Response of Lymphocytes to Radiation in Untreated Breast Cancer Patients as Detected with Three Different Genetic Assays[1]

JIAN-LIN LOU[*], ZHI-JIAN CHEN[*], JIANG WEI[*], JI-LIANG HE[*,2], LI-FEN JIN[*], SHI-JIE CHEN[*], WEI ZHENG[*], AND SHI-JIE XU[‡]

[*]*Institute of Environmental Medicine, Medical College, Zhejiang University, Jiaxing 310058, Hangzhou, Zhejiang, China;* [‡] *The First Affiliated Hospital of Medical College of Jiaxing University, Jiaxing 314001, Zhejiang, China*

Objective To detect the response of lymphocytes to radiation in untreated breast cancer patients with three different genetic assays. **Methods** Blood samples were collected from 25 untreated patients and 25 controls. Each blood sample was divided into two parts: one was irradiated by 3-Gy X-ray (irradiated sample), the other was not irradiated (non-irradiated sample). The radiosensitivity of lymphocytes was assessed by comet assay, cytokinesis-block micronucleus (CBMN) assay and 6-TG-resistant cells scored (TG) assay. **Results** The baseline values of micronucleated cell frequency (MCF) and micronucleus frequency (MNF) in the patients were significantly higher than those in the controls ($P<0.01$), and 3-Gy X-ray induced genetic damage to lymphocytes in the patients increased significantly as compared with that in the controls as detected with the three genetic assays ($P<0.01$). The proportion of radiosensitive cases in the patient group was 48% for the mean tail length (MTL), 40% for the mean tail moment (MTM), 40% for MCF, 44% for MNF, and 48% for mutation frequencies of the *hprt* gene (Mfs-*hprt*), respectively, whereas the proportion of radiosensitive cases in the control group was only 8% for all the parameters. **Conclusion** The difference in the lymphocyte radiosensitivity between the breast cancer patients and the controls is significant. Moreover, there are wide individual variations in lymphocyte radiosensitivity of patients with breast cancer. In some cases, the radiosensitivity of the same patient may be different as detected with the different assays. It is suggested that multiple assays should be used to assess the radiosensitivity of patients with breast cancer before therapy.

Key words: Micronucleus assay; Comet assay; *hprt* gene mutation; Radiosensitivity; Breast cancer

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[2]Correspondence should be addressed to Ji-Liang HE, Institute of Environmental Medicine, Medical College, Zhejiang University. Tel: +86-571-88208187; Fax: +86-571-86996525; E-mail: hjl_zju@yahoo.com.cn

Biographical note of the first author: Jian-Lin LOU, male, Ph. D. candidate, Institute of Environmental Medicine, School of Medicine, Zhejiang University.

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