Adipose tissue miRNA level variation through conjugated linoleic acid supplementation in diet-induced obese rats

Maryam Nazari1,4, Alishan Saberi2,4, Majid Karandish1,4, Mohammad Taha Jalali1,4

1 Food (Salt) Safety Research Center, School of Nutrition and Food Sciences, Semnan University of Medical Sciences, Iran
2 Department of Medical Genetics, Faculty of Medicine, Ahvaz Jundishapur University of Medical Sciences, Iran
3 Nutrition and Metabolic Diseases Research Center, Ahvaz Jundishapur University of Medical Sciences, Iran
4 Hyperlipidemia Research Center, Ahvaz Jundishapur University of Medical Sciences, Iran

A — research concept and design; B — collection and/or assembly of data; C — data analysis and interpretation;
D — writing the article; E — critical revision of the article; F — final approval of the article

Advances in Clinical and Experimental Medicine, ISSN 1899-5276 (print), ISSN 2457-2680 (online)

Abstract

Background. Conjugated linoleic acid (CLA), which is an octadecadienoic acid isomer, is believed to play different positive physiological roles, such as lowering body fat. Due to some reported side effects of CLA, like lipodystrophy and impaired glucose metabolism, it is important to establish its safety by understanding detailed molecular mechanisms. One of these mechanisms may be the role of this dietary agent in modifying the function and activity of microRNAs (miRNAs).

Objectives. The aim of the study was to investigate how adipocyte miR-27a and miR-143 expression may be influenced by CLA in obese rats.

Material and methods. In this study, 24 male Wistar rats were randomly divided into normal-fat diet (NFD) and high-fat diet (HFD) groups. After 8 weeks, the rats were weighed and half of the diet-induced obese rats were randomly selected to receive 500 mg CLA per 1 kg body weight for 4 weeks. At the end of this period, epididymal fat was isolated to investigate the expression level of miRNAs by real-time polymerase chain reaction (RT-PCR).

Results. After 12 weeks, the obese rats in the HFD group, compared with rats in the NFD group, demonstrated a significant decrease in the expression of miR-27a (p < 0.05) and a significant increase in the expression of miR-143 (p < 0.05). In the group which had received CLA for a 4-week period, these events were reversed. Moreover, the rats in this group gained less weight than other rats in HFD groups, although the difference was not statistically significant.

Conclusions. In conclusion, this study demonstrated that CLA, as an anti-obesity agent, may minimize abnormal changes in miRNA expression in obesity. This suggests a new pathway for weight loss; however, further studies are needed.

Key words: obesity, microRNA, high-fat diet, conjugated linoleic acid

Address for correspondence
Alishan Saberi
E-mail: saberi.a@ajums.ac.ir

Funding sources
The study was supported by Ahvaz Jundishapur University of Medical Sciences, Iran (grant No. JUMS 9394).

Conflict of interest
None declared

Acknowledgements
The authors would like to thank Dr. Azadeh Sakhi for her statistical advice.

Received on June 16, 2017
Reviewed on August 2, 2017
Accepted on July 24, 2018

DOI
10.17219/acem/93728

Copyright
© 2018 by Wroclaw Medical University
This is an article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc-nd/4.0/)