

[From Model Laboratory Species to Model Wild Species; the Next Generation of Model Animals Derived from Japan, but Applicable Worldwide: Japanese Wood Mouse, Japanese Medaka, and Japanese Newt]

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The House Mouse and Wood Mouse — From Laboratory Animal Models to Wild Animal Models

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The house mouse *Mus musculus* is widely used as a mammalian model for biomedical research. Obviously *Mus musculus* is the best animal model to understand fundamental genetic traits in mammalian species including humans, in particular to mimic human inherited disease. In the 21st century, the importance of biodiversity is widely recognized in life science. Today's laboratory mouse strains, however, were derived from fancy mice which have been developed under strong selection pressure in artificial breeding during past 500 years. Consequently, such mice might have lost various important genetic traits that wild animals usually should have for the survival in the natural environment. Before that, wild mice lived in close contact with human society to obtain food. Therefore, for better understanding of rodents in the natural environment, a more appropriate species than the house mouse is needed. In this context, the large Japanese wood mouse *Apodemus speciosus* is an appropriate candidate for the study of biodiversity because they inhabit almost every broad-leaf forest of the Japanese Islands from Hokkaido to Kyushu with a relatively high population density. *Apodemus speciosus*, belongs to the subfamily Murinae the same as the animal models of *Mus musculus* and *Rattus norvegicus*. Hence, we can incorporate a vast knowledge of genetics and genomics from the rat and mouse. Moreover, *Apodemus speciosus* can provide valuable information on geological episodes of the Asian Continent and the Japanese Islands because their inhabitation is generally thought to be independent of human movements. On the other hand, this rodent should be quite helpful in evaluating the effects of environmental mutagens and carcinogens on genetic materials.

In conclusion, the wood mouse species has a great potential as an animal model in both evolution and ecology, the basic biological sciences, which are absolutely essential as the intellectual foundation of human society, and also in the field of applied science concerning environmental agents.

The Large Japanese Wood Mouse, As a Valuable Model Organism for Biodiversity Science

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The large Japanese wood mouse, *Apodemus speciosus*, occurs throughout the four main Japanese Islands and their peripheral islands, including the Sado, Izu, and Satsunan Islands. *Apodemus speciosus* has long attracted research interest because of the substantial morphological variation seen in specimens from the main and the peripheral islands. The populations on Hokkaido and on Miyake Island, for example, are sometimes even treated as valid species. The species is also known to have dimorphic variation in its karyotype: populations with $2n=48$ are found in the eastern part of the main island of Honshu and $2n=46$ in the western parts of Honshu, with a