

Electrophysiological effects of ^{12}C on patients undergoing heavy ions therapy at GSI: a pilot study

W.G. Sannita (1), L. Narici (2), J. Debus (3), S. Carozzo (4), M Saturno (4), D. Schardt (5), D. Schulz-Ertner (3)

1. Neurophysiopathology, Dept. of Motor Science and Rehabilitation, University of Genova, Italy, and Dept. of Psychiatry, SUNY, Stony Brook, NY.
2. Dept. of Physics, University of Roma "Tor Vergata", Roma
3. Radiologische Universitätsklinik , Heidelberg, FRG
4. Dept. of Motor Science and Rehabilitation, University of Genova, Italy
5. GSI/Biophysik, Darmstadt, FRG

Phosphenes (“*light flashes*”) observed in space have been attributed to heavy ions interfering with the retina photoreceptors. However, their generating mechanisms are still undefined and neurons of the retina and non-ocular visual structures are as sensitive to ionizing agents as retinal photoreceptors. Multiple sources are therefore possible that could question safety in manned space travel. Patients undergoing ^{12}C ion therapy of skull tumors also involving the anterior optic pathway often report phosphenes similar to those described by astronauts and volunteers in accelerator experiments.

In a pilot study, their occurrence (either within each beam pulse or shortly after it in case of very short pulses) correlated with the beam position and local dose deposited near the optic nerve or eye during irradiation.

Further research is in progress at the GSI/Biophysics facilities in Darmstadt (FRG).

Purposes of the study are: 1- to identify electrophysiological cortical concomitants of phosphenes; 2- to correlate phosphenes with irradiated portions of the anterior visual pathways and with known basic mechanisms of vision; and 3- to obtain information to be used in the understanding of phosphenes observed in space.

We will present preliminary results from the first measurements.