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New Research Breakthroughs at UHN

Aching to Sleep: Sleep Problems Linked to Pain in Arthritis

Pain is a major cause of sleep difficulties in individuals with arthritis, according to a large-scale study that analyzed data from more than 130,000 individuals across Canada. 


Little was previously known about the role of pain in the relationship between arthritis and sleep problems, leading UHN's Dr. [Elizabeth Badley](#) and her research team to analyze data from the 2000/2001 Canadian Community Health Survey (CCHS) that includes data on individuals representing all demographics of Canadian society.

"The rate of sleep problems for individuals with arthritis was found to be approximately double that of the general population," says Dr. Badley. "Most sleep problems in arthritis sufferers were due to pain," she continued. "Our results suggest that it is important for Canadians to manage pain appropriately."

Arthritis and insomnia symptoms are common disorders, afflicting approximately one in six and one in seven Canadians respectively. Sleep problems have far-reaching consequences that extend into other aspects of quality of life, including work and academic performance.

Arthritis and Rheumatism. Dec 15, 2005. 911-9. [[PubMed Abstract](#)]
Research supported by Ontario Ministry of Health and Long Term Care (Health System-Linked Research Unit grant)

Imaging Inner Geometry in Radiotherapy

A new medical imaging technique that takes into account differences in the body's inner shape over time will make it easier for clinicians to target and monitor tumours during radiotherapy, according to UHN researchers Drs. Kristy Brock, [Laura Dawson](#), Michael Sharpe, Douglas Moseley and [David Jaffray](#). 

Radiotherapy uses controlled doses of radiation to treat cancer. A difficulty with the treatment is minimizing normal tissue's exposure to radiation. The team employed Morfeus, a software program developed at UHN that uses the relationship between the body's internal organs to create accurate models of the liver tumours studied.

"Our study showed that Morfeus improved our ability to see radiotherapy's effect on an individual tumour over time," said Dr. Brock. "This technology has the potential to help clinicians apply image-guided radiotherapy more accurately, meaning that normal tissue will be less affected and improving quality of life for cancer survivors."

Int J Radiat Oncol Biol Phys. 2006 Jan 24. [Epub ahead of print] [[PubMed Abstract](#)]
Research supported by Varian Medical Systems and the Susan Grange Family.

Knowledge of Immune Molecule Growing

A surprising discovery linking an immune molecule to the body's hormonal signals for growth sheds light on how the body's immune system is integrated with brain development according to UHN researchers Drs. [Shereen Ezzat](#) and [Sylvia Asa](#).

Ikaros—a gene implicated in immune stem cell development—was found to stop pituitary production of growth hormone. If a gene normally stops the body from producing growth hormones, it could be expected that shutting down that gene

might lead to bigger individuals. But the research team discovered that mice lacking Ikaros suffer from stunted growth. Through genetic and biochemical approaches, they demonstrated that Ikaros also directs the development of higher centres in the brain that control the hormonal production of growth signals.

Ikaros was previously associated with the body's immune system, where it regulated development of white blood cells.

"This is exciting since it shows that this single molecule is involved at the interface of two separate systems. Discovering that Ikaros has a role in regulating brain development could lead to a better understanding of mechanisms of diseases involving immune surveillance and neuroendocrine dysfunction," says Dr. Ezzat.

PNAS. Feb 14, 2006; 2214-2219. [[PubMed Abstract](#)]

Research supported by the Canadian Institutes of Health Research and Toronto Medical Laboratories.

Enzymes at the Heart of Structural Changes

The discovery by UHN researchers Drs. [Ren-Ke Li](#) and [Richard Weisel](#) that a family of enzymes called the disintegrin metalloproteases is associated with structural changes in the heart could lead to new treatment options for congestive heart failure.


Says Dr. Li, "We discovered that the levels of disintegrin metalloproteases in heart tissues of congestive heart failure mirror the pattern of structural changes, indicating that there is a relationship of some type. There is a good possibility that these enzymes could prove to be targets for therapies to prevent congestive heart failure."

Over 200,000 Canadians are affected by congestive heart failure and it is the leading cause of hospital admission among the elderly.

Circulation. 2006. 238-245. [[PubMed Abstract](#)]

Research supported by the Canadian Institutes of Health Research and the Heart and Stroke Foundation of Ontario.

New Repair [c-]Kit for Heart Disease

A research team led by Drs. [Peter Liu](#) and [Jeffrey Medin](#) has found that a protein called c-kit has a role in the mobilization of bone marrow-derived white blood cells to the heart after a heart attack, a finding that could lead to better therapies for treating the leading cause of death in Western countries. 

In a heart attack, heart tissue may be damaged from lack of oxygen. By looking at a specific strain of mouse, the researchers discovered that c-kit calls upon the body's innate immune system to help bone marrow stem cells generate new blood vessels in the heart.

"The discovery of c-kit's active role in repairing and remodeling the heart could improve therapeutic strategies for heart disease by recruiting the heart's own repair mechanisms," says Dr. Liu.


PNAS. Feb 14, 2006. 2304-2309. [[PubMed Abstract](#)]

Research supported by the Canadian Institutes of Health Research, the Heart and Stroke Foundation of Ontario, the Canadian Heart Failure Team Program and the National Institutes of Health/National Heart, Lung, and Blood Institute (USA).

Infection Target Iron-ically Obvious

A research team led by UHN's Dr. [Tak Mak](#) has discovered that the protein lipocalin

2 is essential in the body's early immune response to harmful bacteria.

Lead author Dr. Thorsten Berger found that mice lacking the lipocalin 2 gene were much more vulnerable to bacterial infection, showing the gene's critical anti-bacterial role. Says Dr. Mak, "Although most of the iron in the body is securely bound in tissues, invading bacteria such as *E. coli* secrete molecules called siderophores to 'steal' iron from their hosts. Lipocalin interferes with this process, stopping bacteria from reproducing." 


These findings could lead to improvements in the clinical treatment of bacterial infections, a common cause of illness and death.

PNAS. February 7, 2006. 1834-1839. [[PubMed Abstract](#)]

Research supported by the Canadian Institutes of Health Research and Cancer Research Institute (NY).

Breaking News from UHN Research


Arthritis Researchers Awarded Major Grant

UHN Research congratulates Drs. [Robert Inman](#) and [Dafna Gladman](#), members of The Spondyloarthritis Research Consortium of Canada (SPARCC), which was recently awarded a \$2.5 million grant by The Arthritis Society as part of their first National Research Initiative. SPARCC is a collaborative, multidisciplinary research team from across Canada, led by Dr. Inman, that will examine spondyloarthritis, a group of diseases characterized by chronic inflammation of the spine. 

Dr. Michael Jewett Named Farquharson Chair

UHN Research congratulates Dr. [Michael Jewett](#), who has been selected as the inaugural Farquharson Chair in Kidney Cancer Research at Princess Margaret Hospital. Dr. Jewett is the current President of the Canadian Urology Association and is known for his research contributions to the fields of testis, bladder and kidney cancers.

Research Fact

February has been a stellar month for UHN researcher Dr. [Michael Fehlings](#), who was voted Chair-Elect of the Section on Neurotrauma and Critical Care of the American Association of Neurological Surgeons/Congress of Neurological Surgeons (effective April 1, 2006) and who published a book, *Spinal Cord and Spinal Column Tumors: Principles and Practice* (co-authored with Ziya Gokaslan and Curtis Dickman, Thieme New York). 

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