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# Investigation of biological response of human glioma cell lines after exposure to carbon-ion radiation

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M. Araszkiewicz1,2, D. Banaś3,4, J. Ginter1, U. Kaźmierczak5, A. Korgul1, A. Lankoff6, T. Lorenc7, K. Maliszewska-Olejniczak8, W. Olejarz7, M. Paluch-Ferszt5, M. Pruszyński6, I. Skwira-Chalot1, K. Szary3,4, S. Sęk9, Z. Szefliński5, and K. Tymińska2

1Faculty of Physics, University of Warsaw, Pasteura 5, 02-093 Warsaw, Poland
2 National Centre for Nuclear Research, Andrzeja Sołtana 7, 05-400 Otwock, Świerk, Poland
3 Institute of Physics, Jan Kochanowski University, Uniwersytecka 7, 25-406 Kielce, Poland
4Holly Cross Cancer Center, Artwińskiego 3, 25-734 Kielce, Poland
5 Heavy Ion Laboratory at the University of Warsaw, Pasteura 5A, 02-093 Warsaw, Poland
6Institute of Nuclear Chemistry and Technology, Dorodna 16, 03-195 Warsaw, Poland
7Medical University of Warsaw, Żwirki i Wigury 61, 02-091 Warsaw, Poland
8Department of Physics and Biophysics, Institute of Biology, Warsaw University of Life Sciences –SGGW, Nowoursynowska 166, 02-787 Warsaw, Poland
9Faculty of Chemistry, University of Warsaw, Pasteura 1, 02-093 Warsaw, Poland

Radiotherapy is currently the main method of cancer treatment in addition to surgery and chemotherapy. The choice of the right treatment method depends on the tumor type and location in the patient's body. Therefore, it is principal to compare available alternative methods in order to choose the most optimal one. To understand better the effects of ionizing radiation on the tumor and surrounding tissue, it is important to explore and quantify the relationship between energy deposition and initial biological events.
Glioblastoma is the most common and the most malignant and difficult to treat among brain tumors [1]. Two human glioma cell lines which differed in their intrinsic sensitivity to ionizing radiation (radiosensitive M059J and radioresistant M059K) [2] were chosen for preliminary research.
Both of the cell lines were irradiated by a carbon ion beam (12C) of energy 45.3 MeV generated by a U200P cyclotron located at the Heavy Ion Laboratory at University of Warsaw according to the irradiation procedure described previously [3]. To investigate the biological response of the irradiated cells, a colony formation assay was performed.
To obtain the desired doses, the radiation field's parameters and the time of irradiation were estimated by Monte Carlo simulations using the MCNP6.2 code.
Results of the cancer cell's survival fraction after irradiation by carbon ion beam will be compared with the data obtained after irradiation by other high LET (Linear Energy Transfer) and low LET radiation that is planned to perform.

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**Primary author:** ARASZKIEWICZ, Martyna (Faculty of Physics, University of Warsaw)

**Presenter:** ARASZKIEWICZ, Martyna (Faculty of Physics, University of Warsaw)

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