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Conference Report

Laboratory animals developed and established in Japan — The Ninth Medaka Symposium —

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The present symposium was organized by Dr. A. Shimada of the University of Tokyo. She has been studying radiation-induced mutagenesis of medaka in the laboratory of Professor Shima, the last speaker of the present symposium. The University of Tokyo has been keeping many medaka stocks from wild populations as well as artificially induced mutants, and is recently seeing an increasing demand for these fish from both Japanese and foreign biologists. Medaka is native to Japan and has been studied extensively by mainly Japanese researchers. It is true that this recent attention to medaka was induced by progress in the developmental biological studies using zebrafish, but it should be emphasized that the information accumulated during the past 80 years invests the medaka with an enormous potential as a laboratory animal. Besides medaka, Japanese biologists have established several important laboratory animals. From this viewpoint, the present symposium was organized as follows.

A unique mating behavior of the musk shrew, *Suncus murinus* (O. Matsuzaki, Tsukuba Univ.)

Strains with a variety of larval body markings of the silkworm, *Bombyx mori*, and their utilization for the research on the identification of genes related to mimicry. (H. Fujiwara, Univ. of Tokyo)

Biologic of artificially induced mutations in medaka. (A. Shima, Univ. of Tokyo)

With 45 in attendance, presentations and discussions were carried out under the chairpersonship of Dr. Shimada.

Dr. Matsuzaki described the peculiar mating behavior of the musk shrew (Insectivora) that inhabits a wide area of southern Asia from Egypt to Japan. Since 1973, the breeding of the musk shrews for laboratory purposes has continued, and in 1981 they were certified as a new laboratory animal in the Japanese Association for Laboratory Animal Science. Dr. Matsuzaki described the sexual behavior of males and females in detail, and also the pseudo-sexual behavior between homosexual couples. In *Suncus*, the ceremony leading to copulation consists of a series of behaviors which can be performed by individuals of both sexes. Only when a male and a female meet the sex-specific pattern of behavior is elicited in both sexes. It is not known how *Suncus* identify the sex of their partners in reproductive activity.

Dr. Fujiwara presented their molecular analysis of the genes which control the larval body markings of silkworm. From genetic studies, nearly 20 loci had been known to control the larval body marking. Among them, more than 10 alleles at the *p* locus have been identified. Using the mottled stripe strains, especially the strains with a fragmented chromosome bearing *p* locus, he clarified that the chromosome fragment contains a chorion gene cluster as well as *p*, and that the distance between these two loci is within 800 kb. In his opinion, the *p* gene will be cloned in the near future. Concerning the mottled stripe strains, he also mentioned about two possible research subjects. First, the analysis of the body marking pattern of various types of genetic mosaicism can yield information about the developmental process of the larval skin. Second, from the investigation of the structure of unstable fragmented chromosome bearing the *p* locus, the chromosome structure indispensable for the stability of chromosomes may be elucidated.

Dr. Shima has been studying about the radiation-induced mutagenesis in medaka, using the

"specific-loci method". He and his colleagues produced "tester strains" which have multiple recessive genes. From these fish, they established an inbred tester strain with recessive genes on three separate loci. During a ten-year investigation, about 900,000 embryos and 2,400,000 loci were examined, and about 2,000 mutant fish were identified, among which 240 mutants were viable. The mutation rate of viable mutations was almost comparable to that in the mouse determined by Russell and Kelly (1982). It must be emphasized that the use of fish embryos, which develop "out of uterus", enabled the detection of all mutations, not only viable ones but also lethal ones. Recently their research fields using mutants began to expand. Construction of genetic linkage maps of RAPD markers has started. Furthermore, he distributes the mutants to molecular developmental biologists in Eugene, Boston and Tubingen, and molecular analysis of the genes associated with the early developmental stages are now in progress.

In addition to their scientific achievements, Dr. Shima's lecture greatly impressed us. In the final part of his lecture, he deplored that Japanese biologists lack interest in his medaka mutants, while they are eager to utilize zebrafish mutants from Eugene, Boston or Tubingen. Dr. Shima's laboratory is one of the most powerful institutes in medaka research in Japan, and therefore his statement was meaningful. Compared with the time when we started this series of symposia, more researchers in Japan have come to pay attention to medaka. But we should note that most of them are interested in the potential of medaka as a model system for the investigations on the subjects which were proposed through studies using other animals, especially zebrafish. We hope that research in biological subjects using our own native animals like medaka, silkworm or *Suncus* can produce a new approach which evokes a new attention to other animals.

Preceding the symposium, a special lecture was given on the use of medaka for science education in elementary schools by Mr. K. Watanabe, Education Center in Kanagawa Prefecture. He summarized the merits of medaka for the educational program and introduced the course used in program in the elementary schools in Kanagawa Prefecture.