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Effects of different exercise on autophagy and inflammation in visceral adipose tissue of obese

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Objective To compare the effectiveness of endurance exercise and resistance exercise in fat reduction, then to examine the impact of exercise on autophagy activity and inflammation response in visceral adipose tissue in obesity, finally to explore the relationship between autophagy and inflammation in adipose tissue after exercise.

Methods 42 obese mice were randomly divided into four groups as follows: high fat diet group (HC, n=9), normal diet group (NC, n=9), normal diet combined with endurance exercise intervention group (NE, n=12), and normal diet combined with resistance exercise intervention group (NR, n=12). NE and NR group conducted treadmill and ladder climbing exercise respectively for 8 weeks. Then to detect the gene and protein expression of autophagy, inflammation, ER stress and antioxidant markers using RT-PCR and WB, in addition, TEM and IHC were used to observe the autophagosome in visceral adipose tissue.

Results BW, Lee's index and BFI were significantly decreased in all three intervention groups, and there is a great decreasing in the two exercise group, but no difference between them. Atg5, Becn1 expression and LC3II/I were decreased significantly in NE and NR group compared with HC, meanwhile p62 expression were significantly increased. When compared with NC group, p62 expression were significantly increased in NE and not happened in NR group. Becn1 mRNA expression increased and p62 protein expression decreased significantly in NR group when compared with NE group. IL-1 β was decreased significantly in NC, NE and NR group compared with HC. In addition, IL-6 and IL-10 protein expression increased significantly both in NE and NR group. When compared with NC group, IL-6 and IL-10 protein expression increased and IL-1 β was decreased significantly both in NE and NR group except IL-6 protein expression in NR group. IL-6 increased and IL-10 decreased significantly in NR group when compared with NE group. Finally we found that IL-10 showed a negative correlation with almost every autophagy markers used in this study.

Conclusions The effectiveness of 8wks different exercise intervention had no difference in fat reduction. The autophagic activity of visceral adipose tissue was inhibited after exercise, especially after aerobic exercise. Autophagy and inflammation enjoy the same trend before and after exercise intervention in visceral adipose tissue in obesity, and the IL-10 is the most sensitive factor in reflecting the relationship between autophagy and inflammation.