

THE BEAT

A COMPENDIUM OF INFORMATION ABOUT THE UNIVERSITY OF OTTAWA HEART INSTITUTE

HIGHLIGHTS

"We do more nuclear cardiology scans than anywhere else in the country." Patients are sent from all over the country; 50 percent come from outside the Ottawa region.

- Dr. Robert S. Beanlands, Chief of Cardiac Imaging and founding Director of the National Cardiac PET Centre (from *Canada's Most Advanced PET Centre Fuels Clinical and Research Progress*, pages 1-2)

Dr. Donald S. Beanlands has been awarded the 2006 Lifetime Achievement in Cardiovascular Sciences from the International Academy of Cardiovascular Sciences.

(from *Heart Institute Icon Recognized for a Lifetime of Work*, page 1)

"The Heart Institute has trained many fellows, who have then furthered their training at other institutions then returned to Ottawa to join the Heart Institute."

- Dr. Ben Chow, co-director of Cardiac Radiology at UOHI (from *World Cardiac Community Comes Here to Pursue Advanced Research*, page 3)

Canada's Most Advanced PET Centre Fuels Clinical and Research Progress



Dr. Robert Beanlands, Chief of Cardiac Imaging and founding Director of the National Cardiac PET Centre uses the PET scan to assess the viability and blood flow to the heart.

A new mini-scanner sensitive enough to use on laboratory mice has been installed at the Heart Institute's National Cardiac PET Centre, the country's only such facility dedicated to cardiovascular disease.

Cardiac Positron Emission Tomography (PET) measures the metabolic activity of cells and can help detect heart ailments. The medical imaging technology is widely used as a diagnostic tool in cancer and heart disease. Until recently machines have not been able to capture enough detail for use on small animals such as mice and rats.

The National Cardiac PET Centre, which fully opened in 2002, is uniquely positioned

in the area of nuclear cardiology to conduct both research into heart disease and provide diagnosis and detect the viability and blood flow of the heart. PET is a nuclear imaging technique in the field of cardiology. A tiny amount of radioactive substance called a tracer is injected and gives off energy that is 'traced' by special cameras to reveal areas of the heart that are not getting enough blood, for example.

"These are biological compounds, which we can label in our own radiochemistry facility, to follow their course through the body," says Dr. Robert S. Beanlands, Chief of Cardiac Imaging and founding Director of the National Cardiac PET Centre. "Currently, we use these to look at glucose

(sugar) metabolism, fatty acid metabolism and oxygen consumption in the heart and blood flow. We can also look at the neuro-hormonal functions by following the tracers to receptors in the heart."

As a diagnostic tool, PET assesses the viability and blood flow to the heart. If serious blockage is found, the results can help cardiologists determine the most suitable treatment: coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI) or cardiac transplantation. CABG involves grafting vessels harvested from elsewhere in the body to bypass the blocked vessels. PCI or angioplasty uses a catheter, which is advanced through a vessel with a balloon

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The Beat is published 9 times a year by the University of Ottawa Heart Institute (UOHI). Comments or questions about The Beat should be directed to Jacques Guerette, Vice President, Communications at (613) 761-4850 or jguerette@ottawaheart.ca. For more information about UOHI, please visit www.ottawaheart.ca

Heart Institute Icon Recognized for a Lifetime of Work



Dr. Donald S. Beanlands has been awarded the 2006 Lifetime Achievement in Cardiovascular Sciences from the International Academy of Cardiovascular Sciences. Dr. Beanlands left Toronto in 1975, moving to Ottawa to develop cardiology at UOHI. He served as Chief of the Division of Cardiology for 19 years, Professor of Medicine at the University of Ottawa and is widely recognized as one of Canada's top cardiologists.

Currently, Dr. Beanlands is Professor Emeritus at the University of Ottawa and Deputy Director General of the Heart

Institute. He is the past Director of what is regarded as one of the best postgraduate training programs in the country for young cardiologists. Physicians from across Canada and many from around the world are trained in all aspects of cardiology at the Heart Institute.

His many awards in teaching include the Excellence in Clinical Teaching Award for postgraduate training at the Faculty of Medicine on two occasions and distinguished Teacher Award of Canadian Cardiovascular Society 1998.

Dr. Beanlands continues with an active schedule, remaining committed to teaching and training. Advances in technology and new, more effective medications have improved the ability of physicians to treat patients, he says.

"There has been tremendous progress but we still have to look after individual patients. That is important for residents to learn in their training. We've increased the training program by a year to take account of the technology but I'm not sure that's enough."

Knowledge at the bedside, taking a proper history and conducting a thorough physical examination are critical for young physicians to learn, says Dr. Beanlands. "These are gradually disappearing arts because of a growing dependence on technology. Unless you know what you are doing, hearing and seeing, you can't tell whether the technology is always correct. So it's very important that young cardiologists learn these clinical skills." ❧

(Country's Most Advanced PET Centre Fuels Clinical and Research Progress, continued)

on the tip. The balloon is opened at the point of blockage to widen arteries, most often using a stent that works like scaffolding to ensure the opening remains intact.

About 6,000 patients annually pass through the doors of nuclear cardiology at the Heart Institute. "We do more nuclear cardiology scans than anywhere else in the country," says Dr. Beanlands. Patients are sent from all over the country; 50 percent come from outside the Ottawa region. Those from outside Ottawa have travelled from Belleville, Kingston, Toronto, northern Ontario, Montreal, Quebec City, the Maritimes and the Far North. Nuclear cardiology services are not available uniformly across the country. These patients either will not receive the testing or some may go to the U.S., says Dr. Beanlands.

The National Cardiac PET Centre is also conducting a number of significant research projects, which will expand with the installation of the micro-PET at the end of March. These include:

A three-year study of blood flow, which followed a total of 367 patients beginning in 2000. Researchers found that patients showing a normal PET scan were at a low risk for heart events such as heart attack while people with abnormal scans were at a high risk for these events. The results showed that PET may be particularly useful for people with obesity or people with a previous non-invasive test that produced an uncertain conclusion. "These are important new findings," says Dr. Beanlands.

The outcomes of a randomized study, begun in 2000 involving a total of 430 patients, are still being evaluated. The project examines the use of imaging

as means of obtaining information on the viability of the heart. Patients from Ontario and Quebec were divided into two groups; half were tested using a PET scan to determine the means of treatment for blocked vessels. The other half were not scanned using PET imaging.

A total of 70 men and women with sleep apnea, an obstructive sleep disorder often associated with loud snoring, are involved in a study on the effects of treatment using an airway pressure mask. Research begun last year is examining the heart's function, its metabolism and its nerve function. The study is also investigating these three factors on patients who have heart failure. The combination of heart failure and sleep apnea effect are commonly seen, says Dr. Beanlands. Researchers are looking at whether use of continuous positive airway pressure (CPAP) can improve the heart's performance. Patients are screened at The Ottawa Hospital's overnight Sleep Lab to determine whether they suffer sleep apnea.

"Our research has been able to help us to understand heart disease in relation to areas such as heart failure and sleep apnea and in terms of evaluating the technology," says Dr. Beanlands. "Our recent work involves these long-term studies, of which there are very few."

Research at the Heart Institute enables cardiologists and surgeons to stay at the cutting-edge of diagnosis and treatment of heart disease, adds Dr. Beanlands. "It keeps things exciting here. We are always at the forefront. We can take what we've learned in the lab and apply it to patients, or take what we've learned in clinical research and apply it to patient care and always remain on the frontier of what is new and what will help make people better." ❧



Dr. R.S. Beanlands

"The Heart Institute as a facility provides a unique cardiovascular focus both in terms of our dedication to patient care and our passion for research."

- Chief of Cardiac Imaging
- Founding Director of the National Cardiac PET Centre, University of Ottawa Heart Institute.
- Professor of Medicine (Cardiology), cross appointed as Professor of Radiology at the University of Ottawa.
- Research interests: metabolism, viability and blood flow of the heart; development and investigation of novel probes for evaluation of receptor density and other parameters to advance the understanding of cardiovascular disease.
- Adviser: Health Canada in Consultative Working Group for policy guidelines for PET radiopharmaceuticals in research and clinical practice; International Advisory Panel for PET and Fusion (CT) in Cardiology.

Standard Heart Transplant Management Across the Country Boosts Cardiac Knowledge and Success



Dr. Haissam Haddad is Chair of the Canadian Cardiac Transplant Group which is developing new guidelines for heart patients.

New consensus guidelines are being developed by the Canadian Cardiac Transplant Group for work-up, induction and management of heart transplant patients and to standardize transplantation procedures for heart patients.

The Transplant Group, founded in 1998, falls under the Canadian Society of Transplantation. The Group conducts ongoing research, continuously reviews guidelines pertaining to heart recipient status and location, and assesses guidelines related to heart transplantation in Canada.

A new scientific committee is reviewing guidelines on the management and standardization of heart transplantation

procedures including drug treatment and follow-up care. "We are a very close group and we meet on a regular basis at least twice a year so we can share our experiences, and try to modify and improve our approach," says Dr. Haissam Haddad, recently appointed as Chair of the Canadian Cardiac Transplant Group. Dr. Haddad, who is Director of the Heart Function Program and the Medical Director of the Transplant Program at UOHI, is also leading the Group's scientific committee.

Guidelines are set to manage transplantation, induction therapy, immunosuppression, anti-rejection and follow-up care for transplant patients in cardiac centres across the country, says Dr. Haddad. An estimated 150 heart transplants are performed each year in Canada and the Transplant Group also ensures training in transplant technique is uniform for surgeons and cardiologists. Currently a multi-centre research effort is underway at cardiac care centres across the country including Toronto, Montreal, Vancouver, Edmonton and of course, the University of Ottawa Heart Institute. They are examining

anti-rejection after transplant and use of new anti-rejection drugs.

Transplantation procedures are standardized across all centres both to ensure a uniform stable survival rate with the lowest possible complication rate, and to evaluate research results. The demand for heart transplantation is increasing largely because of an aging population and the growing number of heart attack survivors.

"We are saving lives but subsequently a significant portion develop heart failure at the end," says Dr. Haddad. "As well, we are getting older and there is increased prevalence of heart failure. This may not deflect the demand for transplant because we don't transplant a patient older than 65 except in a small population who are in perfectly good shape. Age is not an absolute contraindication but many studies show that patients older than 65 don't do as well as younger population.

These are among the patients who enter the Heart Function Clinic at UOHI. Previously known as the Heart Failure

Clinic, it is the largest in Canada with a roster of 1,100 active patients. Common symptoms of heart failure patients are shortness of breath, fluid retention and abnormal buildup of fluid in the ankles, feet, and legs (peripheral edema). However, the most common cause of heart failure in North America is Ischemic Heart Disease (heart attack).

The main issue in transplantation, says Dr. Haddad, is the number of donors. Because the waiting lists are so long for so few organs, only about half of the most seriously ill patients are able to receive hearts. "People die on waiting lists for transplantation so we continuously review organ location to see if the guidelines we've developed within the society are appropriate," says Dr. Haddad. Doubling the supply of donor hearts to 300 a year would ease the problem, he adds. "We have a significant shortage of organs, not just the heart - but mostly the heart." ❧

World Cardiac Community Comes Here to Pursue Advanced Research



Dr. Keiichiro Yoshinaga is one of a rotating group of cardiologists from around the world who train at UOHI

An award-winning cardiologist, Dr. Keiichiro Yoshinaga has returned to Japan to continue clinical investigations into links between sleep apnea and heart disease, ending a three-year research fellowship in nuclear cardiology at the Heart Institute.

Dr. Yoshinga is among a rotating group of cardiologists who arrive at UOHI from points around the globe and sometimes closer to home to train under the supervision of top cardiology researchers. His supervisor was Dr. Rob Beanlands, Chief of Cardiac Imaging and director of the Heart Institute's National PET Centre. The centre is the only PET facility in Canada using Positron Emission Tomography – a nuclear imaging technique – dedicated exclusively to cardiovascular disease. PET uses signals emitted by radioactive tracers to measure blood flow, metabolism and nerve function in the heart. The radioactive tracers are

produced onsite at the PET Centre's own laboratories.

Dr. Yoshinga's departure leaves an opening that will be filled in the fall by Israeli cardiologist, Dr. Ronen Durst. A second clinical research fellow, Dr. Hatem Nasr, a nuclear medicine physician from Egypt, is currently completing his term under the supervision of Dr. Terrence Ruddy, Director of Nuclear Cardiology at the Heart Institute.

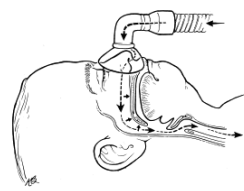
"Researchers come here because of our reputation," says Dr. Beanlands, "That stems from multiple factors such as our dedication to cardiovascular disease – our focus – along with our large patient base and our clinical research excellence, and that includes our imaging research excellence."

In fact, Dr. Yoshinga was encouraged by Dr. Nagara Tamaki of Hokkaido University to pursue further research under Dr. Beanlands in Canada. Dr. Yoshinga had no idea where either Ottawa or the Heart Institute were located initially. He was only aware of the research expertise. "Dr. Tamaki recommended fellowship training at a top research facility. We looked for the best facilities in the United States, Europe and in North America generally. He knew Dr. Beanlands." They had read his work and were impressed with the kind of research underway.

Dr. Yoshinga, who received the The Best of Young Investigators Award in 2002 from the Japanese Society of Nuclear Cardiology, was a natural fit for the Heart Institute's PET Centre. His Japanese supervisor has also been studying sleep disorder and its association with heart disease. In Ottawa, Dr. Yoshinga arrived

with the formal opening of the National PET Centre.

The UOHI research team, with a grant from the Heart and Stroke Foundation, has been examining the effects of continuous positive airway pressure (CPAP) on the heart's function and on people with heart failure. CPAP respiratory devices are used for sleep apnea, an obstructive sleep disorder sometimes called the snoring disorder. Sleep apnea translates into cessation of breath and shows up in episodes of airway blockage during sleep.



Continuous positive airway pressure (CPAP) is the most common treatment for sleep apnea. A CPAP machine uses air pressure to push the tongue forward. This opens the throat to air, and reduces snoring and apnea. However, it may lead to cardiac complications.

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Undiagnosed and left untreated, sleep apnea is believed to increase the risk of heart attack, stroke, high blood pressure and heart disease.

Another of Dr. Yoshinaga's major projects was recently accepted for publication in a top cardiology journal, the *Journal of the American College of Cardiology*. His work shows that PET imaging can be used to predict the prognosis of patients who are referred for imaging to define the degree of heart disease.

The Institute's fellowship program has done more than enrich the repository of information into cardiac medicine. Some of the top research fellows have returned to the Heart Institute to continue their careers. Among them is cardiologist Dr. Ben Chow, co-director of Cardiac

Radiology at UOHI and now involved in cutting-edge technology that could lead to improved diagnosis, treatment and shorter waiting periods for cardiac patients.

"The Heart Institute has trained many fellows, who have then furthered their training at other institutions then returned to Ottawa to join the Heart Institute," says Chow, who subsequently joined the Heart Institute, then took a brief sabbatical to study Cardiac CT at Harvard Medical School in Boston.

Dr. Yoshinga's stay in Canada was filled with pleasant tasks, interesting challenges and a good look at how the cardiac care system works in Ontario. The regionalization of cardiac care to large centres, particularly the Heart Institute, is a much different model than in Japan, he says with characteristic modesty. "Many Canadians complain about the Canadian health care system. But many top specialists, especially in the Heart Institute, have a quality that is very high. It is a very sophisticated system." He saw many other cultural differences as he learned English; notably statutory holidays including weekends where staff take time off, and a work day that ends near the evening dinner hour. "In Japan," he says, "professors work until 10 p.m. Also Dr. Beanlands recommended I take holidays and days off. It is absolutely different compared to Japan." ❧

Canada Comes to a "Stressful" Event

The 3rd Symposium on Stress Testing and Ambulatory Monitoring, hosted by the Cardiac Diagnostic Centre at the Heart Institute, was held May 26-28. This event is held every three years in Ottawa with a unique Canadian program covering the basics as well as advances in cardiac diagnostic procedures in workshops and interactive sessions.

The program was designed for cardiac technologists, physicians, nurses, and allied health professionals working in

non-invasive diagnostic cardiology departments.

The Heart Institute performs more than 100,000 non-invasive procedures a year ranging from ECG's and stress testing to cardiac nuclear imaging and now CT scanning with one of the most advanced systems in North America.

More than 150 healthcare professionals from across Canada packed the Foustanelas Auditorium for the sold out

event. "Interest in cardiac testing remains high and there is a large demand for these types of events," says Ted Waring, Manager of the Heart Institute's Cardiac Diagnostic Centre.

"We perform many different tests in high numbers, and our staff has become very specialized. We feel it is important to provide leadership to the cardiology community by sharing our knowledge," says Waring, who has 20 years of experience in cardiac diagnostic testing at UOHI.

The symposium, which was sponsored in part by an unrestricted grant from GE Healthcare, featured 22 guest speakers and included sessions and workshops on the following:

- Diagnostic techniques to assess cardiac anatomy, physiology and pathology;
- Advanced ECG interpretation;

- Recognition of the sources of false negative and false positive studies, including common artifacts and errors;
- Advancements in ambulatory ECG monitoring;
- Testing and interpretation of special needs patients;
- The diagnostic role of imaging modalities, including stress echo, cardiac nuclear imaging, and CT testing

Dr. Robert Roberts, CEO of the Heart Institute and a prominent genetics researcher in coronary artery disease, opened the symposium and stressed the role of genetics in future cardiac testing and treatment. ❧

"Interest in cardiac testing remains high and there is a large demand for these types of events."

– Ted Waring

International Fellowships Integral to Advanced Science

The Heart Institute plans to expand an international training program where young researchers from around the world conduct groundbreaking studies into the causes and treatment of coronary artery disease and heart failure.

A \$1 million five-year grant from the Heart Foundation of Ontario, which has been augmented by other sources, has enabled the training of a number of new researchers under the supervision of four scientists at Heart Institute. Currently, four research fellows and three graduate students are supported in projects related to coronary artery disease and heart failure.

Dr. Frans Leenen, director of the Hypertension Unit, is also director of the training program. The goal is to recruit several more scientists, bringing the number to six, and enlarge the research program to accommodate as many as 10 to 15 fellowships and graduate students combined. The young researchers carry out projects over a period of two to four years. They come from as far afield as France, the Netherlands, Egypt and Lebanon.

"There are world renowned researchers in Ottawa and at the Heart Institute who can work with and train these students and fellows," says Dr. Leenen, an internationally acclaimed cardiologist. "They are an integral part of a scientific program for most scientists in any laboratory and institute because they are the future generation of scientists."

Young researchers also execute the major part of any significant scientific investigation under way within the Heart Institute, for example. "And if they are good, they challenge the scientists so they stay on their toes and help them come up with a better program for the next few years," adds Dr. Leenen. "You need fresh ideas. That is important."

Other scientists in the grant program are biochemist Stewart Whitman, appointed a

principal investigator at the Heart Institute in 2001 who is also director of the newly established Core Pathology Facility at UOHI. Others include Frédérique Tesson, a geneticist who is Director of the Laboratory of Genetics of Cardiac Diseases, and Balwant Tuana, a molecular biologist who studies mechanisms regulating the translation of genes into proteins. He is also a Professor of Cellular and Molecular Medicine at the University of Ottawa.

Dr. Leenen holds the Pfizer Chair in Hypertension Research at the Heart Institute. Pfizer Canada Inc. and the Heart Institute Foundation have each invested \$1 million with a contribution of \$400,000 from the Canadian Institutes of Health Research to support groundbreaking hypertension research at the Heart Institute.

High blood pressure, or hypertension, affects up to one quarter of Canadians. Each increase in systolic (the top number) blood pressure by 10 millimetres of mercury raises the risk of stroke or heart by about 50 percent, says Dr. Leenen.

Dr. Leenen's wide research program includes a closer look at salt intake and how it is reflected in higher blood pressure. The link between salt use and changes in blood pressure has been well documented. "In parallel with the obesity epidemic is the salt epidemic and together this is translating into higher rates of hypertension and in younger ages as well," says Dr. Leenen.

Some people appear to have a higher sensitivity to salt intake and this is being investigated further in terms of effects of salt on brain function and testing for genetic variations at the Heart Institute. Previous research on the impact of salt on the body has mainly focused on the kidneys. But other organs such as the brain are involved as well. "For genetic studies, we focus on younger people. When you get older, kidney function is reduced and blood

Dr. Frans Leenen

"It is important to keep in mind that if you want to provide state-of-the art care in cardiac medicine, that means you must have people or physicians who do science at the same time and translate new findings into clinical practice."

- Cardiologist.
- Director, Hypertension Unit, University of Ottawa Heart Institute.
- Professor, Medicine & Pharmacology, Departments of Medicine and Cellular and Molecular Medicine, University of Ottawa.
- Awarded Pfizer Research Chair in Hypertension, an endowed chair supported by Pfizer Canada, the Ottawa Heart Institute Foundation, and Canadian Institutes of Health Research.
- Principal Canadian investigator 1996-2002 into the Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial, (ALLHAT), the largest ever hypertension study conducted to assess the most effective treatment for patients with high blood pressure.
- Research Interests: brain mechanisms determining sympathetic hyperactivity in salt-sensitive hypertension and congestive heart failure; the role of circulatory versus cardiac renin-angiotensin system in cardiac hypertrophy and remodeling, and antihypertensive agents and the heart.
- Recipient, Dedicated Service Award from the Heart & Stroke Foundation of Canada.

vessels become more stiff, so we know that in the later phase, genetics becomes less important," says Dr. Leenen.

The Heart Institute has been a leading site for research into hypertension. Dr. Leenen was the principal Canadian investigator into one of the largest trials and surveys on high blood pressure and cholesterol and their treatment. More than

42,000 participants in 623 specialty clinics across Canada and the United States were studied over a five-year period. The findings, released in late 2002, suggested that less expensive diuretics or 'water pills' could be an effective starting point in the early treatment of high blood pressure in many patients. 🐾



Nicolas Sylvius, a geneticist from the University of Paris is recruiting heart attack patients to study their genetic make-up in more detail.

Genetic Differences Lead to Different Outcomes

Researchers at the Heart Institute want to understand why some patients who suffer a myocardial infarction (heart attack) fully recover but other patients end up with heart failure further down the road.

Nicolas Sylvius, a geneticist who obtained his PhD from the University of Paris, is in the process of recruiting heart attack patients at UOHI to study their genetic makeup in more detail. He is also part of the research training program managed by Dr. Leenen, the head of Hypertension unit at UOHI. Sylvius is conducting his research in UOHI's Laboratory of Genetics of Cardiac Diseases, under laboratory director Frédérique Tesson.

"After a myocardial infarction, there appear to be two kinds of patients: some recover properly whereas others continue to have heart disease and end up with heart failure," says Sylvius. "Of course there are likely multiple factors explaining this difference; the genetic background of each patient is a major

one. Our work aims at finding the genes that are turned on or in contrast turned off in the heart after the attack and that prevent recovery."

The study is performed on cardiac biopsies taken at the time of a heart surgery. Some interesting preliminary results have already been obtained. However, as with any experiment involving tissue from patients, one of the main critical parts is recruiting a sufficient number of patients. "In terms of techniques we are now all set up, but we want to be fully confident in these results. Once we have enough patients, everything can be done in few months," says Sylvius. "This is a very exciting project involving the most advanced molecular biology techniques. It is our belief that we will be able to significantly improve the care and follow up of heart attack patients in the near future, based on their genetic background." 🐾



Bart Westendorp of the Netherlands is a post-doctoral research fellow investigating animal models and the genes related to tissue growth.

Inducing Heart Cells to Grow

One characteristic of the heart is that its cells lose the ability to divide shortly after birth. During normal development, the heart can only grow by increasing the size of its existing cells. But when heart tissue is killed off after a heart attack, for example, cells will not regenerate. Research at the Heart Institute is trying to understand why muscle cells in the heart are not programmed to regenerate and find a way to stimulate cell division.

Bart Westendorp, a pharmacologist from The Netherlands, has been awarded a post-doctoral research fellowship by the Heart and Stroke Foundation of Ontario – a training program at the Heart Institute. He is studying the cellular machinery of the heart related to the E2F gene family. The control of cell growth and division is activated by genetic signals moving through the E2F family's regulatory network.

"After a myocardial infarction (heart attack), a major problem is that a part of the heart muscle dies," says Westendorp. That heart tissue is replaced by scarring rather than new tissue growth. But the scar cannot contract so the pump function of the heart is impaired, leading to a condition called heart failure, he explains. Researchers would someday like to enable people to regenerate the heart muscle after a heart attack to re-establish a fully functioning heart pump.

Westendorp is investigating in animal models the specific interplay between the different E2F genes to take a closer look at the cell machinery related to tissue growth. "If we can better understand the function of the E2F genes, we hope to understand why cells lose the ability to divide at a certain stage of development. Through gene therapy, for instance, perhaps we can induce cell division (and growth) once again." Growth of more cells would strengthen the heart and provide a self-sustaining treatment based on gene therapy to help heart attack patients fully recover.

His research supervisors at the Heart Institute are Dr. Frans Leenen and Balwant Twuana. A native of The Netherlands where he completed his PhD at the University of Groningen, Westendorp arrived in November to continue scientific training at UOHI's Laboratory of Genetics of Cardiac Diseases, under laboratory director Frédérique Tesson. "I want to acquire more knowledge in the area of molecular biology and get a broader overview on what's going on in cardiovascular research," he says. His supervisor in The Netherlands had conducted research under Dr. Leenen and recommended further research training at the Heart Institute. "Canada is a good place to live, and of course the quality of the research is quite good at the Heart Institute." ❧

World Society of Cardio-Thoracic Surgeons is Coming to Ottawa

The 16th World Congress of the World Society of Cardio-Thoracic Surgeons (WSCTS) will be held in Ottawa Aug. 17-20. The World Congress provides an international multi-disciplinary forum dedicated to prevention, diagnosis and treatment of cardio-thoracic health matters. Medical leaders, scientists, surgeons and allied professionals in areas from cancer research to biomedical engineering are among the participants.

The scientific program will focus on advancements in cardio-thoracic health care, the use of new medical devices, novel pharmaceutical agents, imaging technologies and innovative surgical approaches. New for this year's program is an

introduction to cell-based therapies, which are growing increasingly important in both diagnosis and treatment of cardio-thoracic medicine. These include areas such as bioengineering, genetic research and diagnostic tools and tissue engineering.

The World Congress is the only such international forum providing a multidisciplinary view of cardio-thoracic health care and with the involvement of key opinion leaders, says Congress President Tofy Mussivand, director of the Medical Devices Centre at the University of Ottawa Heart Institute. Participants representing countries from around the globe, from Cameroon to China and points in between.

The 16th World Congress, hosted by the Medical Devices Centre of the University of Ottawa Heart Institute, will be co-chaired by Dr. Joel Cooper, Dr. C. David Mazer and Prof. Sir Magdi Yacoub. Dr. Mazer is a leading researcher and Medical Director of the Cardiovascular Intensive Care Unit at St. Michael's Hospital, an affiliate of the University of Toronto. Dr. Yacoub is one of the world's pioneering heart transplantation surgeons. He was formerly with the National Heart and Lung Institute, part of Imperial College London, and continues research as Founder and Director of Research of the Magdi Yacoub Institute. Dr. Cooper, who performed the first successful lung transplant surgery in 1983, is currently

Chief of the Division of Cardiothoracic Surgery, Washington University at Barnes-Jewish Hospital, St. Louis, Mo.

"This congress brings together the surgeons, anesthesiologists, biomedical engineers, nurses, basic and applied scientists and clinical engineers to discuss how we can help the patient as a multi-disciplinary, multi-specialty team," says Mussivand. "This is the unique feature of this World Congress."

For more information on the Congress, visit www.wscts2006.com or call the Secretariat at 613 761-5116. ❧

Better Preparation Fuels Better Outcomes

Heart patients deal with a unique brand of stress. Diagnosis of heart disease is one thing, then there are concerns about cardiac surgery or any other procedure they must undergo. While every surgical procedure is distinct, cardiac surgery probably elicits the worst fears perhaps because the procedure involves reaching into the very core of the human body.

The team at the Heart Institute's Pre-Admission Unit (HI PAU) works together to help prepare patients and their families for the day of surgery and what will await them afterwards. The key lies in ensuring patients are in the best condition possible prior to their surgery or procedure.

"Most PAU's at other hospitals serve the surgical population," says Carol Harkness, Clinical Manager of HI PAU. The HI PAU has extended its service to include elective cardiac surgery patients and medical patients for percutaneous cardiology procedures performed without surgery. These procedures include Percutaneous Coronary Intervention (PCI) as well as valvuloplasty and other repairs. For a PCI the cardiologist guides a catheter tipped with a small balloon that expands in a narrowed artery to improve blood flow to the heart.

As with other hospitals, patients are provided with details concerning preparation for surgery, including the anesthetic. The visit to the Heart Institute – and even the lead up to the appointment – is more comprehensive partly because of the

complexity of the cardiac procedures. Assessments are conducted by nurses, cardiologists, and anesthesiologists. Educational material including a video of the surgery or PCI procedure is sent home with the patient to share with their families. Instructions provided about admission prior to the scheduled procedure includes what patients can expect during the hospital stay.

Since many Heart Institute patients are from outside the Ottawa region, out-of-town patients and their families may need assistance with accommodation. Staff put them in touch with facilities such as apartments at The Ottawa Hospital in the Interns Residence. Patients are encouraged to bring at least one family member with them to the PreAdmission visit.

"The whole family goes through this experience together. It's not just the patient. It is also the person who is going to be there supporting and visiting them," adds Harkness. Equally important is the aftercare by family because these patients cannot be sent home to be alone. "That's a big surprise for some people," she says. We explain what is expected for the patient and the caregiver and go through the list of activities and restrictions they must follow. The families will need to gear up to rearrange their lives for the patient, who will not be able to drive, cook, or walk alone for a while.

Preparatory work is particularly important since the average age of patients at the Heart Institute is



Carol Harkness, Clinical Manager of the Heart Institute's Preadmission Unit and her team help prepare patients and their families for surgical procedures and what will await them afterwards.

increasing and by the time they require surgery or PCI, some will have more than one disease such as diabetes or hypertension. "Our main goal is to get the patient to the procedure in the best possible physical and mental condition and that's making sure all the lab results are as close to the normal range as possible," says Harkness. "These patients are at higher risk than other patients. We're looking at all the little things that might put the patient more at risk for

complications. Even if they stop smoking a week in advance – it makes a difference.

"Both the physical and psychological preparation focus on helping patients get into the best shape possible with the aim of fewer complications and rehabilitating as quickly as possible," she says. "We know from studies that if patients are prepared for what to expect and about what is normal they will fare better in the end." 🌸

UOHI Helps Build New Biomedical Engineering Graduate Program

The Heart Institute has long been a leader in adopting ground-breaking preventive, diagnostic and treatment approaches to heart disease. Now, a new university program developed in collaboration with UOHI will add another dimension to advanced technology training at the Heart Institute.

A joint Biomedical Engineering Graduate program between Carleton University and the University of Ottawa grew out of groundwork laid by the Director of UOHI's Medical Devices Centre, Tofy Mussivand (FRSC). A renowned pioneer in research and development of advanced technologies in cardiac medicine, he is also a Professor of Surgery and is the Chair of Medical Devices at the University of Ottawa. Before embarking on the infrastructure required for advanced medical device research, development and training, UOHI's Medical Devices Centre conducted a detailed review of similar programs around the world.

After years of rigorous consultation with academics and medical professionals, both universities now are finalizing more

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– Prof. Tofy Mussivand

than a dozen graduate courses for the joint Masters program in Biomedical Engineering. The program gets underway in September with the beginning of the 2006–2007 academic year. UOHI will not

be an exclusive beneficiary of the graduate program. Still, the Heart Institute's long-standing role as an innovator will remain a major drawing card for many of the researchers and students involved.

"While this program will certainly provide immediate benefits for the new students, the ultimate legacy will be in the development of new medical device technologies and expertise for Canada as well as Canadian patients and those from around the world," says Prof. Mussivand.

The graduate courses will cover areas ranging from instrumentation, including basics of how to build a medical instrument, and medical ethics to standards in medical imaging to telemedicine, says program director Rafik Goubran. Goubran is a researcher, professor and chair of Carleton's Department of Systems and Computer Engineering. Graduating students will have a Masters of Applied Science in Biomedical Engineering.

"There have been many advances in technology over the last several years," Prof. Goubran says. "At the same time,

there is a greater need for medical care in the fields related to monitoring and diagnosis of disease, for example. This growing demand combined with the new capabilities and applications of technology brings tremendous new opportunity to health care. In the past, medical imaging meant a simple X-ray. Now there are so many imaging techniques available. The Heart Institute has very sophisticated scanning technology that provide hundreds of images that need to be processed. There is a strong need for people to work in this field."

Prof. Mussivand has worked closely with engineering researchers from both universities, ultimately leading to the development of the new Masters program. "In 1998, when the Rector of the University of Ottawa established the Chair in Medical Devices, development of new formal Biomedical Engineering Programs was the No. 1 priority," says Prof. Mussivand. "The approval of this new program by the provincial authorities is thus an extremely rewarding achievement, and one in which all involved should take great pride." 🌸