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Revision of the IAEA Manual 2011 based on data on radio-sensitivity, dose-rate findings contributing

"Cytogenetic Dosimetry: Applications in Preparedness for and Response to Radiation Emergencies (IAEA, 2011) "plays a vital role in radiology. Although IAEA Manual Report 405 for additional details that were left out of the IAEA Manual 2011. The use of the G function, a time dependent function used to modify the dose squared coefficient of the linear quadratic dose response relationship to allow for the effects of dose protection（IAEA, 2011）, however, the method mentioned in the paper has some limitations, such as lack of detailed researches to explain the effects of individual differences in radiosensitivity and radiation dose rate on biological dose-response curves, establishing a unified standard curve of biological dose is urgently needed.
What are the new findings?
1. Individual differences of radiosensitivity are very large.
2. At each dose point, "(dicentric chromosome + centric rings) /cell"is proportional to "dose rate", that is, Y=k x +b ;
3."(dicentric chromosome + centric rings) /Cell "is a quadratic linear relationship with dose rate, that is， y=a x 2+b x +c.
4. We created a "Unity Standard Curve of Biological Dose Estimation".
Creating a Unity Standard Curve of Biological Dose, under these circumstances, we can form a joint and rapid response to a nuclear and radiological accident.
ABSTRACT
Objectives: In order to achieve the goal of rapid response, effective coped with and protection of life of large-scale radiation events, the establishment of an in vitro unified standard dose-response curve for chromosomal aberration becomes an urgent need.
Methods: Using 60Co radiation (0.27 Gy/min), analysis individual differences in radiation sensitivity; Chromosomal aberrations with different irradiation dose rates were used to establish the biological dose curve and analyze the excess of the "dicentric + ring"caused by the dose rate at each dose point; DAPI-images and Metafer 4 captures metaphase images images and analysis.
Results: Dicentric+ ring /100 Cell was 17.5-43.8, the average is 28.32 ± 6.98. The mean value of Dicentric+ ring /100 Cell was 31.37 in males and 25.27 in females, there are significant differences ($p<0.01$). Irradiation dose is dominant ; At each dose point, "(dicentric chromosome + centric rings) /cell"is proportional to "dose rate", that is, Y=k x +b ; Within the dose range of 1-5Gy, "(dicentric chromosome + centric rings)/Cell "holds a quadratic linear relationship with dose rate, that is， y=a x 2+b x +c; The DAPI-images might give you more hints than those of conventional Giemsa-stain.
Conclusions: The author recommends revision of the IAEA Manual 2011 based on data on radio-sensitivity, dose-rate findings contributing to a unified dose-response calibration curve, and potential for automation in cytogenetic biodosimetry.

Speakers email

lgscfll@163.com

Speakers affiliation

Gang Liu(Gansu provincial center for disease control and prevention

Name of Member State/Organization

CHINA

Primary author: LIU, Gang (Gansu provincial Center for Disease Control and Prevention)

Presenter: LIU, Gang (Gansu provincial Center for Disease Control and Prevention)

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