4-2016

The Impact of Depleting Dietary microRNA in a High-Fat Diet

Briley Moates  
*University of Nebraska-Lincoln*, briley.moates@huskers.unl.edu

Sonia Manca  
*University of Nebraska-Lincoln*, smanca2@unl.edu

Janos Zempleni  
*University of Nebraska-Lincoln*, jzempleni2@unl.edu

Follow this and additional works at: [http://digitalcommons.unl.edu/ucarereresearch](http://digitalcommons.unl.edu/ucarereresearch)  
Part of the [Molecular, Genetic, and Biochemical Nutrition Commons](http://digitalcommons.unl.edu/moleculargeneticandbiochemicalnutritioncommons)
The Impact of Depleting Dietary microRNA in a High-Fat Diet
Briley Moates, Sonia Manca, Janos Zempleni
Departments of Nutrition and Health Sciences and Animal Science, University of Nebraska-Lincoln

Introduction

- MicroRNAs (miRNAs) regulate genes in animals and plants and can be synthesized endogenously.

- In milk, miRNAs are encapsulated in exosomes. These vesicles protect miRNAs from degradation and facilitate cellular uptake by endocytosis.

- Bovine miRNAs have nucleotide sequences complementary to human gene transcripts and are able to regulate human genes.

Previous Studies

- Endogenous miRNA synthesis does not compensate for dietary miRNA depletion.

- Dietary depletion of dietary miRNAs reduces fecundity in mice (litter size, litters surviving to weaning).

- Depletion of dietary miRNAs reduces weight and body fat in mice.

Objectives

We tested the hypothesis that a high-fat diet would increase the difference in body weight between C57BL/6J mice provided dietary microRNA (Exo +) and mice which were fed the same diet depleted of microRNA (Exo-).

Methods

- 20 mice were fed 3.5 g once per day for seven weeks.

- Divided into four feeding groups:

Exo+, Fat | Exo-, Fat | Exo+, Normal | Exo-, Normal
---|---|---|---
L-Cysteine | 0.75 | L-Cysteine | 0.75
Choline Bitartrate (61.3% choline) | 0.62 | Choline Bitartrate (61.3% choline) | 0.62
Test-bub|y/without| equivalence | 0.09% | Test-bub|y/without| equivalence | 0.09%
Vitamin mix (AIN-93-VX) | 3.5 | Vitamin mix (AIN-93-VX) | 3.5
Mineral mix (AIN-93-MX) | 8.75 | Mineral mix (AIN-93-MX) | 8.75
Fiber | 10.5 | Fiber | 10.5
Dextrose cornstarch | 3.8 | Dextrose cornstarch | 3.8
Soybean oil (no additives) | 17.8 | Soybean oil (no additives) | 17.8
Normal/Soybe|nized Milk Powder 10% of milk: | 16.10 | Normal/Soybe|nized Milk Powder 10% of milk: | 16.10
Casein | 35.7 | Casein | 35.7
Cornstarch | 37.52 | Cornstarch | 37.52
Salt | 1.56 | Salt | 1.56
TOT | 210.02 | TOT | 210.02

Results

- A high-fat diet did not increase the difference between body weight of Exo+ and Exo- mice, when compared to mice consuming a normal, low-fat diet.

Conclusions

- The data demonstrate that depleting miRNAs from a high-fat diet does not impact the difference in body weight between Exo+ and Exo- subjects.

- Depleting dietary miRNAs from normal low-fat diets do result in differences in body weight, fat, fecundity, purine metabolism, and gut microbiome.

References
