SERVIZIO SANITARIO REGIONALE
Regione Emilia Romagna
Azienda Ospedaliera di Reggio Emilia

Arcispedale Santa Maria Nuova - IRCCS

SANTAMARIANUOVA
ARCISPEDALE | IRCCS | REGGIO EMILIA

Circulating miR146a and 486-5p are altered in obese children with and without non-alcoholic fatty liver disease (NAFLD) and correlate with abdominal fat and BM

L. Montanini[2], V.D. Patianna[1], C.Sartori[2], B. Predieri[3], P. Bruzzi[3], P. Lazzeroni[2], S. Merli[2], P. Bergamaschi[2], S. Bernasconi[2], L. Iughetti[3], M.E. Street[1]

[1] Dept. of Paediatrics, S. Maria Nuova Hospital and Research Institute, Reggio-Emilia, Italy
[2] Dept. of Paediatrics and Maternal Care, University Hospital of Parma, Parma, Italy
[3] Dept. Of Medical and Surgical Sciences of the Mother, Children and Adults, University of Modena and Reggio Emilia, Italy

Introduction

MicroRNAs (miRNA) are small non coding RNA molecules, key regulators of metabolic pathways. Obesity is characterized by many metabolic changes. Primarily insulin resistance is well known to occur. NAFLD is mainly seen as a complication of obesity. FOXO-1 is a key regulator in insulin signalling and in intracellular adipogenesis, and has been shown to be implicated in NAFLD. We previously identified a group of miRNAs as regulators of the FOXO-1 gene.

Aims

We aimed to assess in serum whether the regulation of miR-146a, a FOXO1 gene regulator, and miR-486 in addition, changed in obese subjects, and whether any changes were related with measurements of adiposity and indexes of insulin sensitivity. We investigated also possible relationships with the presence of NAFLD.

Materials and methods

Eighty-three obese children, with and without NAFLD were enrolled in the study (Table 1). Twenty-three healthy controls, comparable for age, sex and pubertal stage were used for comparison (Table 2).
NAFLD was diagnosed by liver ultrasound undertaken by a single operator.
Total RNA from serum was extracted using MirVana PARIS kit (Ambion, Austin, USA) following the manufacturer's protocol.
MiRNAs were quantified by TaqMan microRNA Assays and normalized with respect to miR-16 and miR-93, as housekeeping miRNAs.
dCts were normalized with respect to the pool of dCt controls of comparable age, sex and pubertal stage.
Relative gene expression was then presented as fold change (Log10).

Table 1: obese subjects

	NAFLD	Normal Liver
N.of Subjects	44	39
Males/Females	21/23 20 Prepubertal; 24 Pubertal	20/19 12 Prepubertal; 27 Pubertal
Age (yr)	11,37 ± 0,47	11,217 ± 0,49
BMISDS	3,28 ± 0,13	3,1 ± 0,12
Waist circumference/height	0,64 ±0,01	0,61 ± 0,01

Table 2: Normal-weight subjects

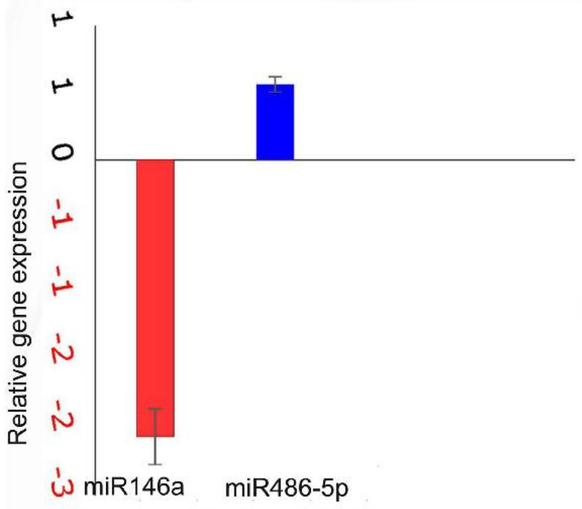
Number of subjects	23 (M:12, F:11)
Age	12,1 ± 1,3 yr
Sex	12F, 11 M
BMI SDS (Cole)	0,56 ± 0,66

Statistical analysis

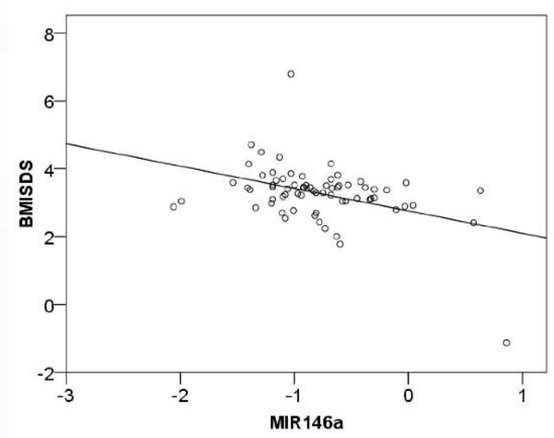
Standard statistical analysis was performed using statistical package SPSS 18.0 as appropriate. MiR146a and miR-486-5p serum content was similar in males and females, thus the data were analysed together.

Results

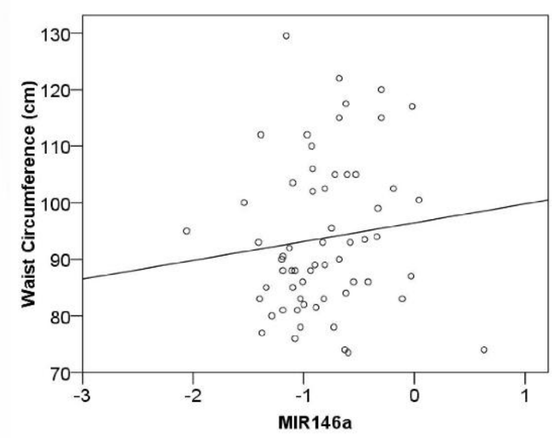
Obese subjects having NAFLD had a larger waist circumference (96.63±2.58 cm vs 88.58±1.87, p<0.05).



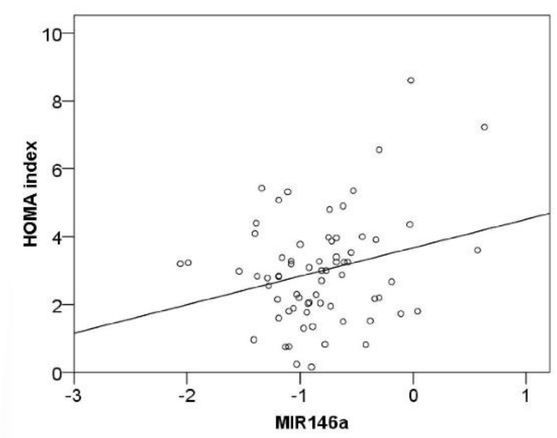
miR-146a and miR-486-5p relative gene expression in serum in obese subjects with and without NAFLD. Both miRNAs over-expressed in obese subjects with respect to controls.



Correlation between miRNA146a and BMISDS. R: -0.3; P=0.013



Correlation between miRNA146a and waist circumference (cm). R: 0.36; P=0.006



Correlation between miRNA146a the HOMA-IR index. R: 0.3; P=0.015

Conclusions

Both circulating miR-146a and miR486-5p show changes in obesity. MiR-146a showed clear relationships with BMISDS, and with parameters of distribution of adiposity and of insulin sensitivity (HOMA-IR).

DOI: 10.3252/pso.eu.54espe.2015