ISSN: 2634 - 680X

Journal of Clinical Case Studies Reviews & Reports

SCIENTIFIC Research and Community

Conference Proceedings

Open Access

Plasmatic Extracellular Vesicles at the Intersection of Immune and Metabolic Dysregulation in Obesity and Type 2 Diabetes

Nilo D[1*], Di Lorenzo G[1*], Caturano A[1], Spatocco I[2], Mele G[2], Fusco C[2], Ruggiero K[2], De Rosa G[2], Russo C[3], Hoxha M[4], Bollati V[4], Procaccini C[5,6], Matarese G[2,6], Sasso FC[1] and De Candia P[2]

[1]Department of Advanced Medical and Surgery Sciences, University of Campania "Vanvitelli", Naples, Italy

[2]Department of Molecular Medicine and Medical Biotechnology, University of Naples Federico II, Naples, Italy

[3]Federico II University Hospital, Naples, Italy

[4]Laboratory of Molecular Epidemiology and Environmental Epigenetics, Department of Clinical and Community Sciences, University of Milan, Milan, Italy

[5]Neuroimmunology Unit, Santa Lucia Foundation, Rome, Italy

[6]Laboratory of Immunology, Institute for Endocrinology and Experimental Oncology, National Research Council (IEOS-CNR), Naples, Italy

***Corresponding author**

Nilo D and Di Lorenzo G, Department of Advanced Medical and Surgery Sciences, University of Campania "Vanvitelli", Naples, Italy.

Received: November 02, 2025; **Accepted:** November 10, 2025; **Published:** November 20, 2025

Background and Aims: Type 2 diabetes (T2D), often driven by obesity and chronic inflammation, remains a major health challenge. Regulatory T cells (Tregs, $CD4^{+}CD25^{\wedge}high$) are key to immune tolerance, and their dysfunction may contribute to T2D pathogenesis. We hypothesize that plasmatic extracellular vehicles (EVs) reflect metabolic dysregulation and impair Treg function, thus promoting inflammation and increasing T2D susceptibility.

Materials/Patients and Methods: We recruited lean (BMI <25) and overweight/obese (BMI >25) individuals with normal glucose tolerance, impaired glucose tolerance, or T2D. EVs were isolated from plasma via size-exclusion chromatography and characterized for concentration, size, and molecular cargo (proteins and microRNAs). Circulating Tregs were analyzed by flow cytometry for phenotype and proliferation. Functional in vitro assays are ongoing to assess the effects of EVs on Treg activation and suppressive function.

Results: Preliminary data show that EV characteristics such as cargo composition and concentration differ according to metabolic status. EVs from dysmetabolic individuals are associated with altered Treg phenotype and reduced suppressive capacity [1,2].

Discussion: Our findings suggest that EVs may act as both markers and mediators of immune dysfunction in obesity and T2D. This EV–Treg axis may offer novel insights for patient stratification and new therapeutic approaches to delay or prevent T2D onset.

References

1. Noren Hooten N, Evans MK (2020) Extracellular vesicles as signaling mediators in type 2 diabetes mellitus. Am J Physiol Cell Physiol 318: C1189-C1199.
2. Lin C, Guo J, Jia R (2022) Roles of Regulatory T Cell-Derived Extracellular Vesicles in Human Diseases. International Journal of Molecular Sciences 23: 11206.

Citation: Nilo D, Di Lorenzo G, Caturano A, Spatocco I, Mele G, et al. (2025) Plasmatic Extracellular Vesicles at the Intersection of Immune and Metabolic Dysregulation in Obesity and Type 2 Diabetes. Journal of Clinical Case Studies Reviews & Reports. SRC/JCCSR-E171. DOI: doi.org/10.47363/JCCSR/S2/2025(7)408