

Trial reveals anti-inflammatory power of aerobic exercise in adults with obesity

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New research presented at this year's [European Congress on Obesity](#) (ECO) in Venice, Italy (12–15 May), reveals the anti-inflammatory power of moderate-to-vigorous aerobic exercise in adults living with the low-grade inflammation of obesity, shedding light on its potential to help prevent multiple metabolic diseases including type 2 diabetes and atherosclerosis (clogged arteries).

Excessive fat accumulation in [adipose tissue](#) (fat cells) leads to chronic low-grade inflammation, characterized by chronically elevated levels of damaging compounds known as proinflammatory cytokines, which contribute to the development of metabolic diseases.

"We know that exercise can reduce the risk of obesity-related complications and that new weight-loss drugs, like glucagon-like peptide-1 receptor agonists (GLP-1 RA), originally developed for diabetes, effectively reduce obesity and related disorders," explains lead author Professor Signe Torekov from the University of Copenhagen in Denmark.

"In this analysis, we wanted to investigate whether combining exercise with GLP-1 RA could reduce chronic low-grade inflammation in individuals with obesity, a process that underlies many [chronic diseases](#) and age-related conditions."

In the S-LITE randomized, double-blinded, placebo-controlled trial, 195 Danish adults (average age 42, 63% female,) with obesity (BMI 32–43 kg/m²) but no history of diabetes, followed an 8-week low-calorie diet (800kcal/day) and lost at least 5% of their body weight (an average weight loss of 13.1kg).

Participants were then randomized to one year of treatment with either

placebo (usual activity plus placebo), exercise (minimum 150/75 minutes of moderate/vigorous exercise per week as recommended by WHO guidelines plus placebo), [liraglutide](#) (3 mg/day plus usual activity) or a combination of both exercise and liraglutide treatment to maintain the weight loss.

Participants injected themselves with either placebo or liraglutide daily (depending on what group they were in).

The [exercise intervention](#) consisted of two supervised sessions per week of mostly [vigorous exercise](#) on spinning bikes (assessed by [heart rate](#)) and participants were encouraged to perform two individual sessions per week, to reach a minimum of 150 minutes/week of activity.

Blood samples were collected before and after the low-calorie diet and after the one year treatment period to measure changes in known drivers of chronic inflammation—[inflammatory cytokines](#) like interleukins (IL-2, IL-6, IL-8, IL-10, IFN- γ), and tumor necrosis factor alpha (TNF- α)

At one year, patients in the liraglutide only group lost on average an additional 0.7 kg; patients in the exercise group regained 2.0 kg; and participants in the placebo group regained about half of what they had lost (6.1 kg). However, participants in the combined exercise and liraglutide group lost an additional 3.4 kg on average.

Changes in inflammatory markers

After the low-calorie diet, TNF- α levels increased by on average 8.4%, and IL-10 levels increased by 11.7%. The other cytokines showed no significant changes after the dietary intervention. TNF- α is associated with apoptosis (cell death), and the authors speculate that the rapid decrease in weight leads to a transient increase in TNF- α as a marker of

stress.

By the end of the one year intervention period, the exercise group reduced IL-6 levels on average by 31.9%, and by 18.9% compared to placebo. Chronic elevated IL-6 are associated with cardiovascular diseases such as atherosclerosis and insulin resistance. The exercise group also reduced IFN- γ levels on average by 36.6%, and by 37.2% compared to placebo. IFN- γ in obesity is associated with insulin resistance.

The liraglutide and combination groups decreased IL-6 levels by on average 17.3% and 19.9%, respectively, over the intervention period, but did not differ significantly compared to placebo. However, there were no changes in IFN- γ in the placebo, liraglutide, or combination groups.

No significant differences were observed between the groups in the plasma concentrations of IL-2, IL-8, IL-10, and TNF- α .

"Our findings show that performing exercise according to guideline recommendations was the most effective strategy to reduce chronic low-grade inflammation," says Professor Torekov.

"Liraglutide treatment did not reduce inflammation more than placebo, and adding liraglutide to exercise did not reduce inflammation further. These findings emphasize the benefits of moderate-to-vigorous intensity physical activity in reducing the low-grade inflammation of obesity that could help prevent related metabolic diseases."

The drop-out rate was low. At one year, 41 of 49 randomized patients in the liraglutide group, 40 of 48 patients in the exercise group, 45 of 49 patients in the combination group, and 40 of 49 patients in the placebo group completed the study.

Provided by European Association for the Study of Obesity

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