University of Manitoba

RESEARCH NEWS

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# Mouse model expert wins national recognition

*By Frank Nolan, Research Promotion Officer*

In the two years since he arrived at the University of Manitoba, Hao Ding, biochemistry and medical genetics, has attracted increasing national recognition for his research expertise.

Last fall, he was named as a finalist in the biomedical category for the Maud Menten New Principal Investigator Prize, a national award given annually by the Canadian Institutes of Health Research (CIHR) Institute of Genetics, based on his excellent performance in the CIHR grants competition.

In May 2006, he was named as the winner of the prestigious 2006 Young Investigator Award presented by Boehringer Ingelheim (Canada) Ltd. One award is presented each year to an outstanding researcher in the biological sciences who has been a faculty member at a Canadian university for less than five years.

Ding, Canada Research Chair in genetic modelling, is an expert in the use of transgenic mouse models. He uses knockout mice, animals that have had a specific gene removed, to study the function of genes, including their involvement in particular disease pathways.

"Using knockout mice isn't the hard part," Ding said. "The difficult part is choosing the right gene, and then asking the right questions."

Ding is studying a gene called PDGF-C and its role in the development of medulloblastoma, the most common malignant brain tumor in children.

"We found that when PDGF-C is highly over-expressed in brain cells, it can induce this tumor," he said. "The next question we need to answer is why this happens, and what mechanisms are involved."

Ding is also working with several other genes that have been highly implicated in the development of human cancers and genetic diseases.

"Mouse transgenic technology is the most powerful tool for understanding the *in vivo* function of these genes," Ding said. "In collaboration with Klaus Wrogemann, biochemistry and medical genetics, we are trying to dissect out the role of the Trim32 gene in limb girdle muscular dystrophy type 2H."

This work recently caught the attention of researchers in the United States who are investigating the involvement of the same gene in a genetic disorder called Bardet-Biedl Syndrome.

"A group at the University of Iowa was very interested to learn about our knockout studies of Trim32," he said. "I visited them a few weeks ago, and we have now set up a solid collaboration."

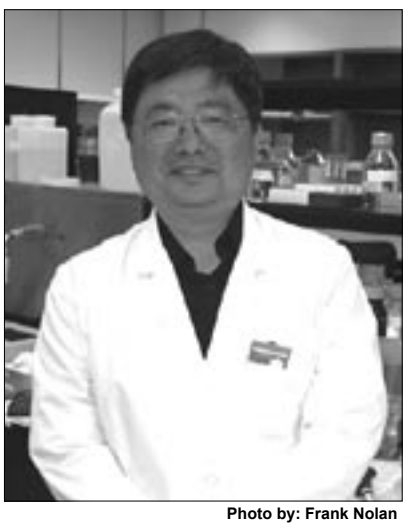

Photo by: Frank Nolan

**Hao Ding, Canada Research Chair in genetic modelling.**

# Long-term grazing experiment is first of its kind

*By Frank Nolan, Research Promotion Officer*

Researchers from the University of Manitoba and the government of Canada have teamed up for a unique grazing experiment at Grasslands National Park of Canada in Saskatchewan. The twelve-year project will document the effects of different intensities of grazing by cattle on virtually all aspects of the park's mixed-grass prairie ecosystem.

Much of Grasslands National Park has been left un-grazed for ten to twenty years. This has resulted in lower diversity, with generally taller grass structure and more litter, or dead plant material, than naturally-grazed grassland would have.

"Grazing is an important process in a mixed-grass prairie ecosystem," said Nicola Koper, Natural Resources Institute. "If you imagine bison going through a landscape, their grazing would result in some areas that have relatively tall vegetation, and others where the vegetation in shorter. This diversity in the vegetation leads to a more diverse ecosystem, including various different kinds of insect and animal communities."

John Wilmshurst, an ecologist with Parks Canada, said this kind of diversity in plants and animals is essential for a healthy ecosystem.

"Right now, this landscape is fairly homogeneous, and it's missing the kind of patchiness you get when different areas are in different stages of plant succession," he said. "The goal of this experiment is to return diversity to the park, so that there are different stages of succession in both plant and animal communities. Different animals make use of different plants, or the same plant at different stages of development, so returning diversity to the vegetation will have a direct impact on the diversity of animal life."

Wilmshurst said the idea for a long-term grazing experiment was planted about ten years ago, when a new management plan for the park began to be developed. Published in 2002, the finished plan allows for both managing for heterogeneity, or diversity, and an experimental approach to determine the effects of grazing.

The project officially started last year with a preliminary meeting in Swift Current that brought together experts in cattle, grazing systems, ecology and experimental design.

"I was invited to that meeting, and it was a great opportunity to be involved right from the beginning," Koper said. "I'm very interested in experimental design and in grazing ecology, particularly how grazing affects birds, so I was lucky enough to become involved in the field work right away."

Koper, Wilmshurst and other team members are making pre-grazing observations to determine exactly what the park's ecosystem is like right now. This pre-grazing sampling will last for two years, with the cattle arriving in 2008 for the ten-year grazing phase of the experiment.

Different numbers of cattle will be brought into experimental pastures throughout the park so that researchers can study the effects of various intensities of grazing. Other sites will be left un-grazed for comparison purposes. Researchers will be looking at the effects of grazing on a wide range of species, including plants, grasshoppers, beetles, birds and ground squirrels. An important goal of the project is to understand how grazing affects species at risk, like the Sprague's Pipit, a threatened prairie songbird Koper has been studying.

"These pipits have declined very seriously across the prairies, but the population density at Grasslands is the highest that I'm aware of," she said. "We don't know very much about the nesting habits of pipits, and learning how they are affected by grazing will be very helpful."

Wilmshurst said this is the only long-term experiment of its kind being carried out in an area that has been left un-grazed for such a long time, and the only one that has a built-in before- and after-grazing treatment.

"At the end of it, we'll have a really good understanding of how grazing interacts with weather, how sites change over time when exposed to specific grazing intensities, and the interactions between a wide range of plant and animal species over time," he said. "We've had a lot of interest in this project from researchers in other parts of Canada and the U.S. who are very interested in seeing what kind of data we get."

Photo by Frank Nolan

**John Wilmshurst, Parks Canada, and Natural Resources Institute researcher Nicola Koper are studying the effects of grazing at Grasslands National Park.**