

# Preface: The First Critical Workshop on the Effect of the Fukushima Daiichi Nuclear Power Plant Accident on the Ecosystem and on Humans

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Ionizing radiation has existed since before the Earth was born, and life on Earth has always been exposed to radiation. Radiation is utilized in various fields, including for medical applications such as diagnostics and cancer therapy. Modern human life cannot be sustained without man-made radiation; however, the adverse effects of radiation on the human body are known. On 11 March 2011, the explosion of a series of power units of the Fukushima Daiichi Nuclear Power Plant (FNPP) occurred due to the hit of a tsunami triggered by the Great East Japan Earthquake. The plant began releasing substantial amounts of artificial radioactive materials into the environment, creating the largest nuclear incident since the Chernobyl disaster in 1986. Both nuclear accidents have been rated 7 on the International Nuclear and Radiological Event Scale (INES)—the highest level. The effects of the FNPP accident on the ecosystem and on the human body have become a major concern for people around the world.

Radiation can be harmful without being detectable by our senses. Therefore, radiation and radionuclides have to be strictly controlled, which makes animal experiments using radioactive materials very difficult. Furthermore, no specific stigma or pathological findings in radiation-induced diseases have been noticeable. All these things make crucial to know and difficult to analyze the biological effects of radiation (especially on humans). Since the experimental study of human radiation exposure is ethically impossible, we can determine radiation effects on humans only by accumulating facts and epidemiological studies pertaining to radiological disasters. It is not an exaggeration to say that without nuclear accidents or the analysis of radiation therapy, there is no way to quantify the effects of radiation on humans. An increase in thyroid diseases became clear 4 years or more after the Chernobyl accident [1]. In that accident, more than 10 times the amount of radioactive iodine was released compared with in the

FNPP accident [2]. Biological effects associated with the FNPP accident, if they occur, will become evident from around 5 years after the accident. Therefore, analysis of the ecosystem is extremely valuable for increased understanding of the environmental pollution and the influence of internal exposure on living things. Using more precise techniques of biological analysis is the only way to shorten the period for detecting the biological effects of low-dose/low-dose-rate radiation. We scientists must be continually vigilant so that we are prepared before health effects become evident. We now seek to form a strong consortium composed of researchers from fields including ecology, dosimetry, biology and medicine. The first critical workshop on the effect of the FNPP accident on the ecosystem and humans was held on August 10 and 11, 2014 at Kyoto University Research Reactor Institute and the workshop is held annually. In the workshop, we discuss what is currently known about the FNPP accident and what we should prepare for in relation to its effects. This is a special issue of the first report on the workshop.

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