

Research Base for Radiation Accidents and Medical Science hosts 1st International Symposium

In April 2016, three universities, namely Hiroshima University, Nagasaki University and Fukushima Medical University, established a network-style, joint research base, the “Research Base for Radiation Accidents and Medical Science”. Following this, Hiroshima University hosted the first International Symposium, “Scientific Underpinning for Restoration from a Radiation Disaster” on February 21-22, 2017.

The symposium was formulated with the aim of promoting the radiation science and medical research being conducted at the three base universities, while also communicating the very latest research both locally and abroad. Then we invited up and coming lecturers (5 from overseas and 8 from within Japan), drawn from a range of related disciplines, to present findings and conduct poster presentations of the latest research. In line with these aims, the Symposium welcomed 312 participants, who took part in two days of lively information and opinion exchange.

Opening

Firstly, Hiroshima University Vice President, Prof. Kenji Kamiya opened the Symposium with a welcome address.

Following this, Dr. Werner Rühm of the Helmholtz Center Munich, Germany, gave a keynote lecture on the topic of “Radiation Risk Inference at Low Dose and Low Dose Rate Exposures”. Dr. Rühm spoke of the issues involved in evaluating the effects of low dose radiation (less than 100mGy) on the human body, highlighting the importance of meta-analysis to



incorporate the results of numerous studies, as well as discussing the issues involved in explaining epidemiological data with mechanism-based models. Furthermore, he gave a detailed introduction to the work of the International Commission on Radiological Protection (ICRP), which is currently compiling a report on the aforementioned issues.



Session 1; Low dose radiation effects and health risk research

In this session, first, Prof. Tom K. Hei of the Columbia University Medical Center, USA, gave a lecture on “Low Dose Radiobiology and Relevance to Human Health.” Prof. Hei gave

an introduction to specific biological responses in low dose areas, as well as presenting the latest results from experiments into DNA damage responses and metabolic control etc., using single-cell micro beam technology.

Following this, Prof. Hiroshi Tauchi of Ibaraki University gave a lecture on the topic of “Induction of somatic mutation by low dose/low dose rate radiation: Experimental analysis by using a hypersensitive system.” Prof. Tauchi clearly explained the latest research results on low-dose radiation effects obtained using a uniquely developed, highly-sensitive radiation detection cell model.

Next, Dr. Kensuke Otsuka of the Central Research Institute of Electric Power Industry gave a presentation on “Cellular responses and gene expression profiles of colonic Lgr5⁺ stem cells after low-dose / low-dose-rate radiation exposure.” Dr. Otsuka reported on findings detailing the effects of high and low dose rates on stem cell function, gained through research involving the latest mouse stem cell trace systems.

Finally, Dr. Michio Murakami, Associate Professor of Fukushima Medical University, gave a lecture on the topic of “Utility of Risk Comparison Regarding Radiation as Individual and Social Decision-Making.” Beginning with an overview of the evolution of risk comparison research, Dr. Murakami explained the significance of implementing risk comparison in decision making processes in modern society.

Session 2: Social impact of a radiation disaster and radiological protection studies

The first speaker of this session was Dr. Sergey Shinkarev, from the Burnasyan Federal Medical Biophysical Centre (FMBC), Russia, who lectured on the topic of, “Comparative analysis of the countermeasures to mitigate exposure of the public to radioiodine following the Chernobyl and Fukushima accidents.” Dr. Shinkarev reported on the differences in radiation exposure levels and measures adopted in the Chernobyl and Fukushima accidents, as well as the thyroid monitoring undertaken by FMBC researchers on Russian nationals in Japan after the Fukushima accident in March 2011.



Next, Dr. Masaharu Tsubokura from Soma Central Hospital and Minami Soma City Hospital, gave a presentation on “Health Issues Other than Radiation Exposure in Soma-district, Fukushima.” Drawing on the latest data, Dr. Tsubokura highlighted that after the Fukushima accident, the significant increase in adult diseases, such as diabetes, increased costs of nursing care, and psychological factors such as anxiety and loneliness, have played a causal role in damaging the health of citizens.

Following this, Dr. Takeshi Imoto, Associate Professor of the University of Tokyo, lectured on the topic of, “Cooperation among Citizens, a Local Government and Experts Supporting Voluntary Decontamination Activity.” Referring to ICPR Publication 111, Dr. Imoto outlined the wide range of activities undertaken with the cooperation of Kashiwa City, Chiba, such as communicating with citizens regarding decontamination and the creation of guidebooks, detailing the lessons to be learnt from these.

The final speaker for this session was Prof. Noboru Takamura of Nagasaki University, who spoke on “For the recovery from the nuclear disaster: a model in Kawauchi village.” Prof. Takamura introduced a vast amount of valuable data in his discussion of Kawauchi Village, the first of the designated evacuation areas to be re-opened after the Fukushima accident, detailing his role working alongside the citizens as a radiation protection expert and outlining the work of rebuilding the community after the citizens’ return.

Session 3: Radiation casualty medicine

The first speaker was Dr. Nicholas Dainiak of the Oak Ridge Institute for Science and Education, USA, who gave a lecture on “Medical Management of Radiation Injury in a Mass Casualty Incident.” Dr. Dainiak used actual injury examples to illustrate the importance of carefully preparing triage, treatment protocols and adequate personnel supply, given the difficulty in predicting appropriate medical treatment requirements in the case of large-scale radiation exposure accidents, which result in large numbers of casualties.



Following this, Dr. Marc Benderitter, from the National Institute for Radiological Protection and Nuclear Safety (IRSN), France, spoke on the topic of “Medical management of patients presenting with accidental radiation-overexposure.” Dr. Benderitter explained radiation injury treatments for Acute Radiation Syndrome (ARS) and Cutaneous Radiation Syndrome (CRS), showing numerous specific cases.

Next, Prof. Yuji Yokouchi of Fukushima Medical University, delivered a lecture, “Is it Feasible to Establish a Tissue-specific Stem Cell Bank Derived from Human iPS Cells for Emergency Medical Treatment of Radiation Casualties?” Prof. Yokouchi discussed the possibility of using iPS cells in the regeneration and recovery of systems affected by Acute Radiation Syndrome (ARS), and strategies for this.

Finally, Prof. Yukihiro Higashi of Hiroshima University spoke of “Cutting-edge Preparation of Cell Therapy for Overcoming Radiation-induced Damages in Humans”, emphasizing the

importance of developing and maintaining a regenerative medicine network and promoting cell therapy as emergency radiation exposure treatments required in the case of radiation exposure accidents.

Welcome Reception

At the Welcome Reception held on the first night of the Symposium, Hiroshima University President, Prof. Mitsuo Ochi gave a warm welcome to the participants, expressing his sincere wishes for the continued development and success of the various research groups. Moreover, invited speakers from overseas gave speeches wishing for the further strengthening and development of collaborative research between the three universities. Finally, Prof. Shinya Matsuura, the director of the



Research Institute for Radiation Biology and Medicine at Hiroshima University, expressed his deep gratitude to the participants. It was an amazing evening, where around 80 attendees, from graduate students to esteemed experts, were able to meet and deepen the bonds of fellowship.

Poster Session

At this Symposium, in addition to the aforementioned invited lecturers, 42 poster presentations were delivered from universities and research centers across the country, spawning active discussion at each poster for the duration of the session. While all were of a high standard, best poster prizes were awarded to Mr. Sunaoshi (Nagasaki University), Ms. Royba (Hiroshima University) and Ms. Koike (Fukushima Medical University) due to the high interest they generated amongst the attendees.

Closing

At the closing reception, keynote speaker Dr. Werner Rühm, praised the rich content of the Symposium, and offered his congratulations on its success. He also conferred his best wishes for the continued development of the research network built on the strong tripartite partnership of Hiroshima University, Nagasaki University and Fukushima Medical University.

Final Remarks

As this Symposium was the first international event hosted under the guise of the new-style research network established between the three universities, there were many difficulties to overcome. However, due to the unwavering cooperation and commitment of all

those involved, it was a resounding success. We would like to take this opportunity to express our sincere gratitude on behalf of the organization committee.

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