mirela

Scientific advisor: Capcelea Svetlana, MD, PhD, Associate Professor, Department of Molecular Biology and Human Genetics, *Nicolae Testemitanu* State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

Introduction. Myopia is a multifactorial pathology that causes the decrease or loss of vision, in most cases the elongation of the longitudinal axis of the eyeball is involved. From an etiological point of view, numerous factors are involved in the appearance and development of myopia: genetic, constitutional, environmental, lifestyle, external factors. Pathogenetically, different molecules are involved that participate in the formation of structures that ensure the normal anatomy and proper functioning of the organ of vision.

Aim of study. Myopia is an important global public health and socioeconomic problem. According to a number of more than 100 studies on the prevalence of myopia, in 2020 there were 28% of registered cases of myopia globally and 4% of cases of high myopia. These numbers continue to grow annually, including the cases of myopia detected at a young age, and definitive treatments for this pathology do not exist, even surgical interventions have different recurrence rates.

Methods and materials. This work was created based on the review of specialized literature, using books and articles published in electronic sources recognized by the international medical community, such as: NCBI, PubMed, GeneCards, OMIM.

Results. According to studies, there are more than 200 genes involved in the occurrence and development of myopia. In some cases, the pathology appears isolated, in other cases it has a syndromic component. For example, the PAX-6 protein, encoded by the homonymous gene, is a regulator of gene transcription and is indispensable for the development of neural tissues, especially of the eye, and mutations in this gene are involved in the development of non-syndromic myopia, according to some studies. At the same time, in recent years, the topic of epigenetic changes is brought up more and more frequently. These can be significantly influenced by environmental factors, are time-dependent and have tissue specificity, all of which complicate the study of epigenetic characteristics, since myopia often appears in childhood and adolescence and it is practically impossible to obtain eye tissues at these ages.

Conclusion. Myopia is a pathology known for a long time and by many people, but most often it does not have a single and concrete cause. If in the case of syndromic myopia, it can be assumed antenatally due to the detection of certain syndromes during genetic testing, then in the case of epigenetic changes, determined by environmental factors and lifestyle, it cannot be precociously predicted. However, in the case of an emmetropic child in childhood and early adolescence and without myopic parents, reducing the time spent on activities that require close visual work, including the use of gadgets, as well as increasing the duration of outdoor activities, could be the first and simplest advice to delay the onset of myopia as much as possible and to minimize the risk of its rapid worsening and its complications in case of detection.