Although this may not be the most pertinent example, a consideration of the requisites needed to engage in a war may throw light on the importance of resources. Our country traditionally prefers grandeur in battle but tends to neglect logistics support. It is impossible to win a war without the adequate supply of food, arms, and ammunition. Similarly, it is impossible to successfully conduct research without resources. The determination of genome sequences of various species was immediately followed by the post-genome era, wherein adequate attention was not accorded to resources. Consequently, it is now increasingly apparent that the analysis of genes and genome functions is not as simple as the determination of genome sequences. This turn of events highlights the indispensability of resources.

Unfortunately, gene knockout projects have not yet been initiated in our country, and the attention of researchers seems to have completely shifted toward the newly discovered induced pluripotent stem (iPS) cells. Nevertheless, gene knockout projects are by no means inferior to iPS research in terms of importance, and they should receive due attention. Gene knockout projects will be beneficial to almost every researcher in life sciences whereas iPS research will only benefit a selected few. We have developed a unique technology which is as effective as those developed in Europe and the US and which will undoubtedly yield results that are more significant when used to conduct projects for generating knockout mice. At the risk of sounding immodest, we must mention that we have developed an exchangeable gene-trap system, wherein a gene is completely knocked-out during the first phase, replaced with a gene of interest during the second phase, and conditionally knocked-out during the third phase. Although projects undertaken by Europe and the US employ a method that, in essence, can conditionally knockout genes, gene replacement in vitro is conducted by using a gateway system, and further homologous recombination should be performed by using the products. In our system, gene replacement can be performed via Cre-loxP recombination; thus, our method is extremely efficient and easy to perform.

Another advantage of our method is the fact that it employs the MSM/Ms strain, which is a wild mouse strain of the Mus musculus molossinus species and is native to Japan. This strain was developed by Moriwaki et al. after many years of research and was differentiated from C57BL/6 mice, which belong to the Mus musculus domesticus species, approximately 1 million years ago. Shiroishi et al. reported by Moriwaki et al. after many years of research and was differentiated from C57BL/6 mice, which belong to the Mus musculus domesticus species, approximately 1 million years ago. Shiroishi et al. reported that the genome sequence of the MSM/Ms strain is approximately 0.8% different from that of the C57BL/6 strain and exhibits several unique phenotypes such as cancer resistance. We succeeded in establishing ES cell cultures of this strain and methods to effectively establish ES cell lines of exchangeable gene-trap mutagenesis or homologous recombination can facilitate the development of unique resources that are not available in Europe or the US. Thus, the development of this strain as a mouse resource is a matter of pride for Japan.
The notion that Asian ethnic groups generally neglect logistic support seems to be untrue. We founded the Asian Mouse Mutagenesis and Resource Association (AMMRA) in November 2006. The second meeting of this association was held in November 2007 to discuss the importance of mutagenesis and resources and we also managed to gather information regarding the circumstances prevailing in each country. Due to the economic situation in each country, the consolidation of resources has not progressed extensively. However, the developments achieved in this regard in China are particularly surprising: 100 million yuan has already been invested and another 100 million (200 million yuan in total, i.e., 3–3.2 billion Japanese yen) will be granted as funding for projects involving mutagenesis. In addition, large-scale facilities are under construction, and within a short period of time, China will supercede Japan with regard to such research.

Finally, we present information regarding patents for homologous recombination systems, which, surprisingly, many people are unfamiliar with. Currently, the basic patents for homologous recombination systems are held by the Pasteur Institute, which Dr. Le Mouelle and Dr. Brulet are affiliated to, and the licenses are held by Cellectis, a venture firm of the institute. The patents are valid in Europe, the US, and Japan. The patent held by Dr. Capecchi applies to positive-negative selection methods and is only valid in the US. Private companies that are commissioned to manufacture knockout mice using homologous recombination or those that develop drugs using these mice infringe these patents. TransGenic Inc. is the only company in Japan licensed to perform these activities.

Practicality: As a default setting, Flex provides web developers the Flash version of HTML components such as tables and buttons (including functions that are unique to Flash) that are necessary for web applications. Although Flash can be used to display a wide variety of contents, some users find it difficult to operate. However, Flex has set a certain standard in regard to its components and Flash is now also being used in practical websites.

Easy development: A software package known as Flex Builder (Adobe) is used to develop Flash content. With the Flex Builder program, components provided by Flex can be used by the drag-and-drop option (see Fig.). A trial version of Flex Builder is available and is freely distributed to students and educational institutions; therefore, please download it and attempt to develop Flash content. Further, please refer to the samples that have been developed by using Flex Builder (Shingo Sakanaiwa).


Editor’s Note: As a continuation of the previous month’s issue, the second half of Dr. Yamamura’s article “Mouse Resources and Nobel Prize” has been included in this issue. Impassioned messages based on his extensive view of the world, foresight, and advanced technological skills were conveyed to us. We also appreciate his comments regarding the encouragement of logistic support (Y.Y.).

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