

Effect of altered glucose levels on fatty acid synthase enzyme and downstream fatty acids in extracellular vesicles

Namita N. Kashyap¹, Dinesh Upadhya^{1*}

¹Centre for Molecular Neurosciences, Kasturba Medical College, Manipal Academy of Higher Education, Manipal, Karnataka – 576104

Abstract:

Extracellular vesicles (EVs) are the biologically produced nanospheres (30-1000nm) by almost all the cells, thereby encapsulating the components of the cell including carbohydrates, proteins, metabolites, and several nucleic acids. Among proteins are the enzymes that are extremely important biological catalysts and one such enzyme is fatty acid synthase (FASN), a multimeric enzymatic complex solely responsible for fatty acid synthesis in the biological system. We tried to understand whether EVs have the caliber to metabolize substrates from the FASN perspective, using *in vitro* and *in vivo* EV sources- HEK293T cells and human serum. We used glucose, as it is the upstream substrate for fatty acid synthesis and can trigger a series of metabolic networks before synthesizing fatty acids. We isolated EVs from cells and serum and incubated them with varying exogenous glucose concentrations. The resulting levels of FASN and fatty acids were studied through immunoblotting and GCMS techniques, respectively. We determined that the EVs can alter the levels of FASN and downstream fatty acids, thereby demonstrating a potential to the possibility of metabolism.

Keywords: Extracellular vesicles, fatty acid synthase, fatty acids, metabolism