

RHEUMATOLOGY

Rheumatology researchers at Capital Health are working to find better ways of diagnosing, monitoring, treating and caring for patients with inflammatory autoimmune diseases. Their ultimate goal: to relieve suffering and improve quality of life for these patients.

Helping patients live better and longer with autoimmune disease

Rheumatology is a diverse specialty. It covers common forms of inflammatory arthritis, such as gout and rheumatoid arthritis, which cause pain, swelling and eventually damage to the joints. It also includes less common diseases like lupus, which can affect any tissue or organ system in the body, and scleroderma, which hardens the skin and can affect the blood vessels, lungs, kidneys and bowels. The common thread that ties these conditions together: they are all autoimmune diseases which arise when patients' immune systems attack their own bodies.

“These diseases affect people of all ages, often emerging in young people and causing significant pain, disability and sometimes even premature death,” notes Dr. Evelyn Sutton, head of the Division of Rheumatology at Capital Health and Dalhousie Medical School. “It’s rewarding to help people live longer, with better quality of life, through rheumatology research.”

Dr. Sutton and fellow rheumatologist Dr. John Hanly, director of research in the division, lead a wide range of studies. They work with a team of research staff and local colleagues in fields

including respirology, cardiology, psychology, pathology, pharmacy, epidemiology and health economics. They conduct clinical studies to assess the diagnosis, treatment and outcome of disease-related problems, translational studies to examine the role of auto-antibodies and other biomarkers in the development of disease, and health utilization studies to learn what health services patients use and how they fare.

The researchers are active in national and international research groups, such as the Canadian Rheumatology Research Consortium, the Canadian Scleroderma Research Group, the Canadian Network for Improved Outcomes in Systemic Lupus Erythematosus and the Systemic Lupus International Collaborative Clinics. “Large-scale collaborations allow us to solve our research questions strategically, making best use of available resources,” notes Dr. Hanly. “By sharing ideas and data globally, we are able to make a bigger difference for our patients locally.”

Funding comes from sources including the Canadian Institutes of Health Research (CIHR), The Arthritis Society of Canada, Green Shield Canada Foundation, Capital Health Research Fund, Ross Quigley Endowment Fund, Gardiner Medical Research Trust Fund and several pharmaceutical companies.



Lynda Cavanagh enjoys doing needle work when her lupus is under control. Fortunately, her disease has been relatively inactive in recent years.

Lupus: One Woman’s Story

Lynda Cavanagh was 28 in 1984, and had just given birth to her first and only child, when the joint pain and fatigue she’d been feeling late in her pregnancy began getting worse and worse. For awhile, she thought this and her rapid weight loss might be due to the birth. As she became weaker and weaker, she knew something was wrong, but her physicians were unable to diagnose anything specific. A few weeks later, she was hospitalized with a blood clot in her leg. Specialists diagnosed her with lupus as she lay in intensive care, the disease charging through her and threatening her life.

“It took me two years to get back on my feet,” Ms. Cavanagh says. “I literally had to learn to walk again.” The lupus had damaged her kidneys, heart and lungs, and the powerful corticosteroids she took to control the disease sent her blood sugar and blood pressure soaring.

Now her lupus is under control most of the time, but it has left an indelible mark on her life. “It changed everything,” she says. “We would have had more children, I would have pursued a career, we would have had a more active social life.” As it was, she poured much of her limited energy into founding the Lupus Society of Nova Scotia, creating a community for patients to share their experiences and a means of raising awareness and money for research. She has participated in many clinical trials over the years and continues to take part in Dr. John Hanly’s patient outcomes studies. “Research gives me hope, not only for myself but for the many others who are diagnosed and must live with this mysterious disease.”

Disease with a thousand faces

Researchers probe the mysteries of lupus and its impact on the nervous system

Striking mostly women in their youth or their prime of life, lupus is called the 'disease of a thousand faces' because its symptoms and effects vary so widely from person to person. While the cause is unknown and a cure is yet to be developed, researchers are learning more about the disease and how to manage it.

In lupus, the immune system attacks a person's own body, causing inflammation in the joints and skin and often other body systems, including the nervous system. It is the nervous system involvement that has most captured Dr. John Hanly's attention.

"There are 19 neuropsychiatric syndromes associated with lupus, but they are not unique to lupus nor are they related to the disease in every lupus patient," Dr. Hanly explains. "We are developing ways to determine which problems are related to lupus and which are not. This has a major impact on prognosis and treatment."

A professor in the Division of Rheumatology at Capital Health and Dalhousie Medical School, Dr. Hanly has been studying the impact of lupus on the nervous system for more than 20 years. He is leading the neuropsychiatric (NP) component of an international lupus probe involving 27 centres in 11 countries. Since 2002, the Canadian Institutes of Health Research-funded study has enrolled approximately 1,400 newly diagnosed lupus patients and will follow some for as long as 10 years.

So far the data has revealed that roughly one third of patients experience some sort of NP event close to the time of their lupus diagnosis. About a third of these problems are directly related to lupus. Seizures, strokes, mood disorders and cognitive changes such as memory loss are among the most common problems, although some patients develop movement disorders, psychosis, neuropathies and other NP conditions. Patients with NP problems report a lower quality of life, whether their problem is related to lupus or not. However, when the NP problems are related to lupus, they are more likely to improve over time.

Lupus auto-antibodies are providing vital clues. "We've found that certain antibodies are present in lupus-related strokes, and different antibodies are present in lupus-related psychosis," notes Dr. Hanly. "These important findings shed light on the cause of the events and help us decide which medications to use."

In addition to numerous local research projects, Dr. Hanly contributes to other aspects of the international study, including investigations of cardiovascular disease and cancer in lupus. In a separate study, he is collaborating with Canadian lupus researchers to find the genetic and environmental factors that may trigger the disease.

Understanding cognitive problems in lupus

Dr. John Hanly (right) is working with neuro-psychologist Dr. John Fisk (left) to shed light on the cognitive problems that often plague people with lupus. These include difficulties in processing and recalling complex information and can have a major impact on patients' lives and livelihood. The researchers are using a computer-based system that assesses mental processing in a variety of



cognitive tests. "We conduct these tests on patients with lupus, multiple sclerosis and rheumatoid arthritis, and on a healthy comparison group," says Dr. Fisk. "We want to see if there are any unique patterns of cognitive impairment associated with these diseases." They aim to develop an objective means of measuring cognitive change, and better ways to predict how patients will fare with these problems over time.

Some Symptoms and Effects of Lupus:

- pain and swelling in the joints
- skin rash, sometimes caused by sun exposure
- sores in the mouth and nose
- kidney inflammation and damage
- cardiovascular disease, including heart attacks
- blood vessel inflammation
- stroke; seizures; psychotic episodes
- cognitive impairment, including difficulty with memory, attention, concentration and organization
- abnormal laboratory tests, such as low blood counts and lupus antibodies

Coping with ‘marble skin’ disease

Researchers seek better quality of life for patients with scleroderma

Like lupus, scleroderma is an autoimmune disease. In scleroderma, the most obvious result is the hardening of the skin. While the limited form of the disease affects only a few parts of the body, such as the hands or face, the systemic form causes hardening throughout the body – not just of the skin but of internal organs as well.

As Capital Health rheumatologist Dr. Evelyn Sutton describes it, “for some patients, it’s like being encased in marble.”

There is no cure for scleroderma. “Treatment is aimed at managing symptoms, which vary by patient depending on what body parts or organ systems are involved,” notes Dr. Sutton. “We can help patients manage swallowing problems, poor circulation, bowel disorders, inflammation in the lungs and other symptoms.”

Her research aims to improve quality of life for scleroderma patients. In one national study with the Canadian Scleroderma Research Group, she and Dr. Deborah Matthews of Dalhousie’s Faculty of Dentistry are examining the oral health of scleroderma patients.

“Some patients can’t open their mouths very wide and have difficulty cleaning their teeth,” Dr. Sutton explains. “We want to learn what problems patients may be having with their teeth and gums and what impact this has on their quality of life.”

Poor circulation to the fingers can result in painful finger tip ulcers and, worse, amputation of the digits. Dr. Sutton is enrolling patients in an international clinical trial that’s testing a new oral formulation of a drug currently used intravenously in

advanced cases of finger ulcers – to dilate the blood vessels and promote healing. “We want to see if the oral drug can heal the ulcers and prevent new ones,” she says.

One of scleroderma’s most serious complications is pulmonary artery hypertension (PAH), a potentially deadly condition of increased pressure in the lungs’ blood vessels and the right side of the heart. PAH can also develop in people with lupus, congenital heart defects, HIV and other conditions.

To better care for these patients’ complex needs, Dr. Sutton joined forces with Drs. Simon Jackson, Miroslav Rajda, Paul Hernandez and Colm McParland in the divisions of Cardiology and Respiriology to launch a multi-disciplinary PAH clinic which now also includes pharmacist Heather McLearn and registered nurse Cecille Ferguson, the program coordinator.

This team is involved in various studies. One international project is investigating whether a combination of non-invasive tests can diagnose PAH as effectively as cardiac catheterization, which involves inserting slender wires into the right side of the heart through a major blood vessel, usually in the leg. This test provides the most accurate picture of what’s happening in the heart, but can cause rhythm disturbances.

“We hope that a combination of tests will provide data that is similarly accurate to the right heart catheterization, so we can more safely and less expensively monitor the status of patients’ disease” Dr. Sutton says. As to the big picture, she adds, “The more effectively we monitor and manage scleroderma and its complications, the more we can keep people out of hospital and living longer, better lives.”

Managing pulmonary artery hypertension (PAH)

Dr. Evelyn Sutton examines the veins in PAH patient Gloria Stockley’s neck, to see if the blood pressure in the vessels returning to the heart is elevated. “We use a number of medications to reduce the pressure in the right side of the heart,” notes Dr. Sutton, “but we must keep a careful eye on how well the pressure is managed.”

After years of feeling exhausted and out of breath, Ms. Stockley was diagnosed with a limited form of scleroderma and PAH in 2006. At the time, she could barely walk and her physician felt her life was in danger. Now, as a patient in Capital Health’s PAH clinic, her symptoms are monitored carefully and she regularly provides information to the clinic’s research database. With oxygen and medications, including one that must be given by continuous intravenous infusion, she has energy and no problem getting out and about. “I have my independence and my life back,” she says, adding that “I’m glad to contribute to the research. I want to help people to understand this disease better.”



Rheumatology Research Team

Back (l to r):

Grace McCurdy, research coordinator; Tina Linehan, research administrative coordinator; Dr. Evelyn Sutton, professor and head, Division of Rheumatology; Dr. Ingrid Sketris, professor, College of Pharmacy.

Front (l to r): Lisa Fougere, research administrative coordinator; Chris Skedgel, health economist; Dr. John Hanly, director of research, Division of Rheumatology; Cecille Ferguson, coordinator, Pulmonary Arterial Hypertension Program; Kara Thompson, biostatistician.



A common pain

Researchers explore impact and management of gout in Nova Scotia

A painful condition that most often affects the small joints in the hands and feet, gout develops when excessive amounts of uric acid form crystals within the joint. The crystals trigger a brisk inflammatory response, causing pain, swelling and warmth.

Unfortunately, gout is all too common among the elderly population in Nova Scotia. In a five-year study of gout in Nova Scotia, Capital Health researchers documented more than 4,000 new cases, primarily in senior citizens.

Led by rheumatologist Dr. John Hanly and funded by Green Shield Canada Foundation, the study compared the gout patients' health care use to that of similar-aged people without gout.

"We found that health care costs for the gout patients were about \$8,000 more per patient over the five years, compared to the control group," says Chris Skedgel, a health economist in the

Department of Medicine. "The greatest costs were due to hospitalization, medications and physician visits."

Gout patients require more care in part because of other problems that often go along with gout, such as high blood pressure, lipid disorders and diabetes.

The study highlighted a number of important medication issues. "We discovered that 55 per cent of the patients with gout were taking diuretics, often given for high blood pressure or congestive heart failure, yet diuretics can trigger or aggravate gout," notes Dr. Ingrid Sketris, a professor at Dalhousie's College of Pharmacy. "Physicians need to be aware of this link... some patients may be able to manage these other conditions with agents that don't impact gout."

The researchers gained another important insight. "Less than one per cent of the gout cases were diagnosed by rheu-

matologists," says Dr. Hanly. "More than three-quarters were diagnosed by family physicians, and the remainder by non-rheumatology specialists." While this makes practical sense – there are few rheumatologists in the province – it underlines the need for better promotion of diagnostic and treatment guidelines for gout. As a recent study by resident Dr. Claire Barber found, involving a rheumatologist results in better adherence to treatment guidelines and better outcomes for patients who are diagnosed with gout in hospital.

"These studies give us a clearer picture of the gout situation in Nova Scotia," says Dr. Hanly. "From here we can design further studies to find solutions to the problems we're seeing."

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