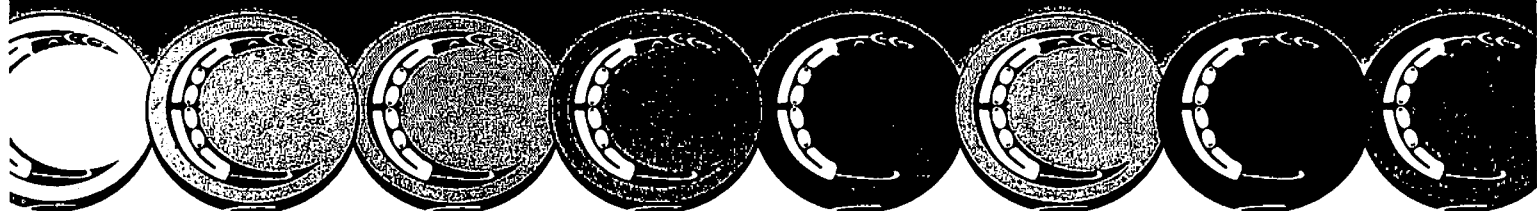


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Program & Abstracts

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The video-based quantitative evaluation of IR-induced effects on locomotory behavior in *Caenorhabditis elegans*. M. Suzuki¹, T. Sakashita¹, Y. Hattori^{1,2}, S. Yanase³, M. Kikuchi¹, T. Funayama¹, Y. Yokota¹, T. Tsuji², Y. Kobayashi¹. 1) Japan Atomic Energy Agency, Takasaki; 2) Graduate School of Engineering, Hiroshima University, Higashi-Hiroshima; 3) Daito Bunka University School of Sports and Health Science, Higashi-Matsuyama.

Background and purpose: Locomotory behavior (motility) is a vital importance in animals. We examined the effects of ionizing radiation (IR) on locomotory behavior using *Caenorhabditis elegans*. We reported an IR-induced reduction of locomotory rate in the absence of food[1],[2]. In the previous experiments, wild-type animals were irradiated with γ -rays in the whole body, and measured the motility using "body bends" (the number of bends in the anterior body region at 20-s intervals)[3]. However, the IR-induced effects in the central and posterior body region were not evaluated by the body bends. In the present study, to investigate the IR-induced effects in more detail, we try to evaluate the motility of the whole body by using the video-based analysis. **Strains and culture:** The *C. elegans* wild-type Bristol N2[4] and the *Escherichia coli* HB101 strain, were obtained from the Caenorhabditis Genetics Center. Using standard methods[4], animals were grown at 20°C on 6-cm plates containing nematode growth medium (NGM) agar spread with *E. coli*. Well-fed adults were used in all experiments. **Irradiation and video-based analysis:** Animals were collected from culture plates and washed, and transferred to the 3.5-cm NGM plate without a bacterial lawn. The movements of animals were video-recorded for 1 min. Subsequently, animals were collected and placed on a plate with a bacterial lawn for 1h to avoid starvation, and irradiated with graded doses (< 1 kGy) of ⁶⁰Co γ -rays. Immediately after irradiation, animals were again transferred to the 3.5-cm NGM plate without a bacterial lawn, and the movements were video-recorded. To measure the whole-body motility, we are now constructing a worm-tracking system based on "the parallel worm tracker"[5]. Using this system, we analyze the trajectories and bends at several points of the body in multiple animals before and after irradiation. **Results and conclusion:** We propose a novel standard results of the analyses, and would like to discuss about the effectiveness of the analysis for evaluation of IR-induced effects. **References:** [1] Sakashita, T., et al. (2008) *J. Radiat. Res.* 49: 285-291. [2] Suzuki, M., et al. (2009) *J. Radiat. Res.* 50 (in press). [3] Sawin, E.R., et al. (2000) *Neuron* 26: 619-631. [4] Brenner, S. (1974) *Genetics* 77: 71-94. [5] Ramot, D., et al. (2008) *PLoS ONE*, 3: 5: e2208.