Research News

umanitoba.ca/research

Keeping seniors mobile and road savvy

BY SEAN MOORE
Research Promotion

Rubber bands, a black box, and a DVD can help older adults remain mobile.

Michelle Porter, Kinesiology and Recreational Management, researches mobility among seniors, paying particular attention to their driving habits, behaviors, and reaction times.

"I think as a society, keeping baby boomers safely behind the wheel will be a major challenge, but it has to be done, especially since they are the majority," Porter said.

To keep aging motorists safe, Porter's lab studies three areas of intervention: education, technology and exercise training.

In terms of education, programs like 55 Alive rehash the rules of the road for participants. In tracking 54 people's progress, however, Porter found it did little to correct bad behaviors, which was measured by how many demerits the driver got on road tests.

So Porter put a video camera in the car to record the passenger's-eye-view of the road, and a GPS system to track speeds. The data was put onto DVD. The driver watched the video with an adjudicator who pointed out all the errors made.

Drivers who got this treatment saw a significant decrease in their demerits on a subsequent test, suggesting re-education programs should require in-car work.

Interestingly, Porter has found that drivers over 70 often receive fewer demerits than drivers aged 30-50. But there's a critical difference in the way the mistakes are made.

Younger drivers consciously make errors – they choose to speed or refuse to signal. Whereas the errors older drivers make are more likely related to their slower cognitive processing of information.

One 80-something man in Porter's study drove through three stop signs unknowingly. In addition, the GPS system reported him as consistently below the speed limit. But then he had his education session – watching the DVD of his drive – and during the subsequent test he drove over the speed limit but stopped at every sign, often quite early.

Here is where technology can help.

Submitted Photo

Michelle Porter, holding the Otto and a DVD, studies mobility issues facing older adults.

A small black box called the Otto sits on the dashboard. It's equipped with GPS and through auditory cues it informs the driver when he is speeding, or, say, approaching a crosswalk. This proves handy since, Porter found, it takes longer for seniors to process visual roadway cues, so this could carry some of the cognitive processing burden.

The final intervention is exercise. Porter's lab is looking at how certain ankle exercises can improve braking time among women. Why women? They are the more durable gender: they live longer. However, they also contend with more disabilities, like osteoporosis, which can limit their mobility in and out of cars.

Groups of women did resistance training twice a week for 12 weeks; some with weights, some with Thera-Bands (giant elastic bands).

Afterwards, when the lab tested how quickly subjects could move their foot from an accelerator-like pedal to a brake-like pedal, they found the Thera-Band group was 24 milliseconds faster than their baseline times. Their counterparts increased their movement time by 14 milliseconds.

Travelling at 100 km/h, a 24 millisecond improvement in braking time stops the car about a meter sooner. But a 24 millisecond improvement in reaction time on a slippery floor could be the difference between catching your balance or falling down and breaking a hip.

Developing new asthma therapies

BY SEAN MOORE
Research Promotion

There's something wrong with the drugs.

Over the last 20 years, asthma rates in Canada and other Western countries have approached near-epidemic proportions. And the amount of drugs prescribed to asthmatics has risen in relative stride.

"Clearly these drugs are not preventing or reversing this disease," said Andrew Halayko, Canada Research Chair in Airway Cell and Molecular Biology working in the departments of physiology and internal medicine.

Halayko's research focuses on new therapies that can prevent or reverse asthma. He will discuss his work at the next *Get to Know Research at Your University* speaker series (details below).

Asthma currently affects 12 per cent of children and 6 per cent of adults in Canada; percentages that have roughly doubled in the past 20 years despite dramatic increase in the prescription of anti-asthma drugs.

Halayko's studies airway smooth muscle, which is different from skeletal or cardiac muscle in that, besides contracting, it plays an immuno-modulator and pro-fibrotic role: it can synthesize pro-inflammatory molecules and make collagen.

"My research embraces the idea that the smooth muscle cells are multi-functional," Halayko said. "This muscle can do many things so we don't limit our studies to just looking at its ability to contract, but look at how it remodels the airway wall."

Airway smooth muscle sheaths bronchioles and when it goes into spasm the passages delivering air to the alveoli narrow, making it difficult to breath. Evidence suggests that smooth muscle in asthmatics is a better contractile machine than in non-asthmatics. This may be true, but Halayko reckons the cause of this (and its over-eagerness to produce collagen and pro-inflammatory molecules) stems as much from the environment the muscle finds itself in as the genes it is designed from.

In examining the cellular environment, novel research has come from Halayko's lab pertaining to G-protein-coupled receptors (GPCRs) – proteins found on the surface of smooth muscle cells that bind the bio-molecules that drive smooth muscle to contract, relax, proliferate and release pro-inflammatory molecules.

GPCRs have long been known to do a lot of things. But they look to be in cahoots with receptor tyrosine kinases (RTK), cell surface receptors for many growth factors, cytokines and hormones.

Both of these receptors are found in caveolae, spittoon shaped structures that are abundant in smooth muscle

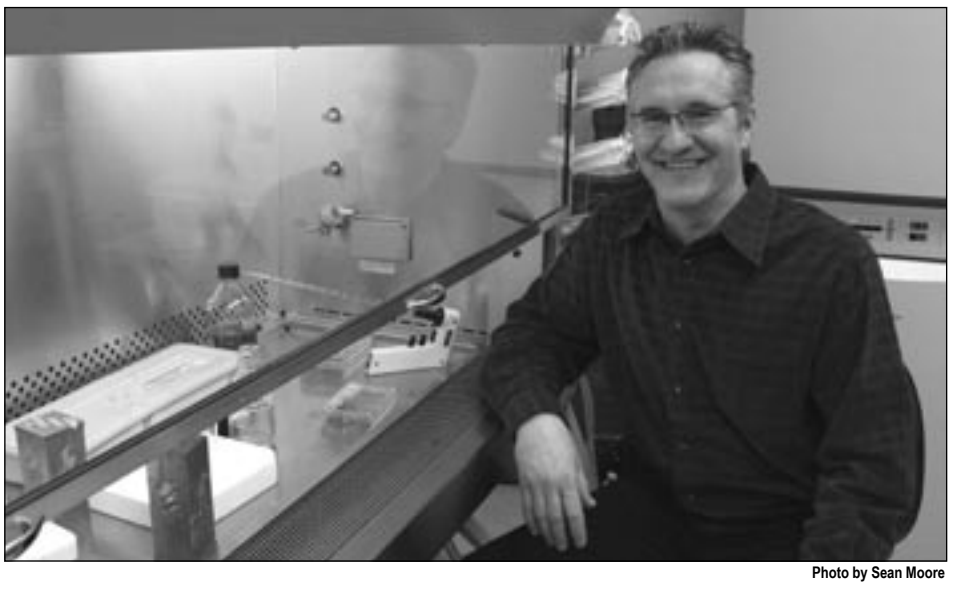

Photo by Sean Moore

Andrew Halayko studies airway smooth muscle cells in the hopes of developing new treatments for asthma.

– they are where the intracellular machinery that tells the cell what to do when receptors bind biomolecules are localized. Simply speaking, think of caveolae as a meeting room.

Two people standing on opposite sides of a long hallway can converse. But they will better interact and express themselves when they are nearer the other, like in a small room. So it is with GPCRs and RTKs; when they are present in the caveolae at the same time, they amplify each others signals resulting in, say, more collagen production.

Halayko is studying ways to take away or disrupt this meeting room, thereby reducing the deleterious things the plasma environment induces them to do.

If you want to learn more on this and how a popular anti-cholesterol drug may be key to developing new asthma therapies, attend "*Breathing Easier: Finding Better Ways to Treat Asthma*" at the next *Get to Know Research at Your University* speaker series on Feb. 28. It starts at 7 p.m. in the Smartpark boardroom, located at 135 Innovation Drive. Admission is free and all are welcome. For more information please call 474-9020.

Bringing Research To Life

Research News is Published
by the Office of the Vice-President (Research)
Comments, submissions and event listings to:
stefaniu@ms.umanitoba.ca
Phone: (204) 474-9020 Fax (204) 261-0325