

# Marquette University's Dr. Ng Studying Physiological Impacts of MS

## Society-Funded Research Addresses Fatigue and BMD

By Heather Markovich

In May of 2008, the National Multiple Sclerosis Society awarded Alexander Ng, Ph.D. of Marquette University, a \$44,000 grant to pursue research on physiological impacts of multiple sclerosis. Ng's study is one of six National MS Society-funded research projects currently taking place in Wisconsin.

The National MS Society funds more MS research than any other nonprofit organization in the world. Indeed, since its founding in 1946, the National MS Society has invested more than \$550 million in research.

### MS and Muscle Fatigue

Ng grew up in California and did his undergraduate work in Biology at the University of California-Davis. He moved to the Midwest and completed his graduate work in Exercise Physiology at the University of Wisconsin-Madison. A post-doctoral fellowship brought Ng back to California – and that's when he first became interested in studying MS. He wondered, for instance, how chronic disease affected muscle fatigue.

In fact, one of the main complaints of people with MS is fatigue. Ng said fatigue occurs in more than 90 percent of MS patients. Some of Ng's early research presented evidence that there are elements of muscle fatigue that are not necessarily explained 100 percent by the disease itself. Said Ng, "We discovered that there were many other elements that could be contributing to the fatigue experienced by individuals with MS."

### Ng's MS Study

Ng's current research is focused on identifying the mechanisms that trigger decreased bone density in patients with MS. Prior independent studies have shown that people with MS are at high risk of experiencing decreased bone mineral density (BMD). This can lead to osteoporosis and increased risk of bone fractures, which

Ng said can be 10 times greater among individuals with MS compared to the general population. A decrease in physical activity could lead to a decrease in BMD in the general population. Ng is exploring if the same is true of individuals with MS. "Any intervention we can

discover – such as vitamin D, exercise or calcium – that will maintain normal BMD or increase low BMD could be instrumental in reducing falling and bone fractures and maintaining quality of life," said Ng.

In addition to a control group, the study has engaged more than 25 Milwaukee-area participants. Each individual has been diagnosed with MS, is between the ages of 18 and 55 and has no immediate family history of osteoporosis. After being screened by Dr. Douglas Woo, a neurologist at Froedtert and the Medical

College of Wisconsin, each participant visited Ng's laboratory at Marquette University. The visits with Ng consisted, in part, of a bone scan (femoral and lumbar spine), blood draw and a non-diagnostic resting EKG. Participants were also asked to wear an activity monitor, similar to a pedometer, for a week. Biochemical analysis was also done to measure vitamin D levels as well as levels of the "stress hormone" cortisol, which can increase blood pressure and blood sugar and reduce immune system responses and BMD. All participants received a medical interpretation of their bone scan and a summary of the various test results, which they could share with their personal physician. "All of my studies have relied on volunteer subjects who are so willing to give of their time and energy," said Ng.

"The reason I'm so excited about the work we're doing at Marquette University is that it could very well lead to some kind of intervention," said Ng. "It's not just finding out the 'why,' but it's taking the next step."



*Dr. Ng, left, measures research volunteer Jeffrey Gingold's Rating of Perceived Exertion and oxygen uptake as he peddles an exercise bike.*

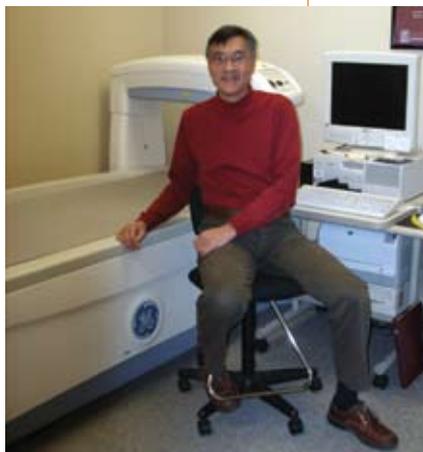
## What Happens Next?

Multiple factors are being explored by Ng to more accurately pinpoint the cause of decreased BMD in individuals with MS. “In order to find out why this is occurring, we are measuring a number of different factors such as vitamin D, cortisol and even investigating cardiovascular control.” Ng explained that among the general population, those with decreased BMD can also have changes in their normal heart rhythm, or heart rate variability. “If one of these factors is found to be associated with decreased BMD in individuals with MS, then our next study will focus on that specific factor,” said Ng.

Physical activity is also a major focus of Ng’s study. “Several previous investigators have hypothesized that decreased physical activity can contribute to decreased BMD in MS, so one of our questions was, ‘Is there evidence that this is true?’” said Ng.

In Ng’s study, the impact of physical activity is being quantified using motion detectors and accelerometers (also known as activity monitors). In fact, Ng said preliminary results indicate that physical activity may be one of the more important factors contributing to decreased BMD.

“The results aren’t totally in yet, but it certainly seems physical activity may indeed play a large role in decreased BMD among individuals with MS,” said Ng. “We know that people with MS can get stronger through resistance exercise,” said Ng, “but no one has really looked at some of the ‘nerdier’ aspects of why or how.” Ng hopes to understand, for instance, the specific mechanisms that trigger strength gain in the muscles of MS patients. This, explains Ng, could lead to the development of better and more specific exercise recommendations for individuals with MS.



*Bone mineral density screening was done on bone scanners such as the one pictured with Dr. Ng.*

## MS Society Support Critical

Ng’s current research is not the first he has had funded by the National MS Society. He shared that his first grant-supported study focused on fatigue and cardiovascular systems in MS patients, a study he continues to receive data on to this day. Ng said the results of that research suggested that cardiovascular control and fatigue may indeed be related.

“Out of all the MS organizations, I feel the National MS Society has taken the lead,” said Ng. “Research sponsored by the National MS Society has made tremendous strides toward finding a cure as well as managing the disease or rehabilitation, not to mention advocacy. I am proud to be associated with the National MS Society.”

## Life Outside Research

Ng teaches exercise physiology and exercise nutrition at Marquette University in the Exercise Science Program, which is part of the Physical Therapy Department. “I love Marquette,” said Ng. “My position allows me to strike a good balance between teaching and research – both of which I enjoy thoroughly.”

Outside of teaching and research, Ng enjoys a variety of outdoor sports such as fishing, cycling, cross country skiing, canoeing, camping and climbing. He is currently a competitor in sprint triathlons, cross country skiing events and citizen cycling in the Badger State Games and Senior Olympics. In addition

to these events, Ng regularly participates in Bike MS in Wisconsin, California and Arizona. While at home, Ng enjoys spending time with his wife Carol and two sons, ages 10 and 13, all of whom accompany him on his “adventures”.

*Heather Markovich is a Journalism major at Carroll University. She was a 2009 fall intern at the Wisconsin Chapter.*

**Interested in volunteering for Dr. Ng’s study? Please call at 414-288-6257 and ask for Molly, Brice or Ben.**