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Diagnosis of Glioma Tumors using Circulating Cell-Free DNA

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Gliomas are the most frequent brain tumors, making up about 30% of all brain and central nervous system tumors and 80% of all malignant brain tumors. Diagnosis of different glioma tumor types and their tumor grade is an essential step to suggest a right treatment for the glioma patients. Existing standard diagnostic technique for glioma tumor includes tissue biopsy, which is a highly invasive and hence a risky technique for the patient's survival. 'Liquid biopsy' is a new and recently developed non-invasive cancer diagnostic technique. This technique includes collection of blood or urine samples and diagnosis of cancer based on analyzing molecular bits or cancer cells that are released from tumor tissue into the blood or urine system. Circulating cell-free DNA (cfDNA) fragments is one those molecular bits that are released into the bloodstream after rapid apoptosis or necrosis of the tumor cells in the cancer patients.

Our goal is to do comprehensive study between distinct types of glioma cancer tumors and cfDNA of the respective patients, to elucidate the scope of cfDNA in liquid biopsy technique for glioma diagnosis. We have successfully detected glioma specific mutations such as *IDH1, IDH2, PDGFRA, NOTCH1, PIK3R1* and *TP53*, from cfDNA isolated from the plasma of glioma patients and could relate this mutations to the different tumor grades of glioma. We are also studying the dynamics of these mutations in response to glioma drug treatment by collecting blood samples at different time intervals. This study may help in developing liquid biopsy technique for glioma tumor diagnosis and in its prognosis for monitoring the glioma treatment by non-invasive approach and will eventually help physicians to decide the right treatment on appropriate time while bypassing the existing 'wait-and-see' approach of treatment monitoring.

Keywords: Liquid biopsy, glioblastoma, circulating cell free DNA, low burden tumors, gliomas.

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Biography:

Dr. Milana Frenkel-Morgenstern has completed her Ph. D at the age of 32 years from Weizmann Institute of Science and postdoctoral studies from Spanish National Cancer Research Centre (CNIO). She has published more than 25 papers in reputed journals and serving as an editorial board member of repute. She is a founder of the Art in Science competition at the ISMB conference since 2008; a chair of the ISCB affiliated Israeli Bioinformatics group and a head of the Cancer Genomics and BioComputing group in the Azrieli faculty of Medicine, Bar-Ilan University. Her Research Interest includes the development of a Liquid Biopsy platform for brain cancers using unique biomarkers, particularly, fusion proteins. We expect to provide a proof-of-concept stage of our research for 50 patients in glioblastoma and the validation stage for 1000 patients in gliomas.