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New insights into exercise intervention for chronic diseases: by promoting α -Klotho expression

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Objective A new view is proposed for the mechanism of exercise prevention and improvement of chronic disease, that exercise may play a role by promoting the expression of anti-aging protein α -Klotho.

Methods By means of literature review and prospective analysis, this paper summarizes the research status of the application of exercise in the prevention and improvement of chronic diseases and the effects of anti-aging protein α -Klotho on chronic cardiovascular disease, diabetes, chronic kidney disease and cancer and other chronic diseases and the effect of exercise on the expression of plasma α -Klotho and its possible mechanism. The research prospects of exercise to interfere with chronic diseases by promoting the expression of α -Klotho are envisioned

Results (1) At present, the incidence and mortality of chronic diseases are high on a global scale. With the development of aging, chronic diseases will cause a serious economic burden and great waste of resources. Therefore, research on how to prevent and treat chronic diseases related to aging and lifestyle has become a top priority. Strong evidence suggests that exercise is an economical and efficient way to slow down the progress of some chronic diseases and to control symptoms such as diabetes, chronic kidney disease, heart failure, cardiovascular disease, and so on. However, we have not fully understood the cellular and molecular mechanisms underlying the effects of exercise. (2) α -Klotho is an anti-aging protein that regulates calcium and phosphorus metabolism, inhibits Wnt signaling, inhibits oxidative stress, and inhibits tumor and fibrosis. It has been proved to play an important role in the occurrence and development of chronic diseases such as chronic cardiovascular disease, diabetes, chronic kidney disease, tumor and other chronic diseases. (3) Exercise has been proved to be effective in promoting the expression of plasma α -Klotho protein, and the degree of response may be related to physical fitness and age. However, the mechanism of exercise to promote the expression of α -Klotho protein has not been reported. Combined with the existing research results, it is presumed that it may be related to DNA methylation, Peroxisome proliferator-activated receptor gamma (PPAR γ) signal transduction and vitamin D receptor.

Conclusions Exercise has gradually become an important way to intervene in chronic diseases, but the lack of understanding of its mechanism hinders the development of exercise in the field of prevention and treatment of chronic diseases. It is found that exercise can promote the expression of plasma α -Klotho protein, and the expression of α -Klotho protein will be beneficial to the prevention and improvement of chronic diseases such as chronic cardiovascular disease, diabetes, chronic kidney disease and tumor. Therefore, it is speculated that promoting the expression of α -Klotho may be one of the mechanisms of exercise prevention and improvement of chronic diseases, but there is still a research gap on the mechanism of exercise promoting α -Klotho expression. In addition, the current research on the expression of plasma α -Klotho is aimed at healthy people, and the effect of exercise on the expression of α -Klotho in chronic diseases, such as chronic cardiovascular disease, diabetes, chronic kidney disease, is also needed to be studied more. The study of the mechanism of exercise prevention and improvement of chronic diseases provides a theoretical basis for the selection and formulation of related exercise programs, and may provide new ideas for the development of new drugs for chronic diseases. Therefore, studies on exercise to interfere with chronic diseases by promoting the expression of α -Klotho have good research prospects.