

Electrophysiological signatures linked to particle irradiation on rodents within ALTEA-MICE

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After several dry and test runs we performed in July 2004 a full scale electrophysiological experiment on normal mice, that provided a first objective *functional* measure of heavy ions effect on the visual system.

Twentytwo mice was studied. Electrophysiological signals were recorded from the retina and visual cortex during (and with time information with) luminance stimulation and beam bursts.

Repeated bursts of ^{12}C ions at 200 MeV/ (i.e. below the Cerenkov threshold) were delivered to the retina of dark-adapted mice. In particular three- to five hundred ^{12}C bursts with nominal length of 1-5 ms, intensity of 10^3 - 10^4 particles/burst (200 MeV/n) and 3 s interval between consecutive bursts were delivered by beam. Light stimulation (light flashes) of 1 ms was performed before and after irradiation.

Ion bursts evoked a transient electrophysiological signal from the retina, with waveform comparable to the response to light but longer latencies and smaller amplitude. Variability among animals was high and may be accounted for by differences (due to e.g. anaesthesia) in the sensitivity/saturation threshold of the cone/rod systems contributing to the response or by effects on photoreceptors of the energy locally supplemented by the heat. The amplitude of the retinal signal was correlated with the number of particles/burst in one mouse with a signal-to-noise ratio and amplitude allowing measurements on the responses to single ion bursts.