

Mini-Symposium on Reproductive Biology Research Using Non-Rodent Mammals: Beyond the Mere Application of Mouse Study

Preface

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Research in mammalian biology has made remarkable progress in the last few decades. Deserving special mention, drastic improvement in research tools, especially the technology of molecular biology, has been a great force driving this progress. Another key aspect of the research regarding mammalian biology is the choice of model organisms. The mouse that has been the most commonly employed mammal in biological research. New findings based on mice continue to extend our knowledge, and the technology for creating mutant mice has helped to validate our ideas concerning novel genes. These circumstances have created a trend in which mice are becoming more and more useful.

However, biological research ought not aim solely at completing an encyclopedia of the elements of the mouse. More extensive research using other animals certainly has rich significance. But such research should not be used simply as a follow-up to mouse study. Rather, it should provide us with materials that stimulate insights into the essential biological mechanisms of mammals. To this end, developing research tools and devices applicable to all mammals is an efficient approach. Some of the latest research technologies, such as microarrays and RNA interference, are potentially applicable to any animal, though they have often been developed for mouse study and are not yet in reach of most researchers using other animals. As we will see in this mini-symposium, however, such technologies can indeed be productive with large animals when experiments are set up appropriately. Also, we will understand that some kinds of experiments are conducted even more efficiently using larger animals than mice. One doesn't have to be discouraged by the apparent difficulties involved in the

use of large animals.

This mini-symposium highlights some recent prominent approaches and findings that are providing new perspectives on reproductive biology. In the first paper, Dr. Abe compiles key features and applications of scanning electrochemical microscopy. This technology can evaluate the respiration activity of embryos without destroying them. In theory, the system will be applicable to embryos of any mammal, and he briefly refers to its possible future clinical use. In the second paper, Dr. Hashizume and colleagues describe the construction and application of a microarray system for analysis of gene expression in bovine placenta. It should be emphasized that this paper is not merely a good presentation of their work, but also provides a comprehensive guide to this powerful research tool. In the third paper, Dr. Miyano and co-workers, who in their research utilized both pig and mouse, discuss the essential differences that they observed in the oocytes of those species at meiotic maturation. Their findings clearly indicate that pig oocytes are not just a-bit-bigger mouse oocytes. In the last paper, Dr. Nagai and colleagues summarize two attractive techniques developed recently to manipulate oocytes for somatic cell nuclear transfer. Of these techniques, "centri-fusion cloning" contains interesting steps in which oocytes first become separated into small pieces of cytoplasm and in the next step the cytoplasm is aggregated. This technique will allow the creation of ample combinations of cytoplasm of different origins. Therefore, this method will be more than a mere substitute for the conventional cloning technique. I would like to thank all the participating authors for their excellent contributions, and hope that this symposium will lead to an enhancement of the reach and quality of our research.