2.5.15 Laboratory: Radiation Safety Control

Member:	Professor	Takahashi, Sentaro, D. Agric. Sci.	
	Associate Professor	Takahashi, Tomoyuki, D. Eng.	
	Associate Professor	Kinashi Yuko, D. Med.	
	Assistant Professor	Yamasaki, Keizo, M. Eng.	
	Assistant Professor	Yashima, Hiroshi, D. Eng.	
	Program-Specific Researcher	1	

A. Research Activities (2009.4-2010.3)

A-1. Main Subjects

a) Development of efficient and high performance methods for radiation safety control Research Reactor of Kyoto University (KUR) are used for a variety of research and development as well as education. In this laboratory, efficient and high performance methods for radiation safety control are being developed. This method uses the information related to features of radiation works, knowledge and experience of workers, and their health, medical and psychological conditions. In this year, we analyzed all the accident and trouble data in the radiation works, and found out a few important factors directly related to those events.

b) Characterizations of radio-aerosol produced by the use of accelerator

Radioactive aerosols are generated during the usage of high energy accelerator, but the detail of the mechanisms and characteristics of the aerosols has not been well known. In this study, the physico-chemical characteristics of accelerator related aerosols were investigated in the air irradiated by high energy neutron generated with a linear accelerator.

c) Estimation of the residual radioactivity in the nuclear and accelerator facilities It is an important issue for radiation safety control to investigate the induction of secondary particles (mainly neutron) and induced-radioactivity in the air, water, and equipments, during the use of nuclear facilities and accelerator facilities. In this study, the experiment on the shielding to high energy neutron and the measurement on nuclide-production cross-sections induced by charged particles and neutrons have been carried out to contribute to the safety assessment of nuclear and accelerator facilities.

d) Behavior and kinetics of radioactive materials in the land ecosystem

In order to assess the effects of radioactive materials originated from nuclear facilities, a development of model to analyze the behavior of radioactive materials in the environment, and the identification of related parameters are essential . In this year, the modeling of a behavior of 14-C in rice paddy fields and its accumulation in polished rice were studied. In addition, the accumulation of radiocesium in sea fishes are evaluated for dose estimation. e) Health effects and risks of radiation and radioactive materials

The information on the health effects of radiaton is essential for the reasonable radiation safety contorol. In this year, we investigated the attenuative action of ascorbic acid 2-glucocide on the micronucleus induction in distant splenic T lymphocytes following head irradiation, and the effect-induced mutagenisity in HPRT locus of CHO cells following BNCT neutron irradiation.

A-2.Publications and presentations

a) Publications

Original Papers

- Yashima, H., H. Iwase, M. Hagiwara, Y. Kirihara, S. Taniguchi, H. Yamakawa, and 11authors:

Benchmark Experiment of Neutron Penetration through Iron and Concrete Shields for Hundreds of MeV Quasi-monoenergetic Neutrons: PART.I Measurements of Neutron Spectrum by a Multi-moderator Spectrometer. Nuclear Technology,168, 298-303, 2009 - Kinashi, Y., H. Tanaka, S. Masunaga, M. Suzuki, G. Kashino, Y. Liu, S. Takahashi and K. Ono:

Ascorbic Acid 2-glucocide Reduces Micronucleus Induction in Distant Splenic T Lymphocytes following Head Irradiation. Mutation Research - Genetic Toxicology and Environmental Mutagenesis, 695, 69-74, 2010

- Kinashi, Y., M. Suzuki, S. Masunaga and K. Ono,:

Bystander Effect-induced Mutagenisity in HPRT Locus of CHO Cells following BNCT Neutron Irradiation: Characteristics of Point Mutations by Sequence Analysis. Applied Radiation and Isotopes, 67, S325-S327, 2009.

b) Conference and seminar papers presented

- 43th annual meeting of Japan Health Physics Society: 3 presentation

- 2010 (spring) meeting of the Atomic Energy Society of Japan: 1 presentation

- 52th annual meeting of Japan Radiation Research Society: 2 presentations

A-3.Off-campus activities

Membership in academic societies

- Takahashi Sentaro, D.Agric.Sci : Japanese Society of Radiation Research (Councilor)
- Takahashi Tomoyuki, Dr. Eng. : Japanese Society of Health Physics (Editorial Board)

Research grants

1. Grants-in-aid for Scientific Research(KAKENHI)

- Young Scientist (B) : Yashima Hiroshi : A study on the measurements of nuclide-production cross-sections of high energy neutorons.

B.Educational Activities(2009.4-2010.3)

B-1.On-campus teaching

a) Courses given

- Undergraduate level :	Behavior of Contami	nants in the Envi	ronment (Takahashi, S.)
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- Graduate level:	Environmental Radiation Protection (Takahashi, S.), Seminar in
	Environmental Radiation Control I, II (Takahashi, S., Takahashi
	T.), Applied Environmental Radiation Technology (Takahashi,
	S.), Experimental Radiation Control in the Environment
	(Takahashi, S.Takahashi, T., Yamasaki, K., Yashima, H.)

C.Other Remarks

- Takahashi S.: Osaka Prefecture (Environmental Radiation Assessment Committee), , Kyoto Prefecture (Emvironmental Radiation Mesurement Committee)

- Takahashi, T.: Japan Atomic Energy Agency (TRU/Uraniumu Waste Disporsal Committee), , Institute for Environmental Sciences (Plant Carbon Transfer Committee),, Nuclear Safety Technology Center (Monitoring Text Sub-groupe Committee)