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Molecular impact induced by different shaped graphene oxide on immune cells

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Graphene oxide (GO) is gaining the interest of the scientific community for its revolutionary future applications i.e. for drug delivery. In this context, the possible immune cell impact of GO is a fundamental area of study for a translational application in medicine. We focused on the effects, on human lymphomonocytes (PBMCs) of two types of GOs, deeply characterized, which differed in lateral size dimension (GO-Small: 140 nm, and GO-Large 4 µm). To clarify the immune impact of GOs we provided a wide range of assays looking at cells viability, cell activation, cytokines release and gene expression. We let in lights also the impact of GOs on immune response-related 84 genes. GOs didn't impact the cell viability. In particular, the GO-Small modulated 16 genes (FR>4) compared to only 5 of GO-Large, evidencing a clear lateral dimension-dependent impact on cell activation. We confirmed the size-related effect at the protein level by multiplex ELISA. These evidences were also confirmed by microarray analysis on T and monocytes cell lines. GO-Small impact the immune cell activation, underlined by the over expression of genes such as CXCL10 ligand pathway and CXCR3 receptor. Data also evidenced the GO-Small-induced metabolism modulation in both cell types. Our work represents a comprehensive characterization of different sized GOs on immune cells giving crucial information for the chemical and physical design of graphene for biomedical applications i.e. as a new possible drug delivery systems and nanoimmunotherapy tools.

Biography

Lucia Gemma Delogu has completed her PhD from Sassari University and Post-doctoral studies from University of Southern California. She is Assistant Professor of Biochemistry at the University of Sassari, Italy. She has published more than 21 papers in reputed journals and 9 as first or Senior/Corresponding author.

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