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Investigation of cellular response to ionising radiation: Value of different model systems and strategies of irradiation

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The results of radiotherapy of different cancer cases suggest the development of radioresistant tumors and confirm the need in the advanced understanding of radiobiology of tumors. Investigations using 3D cell cultures are expected to result in more successful oncology clinical trials which based on 2D models not representing complexity of tumors currently fail up to 90%. Therefore we have employed 3D cell culture model to investigate cellular response to ionizing radiation. Single or fractionated dose irradiation of 2Gy, 10Gy and 5x2Gy have been used. Global gene and miRNA expression changes after irradiation have been analyzed by transcriptomics analysis in Lewis lung carcinoma (LLC1) cell line cells cultured in 2D or 3D. Cell response of tumor tissue to irradiation is under investigation in an animal model to demonstrate if/which cell culture model better reflects cell radiobiology *in vivo*. In addition nanotechnologies are applied to increase or decrease the cellular sensitivity to ionising radiation. Potential of applied techniques to result in the development of more efficient strategies of anticancer radiotherapy under evaluation. The results of cancer patients treatment strategies derived from experimental research will be presented.

Decreased activity/expression of alkaline phosphatase in clear cell renal cell carcinoma: Plausible role in carcinogenesis

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The present study was conducted to explore the expression and localization of liver/bone/kidney alkaline phosphatase (L/B/K ALP) on renal tubular cells in clear cell renal cell carcinoma (RCC). A total of 50 patients of histopathologically confirmed cases of RCC were included in this study. The L/B/K ALP protein level was determined by immunohistochemistry, immunofluorescence and flow cytometry in renal cell carcinoma and adjacent normal renal parenchyma tissue. The mRNA expression of L/B/K ALP was detected using real time PCR. Immunohistochemical analysis showed significantly low mean L/B/K ALP immunoreactivity in tumor samples as compared to normal renal tissue (0.7±0.4 vs. 2.9±0.8; $p<0.01$). Immunofluorescence showed mean L/B/K ALP immunoreactivity to be significantly low in tumor as compared to normal renal sections (0.5±0.3 vs. 3.2±0.7; $p<0.01$). The flow cytometric studies documented a significant reduction in the ALP presentation on brush border membrane (BBM) of RCC (191±15.9 vs. 291.9±16.8; $p<0.05$). Further, Real time PCR analysis revealed a significant depreciation in the ALP mRNA transcript in the RCC tissue (0.65±0.09 vs. 1.0±0.18; $p<0.01$). The transfection of L/B/K ALP cDNA into ACHN cells documented decreased cell viability, indicating the possible role of L/B/K ALP gene in the oncogenesis of RCC. On the basis of above findings, we conclude that reduced activity of ALP in BBM is associated with reduced ALP gene expression and decreased localization to BBM of RCC. This alteration in gene expression of ALP and its localization to BBM was possibly be involved in oncogenesis of RCC.

Biography

Ujjawal Sharma has completed his PhD from Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India and Postdoctoral studies from PGIMER, Chandigarh and National Institute of Immunology, New Delhi, India. He has published 07 papers in reputed journals and has been serving as an Editorial Board Member of repute.