Preface

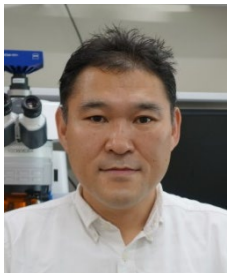
In 1895, German physicist Dr. Wilhelm Röntgen discovered X-rays and the history of human radiation utilization began. Eventually, it was used in medical imaging and radiology. Unfortunately, the use of radiation was not limited to peaceful purposes. Atomic bombs were dropped on Hiroshima and Nagasaki in 1945, killing many precious lives. Nuclear weapons testing was also actively conducted in the 1950s and 1960s, and the world was contaminated with radioactive fallout in the environment.

Despite the negative implications of nuclear weapons, radiation has been used peacefully as one of the means of essential energy production with the development of nuclear power plants. However, there is always a risk of major accidents occurring such as the Three Mile Island Nuclear Generating Station accident in 1979, the Chernobyl Nuclear Power Plant accident in 1986, and the Fukushima Daiichi Nuclear Power Plant accident in 2011.

In radiation emergency medicine, it is necessary to estimate the radiation dose in order to formulate triage and treatment plans for exposed patients. As biological reactions induced by radiation exposure remain in the body, methods associated with biodosimetry can effectively estimate the dose based on suitable biological endpoints. Among these endpoints, the frequency of chromosome aberrations can be used in cytogenetic biodosimetry for exposure dose estimation. Cytogenetic biodosimetry is a highly reliable method and is used frequently in radiation medicine.

Chromosome aberration analysis in biodosimetry requires knowledge and skills based on cytogenetics. However, cytogenetic biodosimetry differs from clinical cytogenetics in multiple factors, such as blood culture method and culture time, number of cells analyzed, assay selection and application according to the exposure scenario. As a result, not everyone involved in clinical cytogenetics have the knowledge and skills for cytogenetic biodosimetry. Furthermore, the shortage of young human resources responsible for cytogenetic dose assessment has become an international issue. Hirosaki University Chromosome Research Group (CRG), led by the Hirosaki University Institute of Radiation Emergency Medicine, has been training undergraduate and graduate students while verifying various processes related to cytogenetic biodosimetry. In this special issue, "Cytogenetic Biodosimetry in Radiation Emergency Medicine", we will provide important guidelines and summarize our findings thus far.

We hope that this special issue will be a useful resource for young people who aspire to learn about and pursue research in cytogenetic biodosimetry. I thank all the authors who contributed to this special issue.



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