ASSOCIATIONS BETWEEN METABOLIC ALTERATIONS AND CHANGES IN BODY COMPOSITION, VO2MAX AND STRENGTH IN MIDDLE-AGED TYPE 2 DIABETIC INDIVIDUALS AFTER COMBINED TRAINING.


Introduction

Obesity and Type 2 Diabetes are multifactorial chronic noncommunicable diseases, which promote metabolic changes leading to a decrease in the functional capacity of individuals. The practice of regular physical exercises can contribute to the treatment and prevention of these diseases. Through the use of lipidomics approach, the aim of this study is to analyze the metabolic and functional changes (body composition, VO2max and strength) seeking to find associations between them in middle-aged type 2 diabetic volunteers after 16 weeks of combined training.

Table 1. Association between pre and post functional changes and metabolites classes.

Results and Discussion

The sample consisted of 34 both sexes middle-aged (51.06 ± 3.94 years), sedentary individuals with overweight (BMI = 29.46 ± 0.58 kg/m²), randomized in two groups: Control Diabetic (CD, n=17) and Training Diabetic (TD, n=17). Functional assessments as the measure of weight, height, perimeters (hip, waist, and neck), 1 repetition maximal test for strength, treadmill tests for maximal oxygen uptake (VO2max) and blood collection were performed before and after 72h after the last training session. The CT was composed of approximately 40 minutes of RT (3 sets of 10 - 12 repetitions and 1 min rest between sets) followed by 35 minutes of TA (45 to 60% VO2max), 3 times a week for 16 weeks.

For mass-spectrometry-based lipidomics analyzes we used Orbitrap XL Hybrid Ion Trap-Orbitrap Mass Spectrometer LTQ spectrometer, at the Innovare laboratory - Faculty of Pharmaceutical Sciences, Unicamp.

After 16 weeks of CT, the subjects in TD significantly increased free fat mass (pre = 53.39 ± 10.66 kg; post = 54.60 ± 11.37 kg) and reduced fat mass (pre = 29.70 ± 6.85 kg; post = 28.61 ± 6.80 kg). They also increased maximum strength in leg press (pre = 190.75 ± 74.0 kg; post = 240.62 ± 84.88 kg), bench press (pre = 28.13 ± 12.89 kg; post = 35.21 ± 14.54 kg) and VO2max (pre = 22.02 ± 4.76 ml / kg.min post 25.22 ± 5.15 ml / kg.min) (p< 0.05). The CT promoted lipidic alterations (Figure 1), in which the classes of glycerophospholipids, sphingolipids, glycerolipids, and phosphosphingolipids showed some associations with functional and body composition changes (Table 1).

Conclusion

The CT promoted lipidic and functional changes in body composition, maximum strength and VO2max in middle-aged type 2 diabetic subjects. These changes were most associated with glycerophospholipids, sphingolipids and glycerolipids metabolism pathways.

Acknowledgment and References

I thank the PIBIC/CNPq (427999/2018-9) for the scholarship and FAPESP (2016/08751-3) for project financing.