

UROLOGY

Urology researchers at Capital Health are taking innovative steps to improve the lives of people who suffer from disorders and diseases of the urinary system.

Researchers seek solutions to problems both painful and common

Capital Health urologists treat patients with a wide array of problems. These range from life-threatening cancers of the bladder, kidney, prostate and testes, to excruciating conditions like stone disease and interstitial cystitis. They also include such distressing disorders as incontinence and overactive bladder.

“Urological problems are very common and collectively cause a lot of human suffering,” says Dr. Ricardo Rendon, a urologist at Capital Health and director of research in the Department of Urology at Dalhousie Medical School. “Our research efforts are squarely aimed at reducing this suffering in all its forms.”

Many Capital Health urologists are heavily involved in research. They are working with clinicians and scientists in other fields to advance knowledge and make an impact on patient care locally, nationally and internationally.

Life-changing technology

Lauren Billard has lived with discomfort for most of her 25 years. Her bladder problems began in early childhood, but were misdiagnosed as infections until she was 18 years old. By then, she was in so much pain she couldn't sleep and could scarcely function in her day-to-day life. “I was exhausted,” says Lauren, “and painkillers were my only option.”

Finally referred to a Capital Health urologist in 2004, Lauren was diagnosed with interstitial cystitis, a severe inflammation of the bladder's inner lining. She began receiving weekly treatments that involved filling her bladder with medicated fluid to stimulate healing, but for her provided no lasting relief. Help came when urologist Dr. Jerzy Gajewski returned to Capital Health after a short sabbatical.

Dr. Gajewski is one of a handful of specialists in the world pioneering sacral neuromodulation (SNM) for the treatment of interstitial cystitis, overactive bladder and voiding dysfunction. He surgically implanted the tiny electrical device—which he describes as a pacemaker for the bladder—under the skin in Lauren's lower back. The effects were immediate.

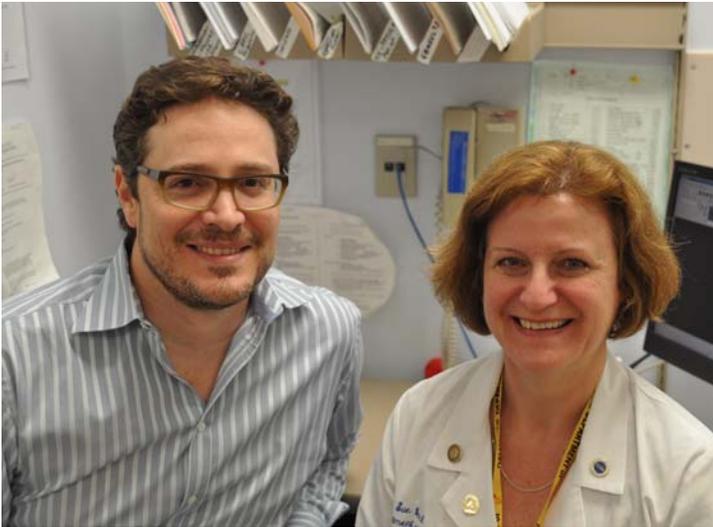
“I noticed a huge difference right away,” says Lauren, who was in her second year of university at the time. “I wasn't in pain anymore. I could sleep, I could eat, I could get my school work done!”

Many people are getting their lives back, thanks to SNM technology. “We have found that 75 per cent of patients experience an 80 per cent improvement in their symptoms,” says Dr. Gajewski, who works closely with registered nurse Liette Connor on this and other studies.

“The device tones down hyperactive nerve signals between the bladder and brain, allowing the bladder to relax and heal.” He hopes his research will lead to more widespread use of the procedure in patients whose interstitial cystitis does not respond to medication. Dr. Gajewski also hopes to play a role in gaining Health Canada approval for the use of botox in treating overactive bladder, a condition that plagues more than 20 per cent of adults. “Botox smooths the bladder muscle, making it less reactive,” explains Dr. Gajewski, who is working with colleagues across Canada on this study. A national leader in his field of functional and neuro-urology, Dr. Gajewski is president of the Canadian Urological Association as of June 2010.



Dr. Jerzy Gajewski explains the workings of the latest sacral neuromodulation (SNM) device to Lauren Billard of Halifax. Her life was transformed when she received a similar device in 2005. Dr. Gajewski continues to follow her progress through a long-term research study.



Dr. Ricardo Rendon and urology research coordinator Susan Winch work together on a number of local and national kidney cancer studies. Kidney cancer is the tenth most common cancer in Canada.

New approaches to kidney cancer

Watchful waiting

Capital Health urology researchers are developing and testing a surprising new approach to early-stage kidney cancer. It involves watching and waiting, rather than the typical approach of surgically removing the tumour as soon as it is diagnosed.

“Some kidney cancers are very aggressive, while others progress slowly,” explains Dr. Ricardo Rendon, a Capital Health urologist and surgeon. “We have identified visible features of tumours that tell us which ones are most likely to grow and spread. These we remove as quickly as possible. The slow-growing tumours, we watch.”

The researchers are monitoring 170 kidney cancer patients via x-ray—every three months for the first two years after diagnosis and less frequently thereafter if the tumour remains relatively dormant.

“Our approach has important implications,” says Dr. Rendon, explaining that surgery to remove kidney cancer is complex and prone to complications. “It could be more harmful for a patient with slow-growing cancer to have the surgery than to watch and wait.” He adds that many kidney cancer patients are elderly and suffer from a host of additional health problems that make surgery a dangerous option.

Accurate diagnosis

In an earlier study, supported by the Capital Health Research Fund, Dr. Rendon developed a method that enables specialists to identify kidney cancer with 90 per cent accuracy—compared to a previous accuracy rate of 70 to 90 per cent. This means

patients with benign tumours are less likely to receive risky surgery they don’t need.

“With rising rates of kidney cancer, an aging population and an increasingly strained health care system, it is crucial that we accurately diagnose kidney cancers and identify how aggressive they are, early on,” says Dr. Rendon. “Our approach ensures that people who really need surgery get it quickly, while those who don’t are followed closely so we can intervene if their cancer becomes more aggressive.”

Ultimately, Dr. Rendon would like to see more sophisticated, non-invasive ways of detecting, diagnosing and monitoring kidney cancer. He is working with Dr. Dawn MacLellan, a pediatric urologist at the IWK Health Centre, and urology resident Dr. Michelle Chang, to identify metabolites in the blood and urine of kidney cancer patients that could serve as such biomarkers of disease (see story, page 4).

Preventing recurrence

At the same time, Dr. Rendon is working with medical oncologist Dr. Lori Wood to see if new drugs being used to treat metastatic kidney cancer can prevent recurrence if given after surgery. “The risk of kidney cancer coming back after removal of the primary tumour can be quite high,” says Dr. Wood, noting that the current standard of care is to observe patients after surgery and intervene with chemotherapy only if the cancer returns. “We’re involved in national clinical trials to see if the new agents can prevent recurrence in the first place.”

Safer surgery

As a surgeon, Dr. Rendon is constantly refining his methods. He recently developed a technique that protects the kidney from damage that can result when blood supply to the organ is cut off during cancer surgery. “We have found a way to reduce the time that blood vessels need to be clamped from 30 minutes to 14,” he explains. “This minimizes oxygen deprivation and protects the health of the kidney.”

Collaborations count

Dr. Ricardo Rendon works with colleagues in many other fields. He and anesthesiologists Dr. Gordon Launcelott and Dr. Shubha De have found that they can safely reduce patients’ post-operative pain and time in hospital by using local nerve blocks during surgery. Meanwhile, he is working with Dalhousie scientists Dr. Patrick Lee and Dr. Roy Duncan on potential new therapies and drug delivery systems to fight prostate cancer.

Prostate cancer research improves outcomes and access to care

Making sure prostate cancer patients receive the care they need—when and where they need it—is a big focus for Dr. David Bell, head of the Department of Urology. As a surgeon, Dr. Bell commonly performs surgery for prostate cancer. As a researcher, he is dedicated to learning how to provide the best possible care that meets each individual patient’s unique needs.



Photo courtesy Dalhousie Medical Research Foundation

Individualized treatment plans

“Each man’s prostate cancer is different,” explains Dr. Bell. “Treatment and care varies tremendously, based on each patient’s age, his overall health, and the stage and aggressiveness of the cancer. The situation is dramatically different for a 50-year-old man with aggressive cancer, compared to an 80-year-old man with slow-growing cancer, who is more likely to die from causes other than his prostate cancer.”

Surgery is clearly called for when the cancer is aggressive, but slower-growing cancers in younger men pose decision-making challenges. Prostate surgery can lead to such complications as urinary incontinence and erectile dysfunction; radiation can cause other cancers; and hormone therapy to block cancer-promoting testosterone increases the risk of osteoporosis and fractures.

“We’ve moved from ‘search and destroy’ to ‘monitor and control,’” notes Dr. Bell. “But to be successful in this approach, we have to develop better ways of controlling cancer progression and recurrence, and monitoring the cancer’s response to drug treatments.”

Dr. Bell is conducting a wide range of studies under the umbrella of ‘Project P,’ a multi-year prostate cancer initiative launched with support from the Soillse Fund (started by Frank Sobey through the Dalhousie Medical Research Foundation). These include numerous clinical trials on promising new drugs, explorations of the impact of prostate cancer on men and their families, and a database that is helping clinicians determine which kinds of patients do best with which treatment plans.

Aligning services with needs

The ‘monitor and control’ approach requires patients to be followed for years, placing a huge burden on the health care system—and on patients, many of whom must travel for hours to see a urologist in Halifax. Dr. Bell is changing how care is delivered, so it is more cost-effective and more convenient for those patients (the majority) who do not need to be followed at a tertiary care centre.

“We hired an industrial engineer to analyze our processes, and he found that 45 per cent of the work done by urologists could be done just as effectively by nurses,” says Dr. Bell. “Based on this, we’re developing a distance telehealth model that employs nurses to provide follow-up care by telephone and the Internet. In a rural place like Atlantic Canada, this is the kind of innovation we need to pursue.”

Examining unintended consequences

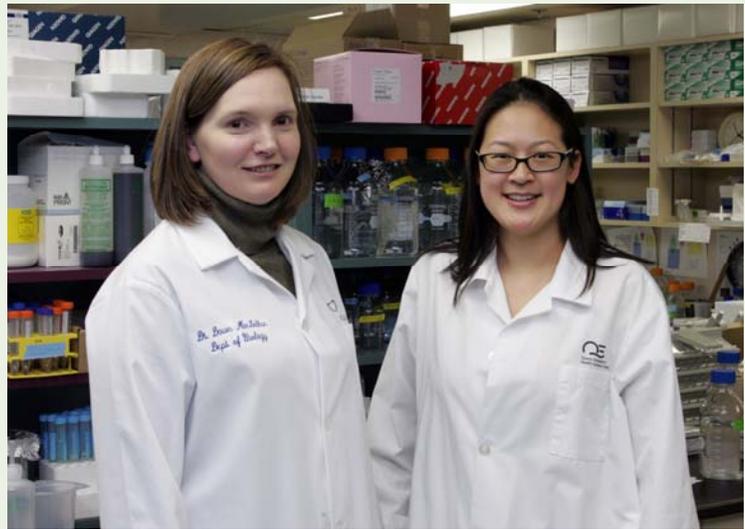
Some common urological procedures—like vasectomies and prostate biopsies—carry risks. Dr. John Grantmyre, a professor of urology who specializes in male infertility in his clinic, has found that up to 15 per cent of Canadian men who have vasectomies experience chronic testicular pain that persists for years. “Men should be aware of this risk,” says Dr. Grantmyre. “Some men have so much pain, they regret having the procedure done.”

Other studies have shown that one to four per cent of men develop an infection after a prostate biopsy for the diagnosis of prostate cancer. In some cases, men develop sepsis and, in rare cases, deaths have been reported from these infections. This finding prompted Dr. Grantmyre and his colleagues to examine the biopsy procedure, to discover that gel used on ultrasound probes can become contaminated with bacteria—one cause of serious infections that occurred in both Nova Scotia and Newfoundland. Now, this gel is individually packaged in sterile pouches to prevent such infections.

Searching for biomarkers of disease

Pediatric urologist Dr. Dawn MacLellan (left) and urology resident Dr. Michelle Chang (right) are working with Dr. Ricardo Rendon, Capital Health pathologists, and scientists at the National Research Council to identify metabolites in the urine of kidney cancer patients that could serve as biomarkers of disease. “Such biomarkers could help clinicians identify how aggressive a cancer is, or monitor a patient’s response to treatment,” Dr. MacLellan says. “Ultimately, we would like to find a biomarker that could be used for early detection and diagnosis of kidney cancer, through a simple urine test.”

Dr. MacLellan is also looking for biomarkers of kidney obstruction in her lab at the IWK Health Centre. Dr. Chang’s research is funded by Capital Health.



Solutions for stone disease

More than a thousand people seek care for kidney stones at Capital Health each year. “Kidney stone disease affects one in ten people in Canada,” notes Dr. Richard Norman, a urologist who studies and treats this common, often extremely painful, ailment. “We can successfully treat stones, but they may come back. Stones recur in half of patients after five years, and in three quarters after ten years.”

Dr. Norman would like to see a nose dive in these recurrence rates. That’s why he and his research team are analyzing the chemical composition of patient urine samples and comparing this information to data about the patients’ diet and overall health—and the type and size of their stones—at the time of enrollment, one year later, and throughout their lives.

“Based on what we find in the urine, we can identify patients’ dietary risk factors and advise them on specific foods to reduce or avoid,” says Dr. Norman, explaining that oxalate-rich foods like peanuts and spinach worsen some kinds

of stones, while others are more likely to form when a person is taking in a lot of protein through meat and dairy products. Most importantly, people need to drink a lot of water to dissolve the mineral salts that will otherwise form stones.

“We believe we can reduce recurrence rates to 10 or 15 percent, providing patients follow our advice,” Dr. Norman says. He and dietitian Lindsay Landry have launched a new study to see if including patients’ partners in discussions about dietary changes leads to better results.

Dr. Norman has found that stones are often more difficult to treat in older patients, especially those over the age of 80 who have other medical conditions. “We’re finding that we need to modify our approach with older patients,” he says. “Instead of trying to eliminate every stone, as we do with younger patients, we are focusing on removing the larger, faster-growing stones.”

Kidney stones can be removed through an incision in the back, laser surgery

using a scope inserted into the ureter, or focused sound waves to non-invasively break up the stones. Dr. Norman is investigating why some patients experience cardiac arrhythmias during this latter procedure. He has found that these arrhythmias are more common in younger patients and when the stones are being broken up in the right kidney. A technique called ECG-gating returns the heart rhythm to normal.

DISCOVERY and INNOVATION for HEALTH



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