an additional double bond in the F ring (often seen at Δ25(27)-), while a diagnostic loss of 158 Da could be interpreted by the presence of both a double bond (often seen at Δ25(27)-) and an OH group in the F ring (often seen at C-23).

RESEARCH PROGRESS AND PROSPECT OF MICRORNA IN PREVENTION AND TREATMENT OF OSTEONECROSIS OF THE FEMORAL HEAD

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[Abstract]MicroRNAs (miRNAs) belong to a non-protein coding family of small RNAs and are involved in the physiological and pathological processes of several diseases. They are approximately 22 nucleotides in length and have specific expressions in human tissues or cells. Among these, one group of miRNAs has been confirmed to play fundamental roles in gene regulation in various orthopedics diseases, such as bone tumors, osteoarthritis, and rheumatoid arthritis. The study of miRNAs in the osteonecrosis of the femoral head (ONFH) can improve the understanding of the pathogenesis of the disease. ONFH is an orthopedic disease that is the primary cause of disrupted blood supply to the femoral head and the main symptoms of bone and muscle dysfunction. Recent studies showed that miRNA played a major role in the regulation of the microcirculation of ONFH, damage and repair of blood vessels, local microcirculation dysfunction caused by other diseases, and apoptosis of bone cells. In this study, recent related research results of miRNA and ONFH were analyzed and summarized, and the prospective in the prevention and treatment of the disease was also discussed.

[Keyword]MicroRNA,Osteonecrosis of the femoral head ,Review,Research progress.

1.Introduction Cells contain a variety of non-coding RNAs. Among them, microRNA (miRNA) is considered to widely present in human tissues or cells. In addition, abundant gene regulatory molecules occur in a variety of cell organisms that can affect the output of many protein coding genes. The miRNA gene produces a micro-transcript of approximately 22 nucleotides that acts as an antisense factor for other RNAs [1,2].

Osteonecrosis of the femoral head (ONFH) is a common orthopedics disease, and if not treated in a timely manner, the femoral head would completely collapse in about 80% of the patients, which is rather challenging for the Department of Orthopedics[3].The pathogenesis of this disease includes increased intraosseous pressure, lipid metabolism disorder, intravascular coagulation, damage of microvascular endothelial cells, apoptosis of osteoblasts and osteocytes, and annihilation of the immune system[4]. Previous studies showed that miRNAs can modulate the physiology and pathology of the body through target genes, including cell proliferation, differentiation, apoptosis, and tissue development .

2.Prospects In recent years, miRNA has gradually become the focus of research in bone science. With an increasing number miRNA studies, miRNA has been speculated to have a promising prospect in orthopedic research owing to the specific structure of the femoral head tissues. The detection and analysis of miRNA opened a new research direction for the studies on pathogenesis, diagnostic methods, and treatment approaches of ONFH, thereby postulating the molecular biology and genetic mechanism underlying ONFH. As different pathological factors could lead to differential expressions of different miRNAs, the detection of miRNA could be used to identify the pathogenesis of different ONFH, rendering a targeted treatment and improving the cure rate of patients with ONFH. In addition, the present study proposed that the strategies for prevention and treatment of ONFH could be divided into 2 directions in the future: (1)silencing the highly expressed disease-related genes through miRNA or similar drugs;(2)silencing the highly expressed disease-related miRNA through anti-miRNA molecules. Therefore, miRNA could not only guide doctors in the clinical treatment but also aid in designing an efficient miRNA-targeting drug .

Presently, the studies on the prevention and treatment of ONFH are still at the preliminary stage. A majority of the target genes and regulatory pathways related to ONFH have not yet been elucidated. The application of miRNA technique in the treatment of ONFH is still at the experimental stage, and the precise role of miRNA in the occurrence, development, prognosis, and treatment of ONFH needs further studies. However, owing to the rapid development of miRNA detection technology and the biological characteristics based on the regulation of gene and chromosome level, novel approaches for the prevention and treatment of ONFH would be available in the future.

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