

## **Circulating Micrnas in Obese and Diabetic Patients. An update**

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### **Abstract**

microRNAs (miRNAs), short noncoding RNA sequences, regulate several biological processes as cell differentiation, proliferation and development, cell-to-cell communication, cell metabolism and apoptosis. miRNAs seem also regulate insulin signalling, immune-mediated inflammation, adipokine expression, adipogenesis, lipid metabolism, and food intake. miRNAs may have a role in molecular mechanisms linked to cellular pathways of some diseases, as viral infections, cancer, diabetes, obesity and cardiovascular disease. Dysregulation of several miRNAs involves different aspects of diabetic disease: glycaemic control, residual beta cell function, insulin secretion and sensitivity, micro- and macro-vascular complications as endothelial dysfunction, renal disease and retinopathy. The recent discovery of circulating miRNAs (c-miRNAs) easily detectable and measurable in plasma and other body fluids, led to the hypothesis of their potential role as disease indicators. Altered levels of several c-miRNAs were found to be linked to type 1 and type 2 diabetes, both at onset and in advanced disease. A lot of c-miRNAs are consistently dysregulated in diabetic patients and miR-126 was confirmed to be the most linked to pathways and development of type 1 and type 2 diabetes and their complications. Altered expression of other c-miRNAs correlates to obesity and its complications. Different levels of some c-miRNAs were found significantly associated with weight gain, but most of the data concern comorbidities and complications of obesity as insulin resistance, pre-diabetes, diabetes, dyslipidaemia, adipogenesis dysregulation and inflammatory processes.

Moreover, several evidences were obtained in obese children, in new-borns and in maternal pre-gestational and gestational obesity. In particular the expression of some c-miRNAs differs in infants born to obese women compared with those born to lean women and these biomarkers might be useful in predicting future risk of obesity in children. At last, down-regulation of different c-miRNAs was observed in overweight/obese subjects after low or high glycaemic index diet and after low-fat diet; c-miRNAs might also be potential novel biomarkers for the benefits of bariatric surgery and the effects of mild exercise. In conclusion, there are scientific evidences suggesting a potential role of c-miRNAs detection as diagnostic, prognostic and therapeutic biomarkers in obese and diabetic patients. Major limits: number, duration and sample size of clinical studies are small; source of c-miRNAs, extraction procedures, quantities of blood samples and methods of analysis were promiscuous and not well standardized; high costs required for c-miRNAs detection. The uncertainty observed in literature highlights the need for reproducible and well standardized methods as well as low-cost and wide availability assays to detect c-miRNAs with high sensitivity/specificity. Large, long-term and randomized controlled clinical studies are need to determine whether c-miRNAs can play a role as biomarkers for obesity and diabetes in daily clinical practice.

## **Biography**

Angelo Michele Carella (MD) has completed his graduation in Medicine, after graduating he has obtained specialization in Internal Medicine, university Master in Healthcare Management and postgraduate courses on Diabetes and Obesity. He is a Medical Doctor at the Internal Medicine in the Department of "T. Masselli - Mascia" Hospital in San Severo (Italy).

He was a past teacher in Health Professions degree course of Foggia University. And served as an Editorial Board Member/Reviewer of several scientific journals, author of about 50 scientific publications (Google Scholar h-index 5). He is a Member of D&CVD EASD Study Group, Investigator in clinical studies (DAVID, ESPORT, ATA-AF, DIAMOND) published in international journals, and Speaker at numerous scientific congresses and meetings. Registered in Google Scholar and Research Gate.

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