SMALL NON-CODING RNA AS BIOMARKERS IN OSTEOARTHRITIS

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Potential biomarkers associated with osteoarthritis are small non-coding RNA (microRNA). MicroRNAs that characterize joint tissue disorders during osteoarthritis are miR-140, miR-22, miR-103, miR-25, miR-337, and miR-29a. Changes in the expression of circulating microRNAs are associated with the development of severe forms of osteoarthritis (miR-454, miR-885-5p, miR-27b, miR-146a, let-7e).

Keywords: microRNA, synovial fluid, biomarker, osteoarthritis, severity.

Osteoarthritis is a degenerative-dystrophic joint disease, the main manifestations of which are the destruction of cartilage and the formation of osteophytes. Deforming joint diseases are widespread and occupy a leading position among all joint pathologies, leading to early disability and reduced quality of life of patients. Amplifying adverse effects of urban environment on the human body contributed to the increasing incidence of osteoarthritis. In this regard, the study of osteoarthritis requires more detailed research into environmental risk factors of the disease, mechanisms of its development and the search for new methods of early diagnosis.

Osteoarthritis manifests itself primarily as a molecular disorder, followed by anatomical and physiological changes. Potential biomarkers associated with osteoarthritis are small non-coding RNA (microRNA).

MicroRNAs play a central role in various physiological processes (cell proliferation, metabolism, apoptosis). Deregulation of microRNAs is related to pathological conditions. Biomarkers are usually considered to be as products rather than causes of disease.

Prospective microRNAs characterizing disorders in joint tissues include circulating microRNA (in serum and plasma, synovial fluid, cerebrospinal fluid). Advantages of microRNAs such as biomarkers are: stability, high sensitivity and easy accessibility. The most studied microRNA involved in the development of osteoarthritis is microRNA-140, which is determined in the joint tissues. Negative correlation of miR-140 level in chondrocytes and synovial fluid in patients with osteoarthritis is exposed: it has been established that during chondrogenesis microRNA-140 increases its activity, but it is suppressed in chondrocytes during osteoarthritis. There are data on the inhibitory effect on interleukin-1β-induced degradation of cartilage due to the synergistic effect of miR-140 and 17-β-estradiol, inhibiting the synthesis of metalloproteinase, which provides a basis for a new approach to the therapy of menopausal osteoarthritis [1]. It was established that miR-22, miR-103, miR-25, miR-337, and miR-29a correlate with the body mass index, which suggests a potential role of these microRNAs in lipid metabolism and osteoarthritis development [2].

The promising trend in the use of microRNAs is using as indicators of the severity of joint degeneration. MiR-454, miR-885-5p miR-27b, miR-146a, etc., and let-7e microRNAs are associated with the development of severe forms of osteoarthritis [3]. The correlation was exposed between the increased expression level of let-7e microRNA and the level of high-density lipoproteins in blood serum, increased blood pressure, and the number of components of the metabolic syndrome. MicroRNA let-7e probably participates in the regulation of insulin activity [4]. Such a relationship between the metabolic syndrome and osteoarthritis is determined by the molecular genetic characteristics of the human body, as well as external factors.

For the final well-founded conclusions on the use of microRNAs as biomarkers in osteoarthritis, there is a need for further research into the basic differences in the severity of the disease based on changes in the level of microRNA expression.

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