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Biomarkers of a stem cell melanoma

Melanomas are a group of heterogeneous tumors that arise in the epithelial cells of the skin, eye, meninges and other parts of the body. Patients with highly malignant melanomas do not respond well to the conventional therapies because most of these tumors are detected after they have invaded multiple tissues. For a number of years, we have studied a highly malignant cat melanoma cell line (CT1413) and examined its genome-wide proteomes at different stages of tumor growth by mass spectrometry. Subtractive proteomics analyses and comparisons of protein profiles of tumor cells with normal cat embryo fibroblasts and a human leukemia cells indicated that CT1413 had a unique profile, which did not match any other cells. Extensive bioinformatics analysis of all proteins indicated that >95% of proteins expressed in this melanoma are similar to proteins that are normally expressed during the growth and development of mammalian embryos. Proteomics analyses of several single cell clones of the cat melanoma indicated that this is a clonal tumor which is most likely derived from a single embryonic stem cell that transformed into tumor cell due to abnormal cell signaling events during the embryonic development. Each of the clones tested in multiple experiments conducted over one year period exhibited embryonic proteins. This phenomenon is in contrast to many human cancer stem cells that are different areas of the tumor mass and exhibit only a few stem cell markers. Our bioinformatics analyses have identified proteins/enzymes and transcriptional regulators that are essential for differentiation of different tissue types/organ systems, development of neural network in the brain and proteins that regulate self-renewal and maintain stemness in these tumor cells. These proteins provide unique biomarkers for the early detection of malignant melanomas and/or as targets for the development of novel therapeutic strategies for treating stem-cell-derived melanomas.

Biography

Suraiya Rasheed is a Professor and Director of Viral Oncology and Proteomics Laboratory in the Department of Pathology at the Keck School of Medicine, University of Southern California, Los Angeles, USA. She has graduated with honors and received her first PhD from Osmania University, Hyderabad, India and second PhD from London University and FRCPath from the Royal College of Pathology, London. She has also served numerous national and international Advisory Committees including Study Sections of the National Cancer Institute, National Institute of Allergy and Infectious Diseases, Antiviral Drug Development and Drug-Screening Programs for AIDS and Abstract Reviewing Committee for the International AIDS Society's conferences.

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