Insulin resistance and *miR-143/miR-145* relative expression profile is associated with dysregulation in the pathological adiposity setting in aging

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OBJECTIVE

Insulin resistance (IR) takes a crucial role in metabolism. Also, the presence of *microRNAs* was involved in metabolic control. Remarkably, circulating *miR-143* and *miR-145* have shown controversial results regarding women-metabolism in the aging process.
Our study aimed to evaluate the association of metabolic profile with the relative expression of circulating *miR-143* and *miR-145* in the insulin resistance pathological adiposity in the elderly women group.

MATERIALS & METHODS

We included 73 women, classified as young and senior (aged 20–39 and 40–59 years), by body fat % as lean and overweight (lean < 35% and overweight ≥ 35%), and insulin or non-insulin resistant by HOMA-IR.
We evaluated body fat storage using bioelectrical impedance. Biochemical markers by routine methods. Insulin and adiponectin-oligomers serum levels by the ELISA method.
Relative expression measures of *miR-143* and *miR-145* circulating levels (normalized with endogenous *miR-320a*) with the *TaqMan Advanced miRNA Assays system* and $2^{-\Delta CT}$ method, were assessed in association with clinical outputs.

RESULTS

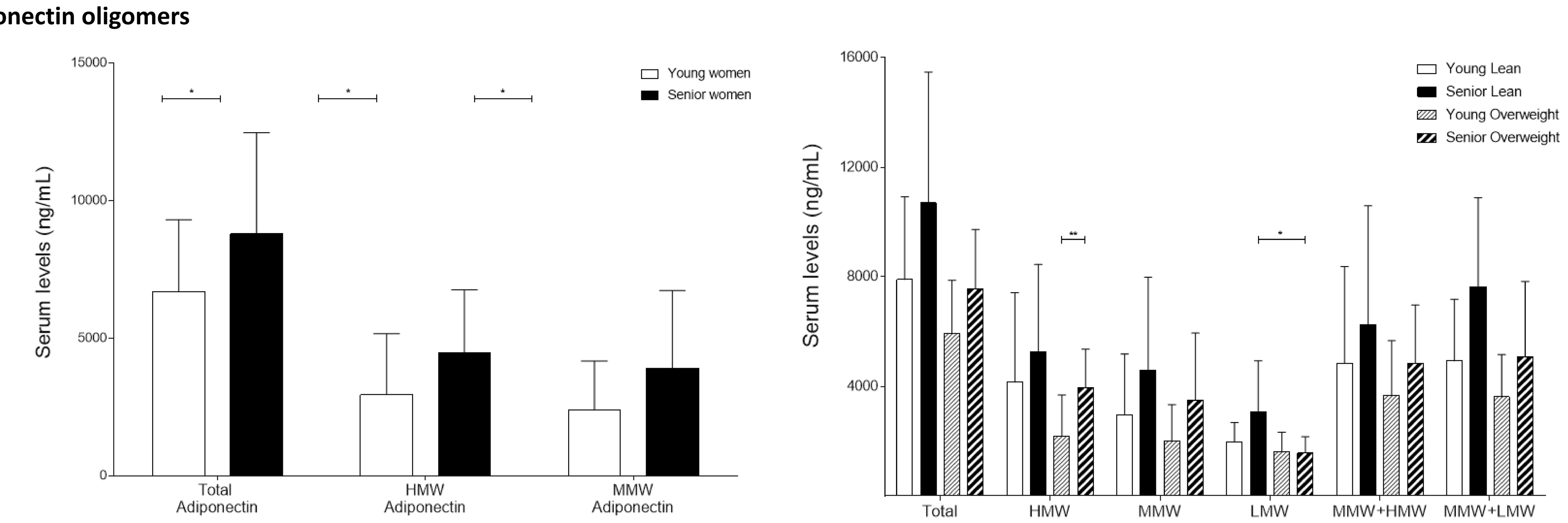
Adiponectin-oligomers were higher in seniors, parallel to lower *miR-145* relative expression [- **2.87-fold change]** *versus* young [See Fig. 1a,b].
* On the non-IR scenario, *miR-143* shows correlations with MMW+LMW-Adiponectin (*rho* = 0.394), insulin, HOMA indexes, and C3/C4 (*rho* = -0.614 to -0.388); on the IR scenario, with sCCL2 levels, WHR and ApoB/ApoA-1 (*rho* = -0.821 to 0.552) [See Table 2a].
* On the IR scenario, *miR-145* correlated with body adiposity, lipid profile, HOMA-AD, C3, and Total and LMW-Adiponectin (*rho* = -0.673 to 0.782) [See Table 2b].

Table 1. Clinical and demographic characteristics of study groups.

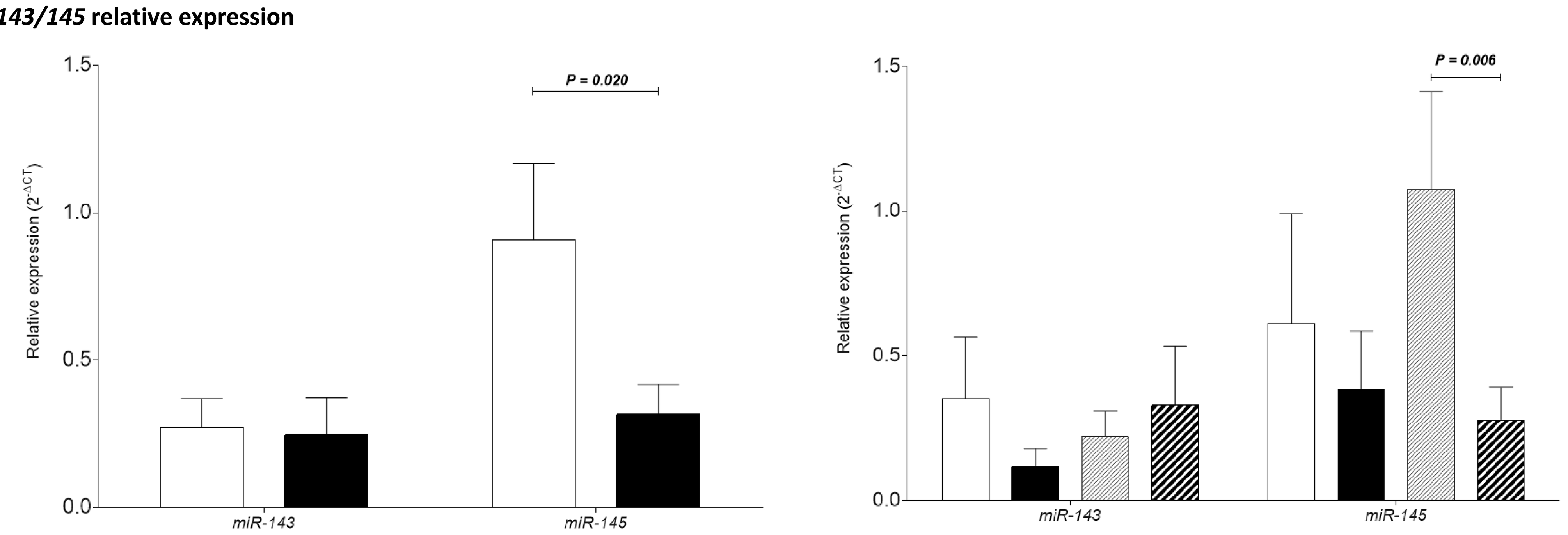
	Lean women		Overweight women		
	Young (n = 14)	Senior (n = 13)	Young (n = 25)	Senior (n = 31)	χ^2 *P*
Abdominal obesity (%)	14.3	30.8	80.0	95.2	**0.000**
Insulin resistance (%)	14.3	30.8	40.0	23.8	0.355
Dyslipidaemia (%)	0	15.4	48.0	42.9	**0.006**
Hypertriglyceridemia	42.9	30.8	50.0	52.4	0.622
Hypercholesterolaemia	7.1	16.7	12.0	14.3	0.891
Hypoalphalipoproteinemia	0	7.7	36.0	28.6	**0.031**
Hyperlipoproteinemia	0	15.4	12.0	4.8	0.400

Figure 1

a. Adiponectin oligomers



b. *miR-143/145* relative expression



RESULTS

Table 2. *miR-143* and *miR-145* relative expression correlations.

a.

	miR-143 relative expression ($2^{-\Delta CT}$)			
	Non-IR		With IR	
	rho	*P*	*rho*	*P*
QUICKI	0.540	0.001		
MMW+LMW-Adiponectin	0.394	0.042		
Insulin	-0.614	0.000		
HOMA-IR	-0.540	0.001		
HOMA-B	-0.560	0.001		
HOMA-AD	-0.471	0.007		
C3	-0.514	0.003		
C4	-0.388	0.046		
WHR			0.552	0.041
ApoB/ApoA-1			0.767	0.001
sCCL2			-0.821	0.023

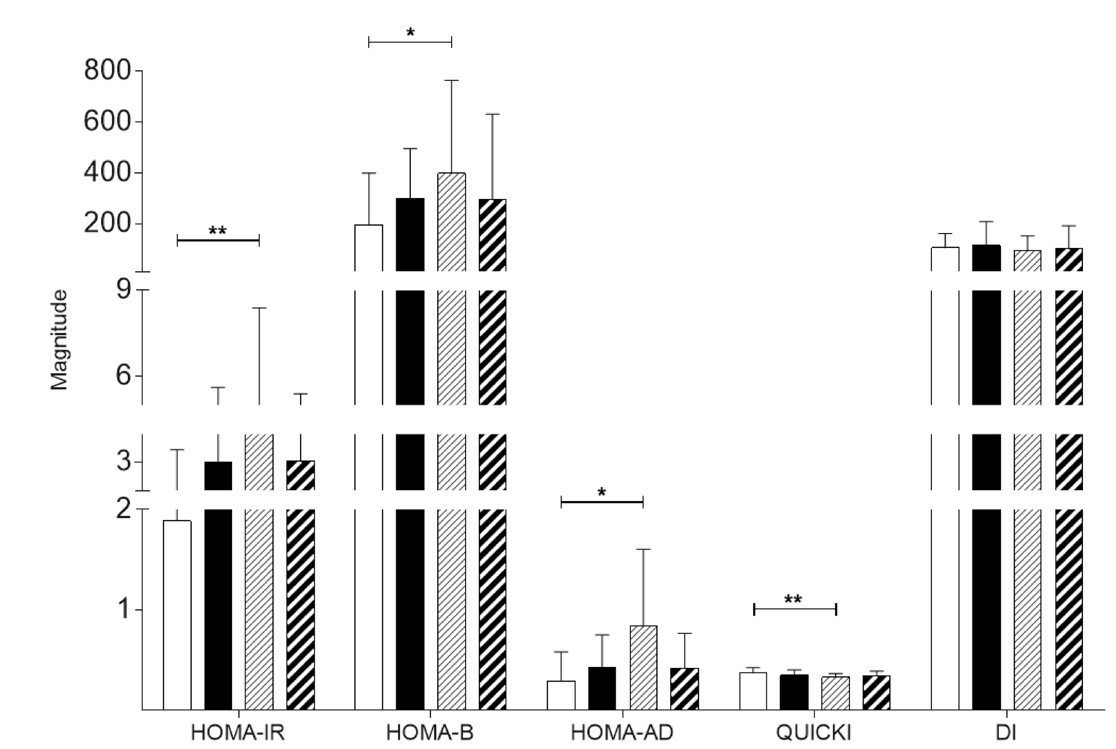
b.

	miR-145 relative expression ($2^{-\Delta CT}$)	
	With IR	
	rho	*P*
Systolic blood pressure	0.561	0.019
Body weight	0.540	0.021
Body mass index	0.622	0.006
Total body fat mass (%)	0.568	0.014
Total body fat mass (kg)	0.546	0.019
Trunk fat mass (kg)	0.547	0.023
Lower limbs fat mass (kg)	0.565	0.015
Upper limbs fat mass (kg)	0.593	0.009
Waist circumference	0.585	0.011
Waist-hip ratio	0.612	0.007
Body fat ratio	0.598	0.009
Waist to height ratio	0.581	0.011
Conicity index	0.494	0.037
Total abdominal	0.585	0.011
Abdominal volume index	0.622	0.006
Visceral adiposity index	0.588	0.017
Middle upper-arm circumference	0.664	0.003
Subscapular skinfold thickness	0.646	0.005
Suprailiac skinfold thickness	0.509	0.031
Triglycerides	0.537	0.026
VLDLc	0.537	0.026
TG/HDLc	0.537	0.026
HOMA-AD	0.782	0.004
C3	0.564	0.015
Total body non-fat mass (%)	-0.568	0.014
HDLc	-0.507	0.032
Total Adiponectin	-0.610	0.027
LMW-Adiponectin	-0.673	0.023

Study groups: non-IR n = 52, IR n = 21.

Figure 2

Metabolic indexes



CONCLUSION

The expression profiles of circulating *miR-143/miR-145* suggest a response to chronic metabolic dysregulation to exert roles in metabolism, on the respective non-IR and IR clinical scenarios, where adiponectin dysregulation is shown in the pathological corporal redistribution of fat mass and dyslipidemic phenotype in aging.

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