

# Lerner Research Institute

## Promising Projects

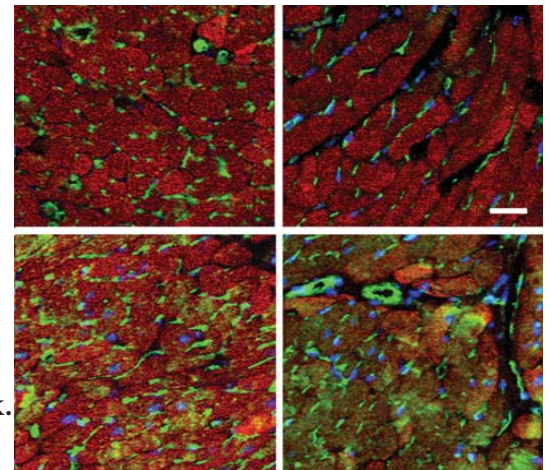
Spring 2008

The Lerner Research Institute is home to Cleveland Clinic's laboratory-based and translational biomedical research. Research conducted at the Institute features integrated partnerships between laboratory researchers and clinical investigators. Every day, more than 2,000 Cleveland Clinic physicians, scientists and engineers work to develop and use new solutions, preventions, treatments, and therapies for various diseases in the areas of cardiovascular, cancer, neurologic, musculoskeletal, allergic and immunologic, eye, metabolic, and infectious diseases. Each of the research activities discussed below has the promise to change people's lives. To make this all happen, the Lerner Research Institute is asking individuals, corporations and foundations to consider making a financial gift to support these and other current research endeavors.

Additional information can be found at <http://www.lerner.ccf.org/>

### Heart, Heal Thyself

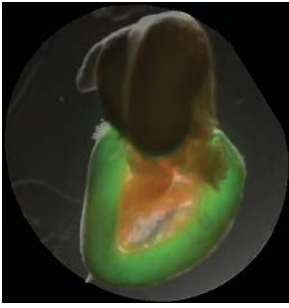
When a person has a heart attack, the body sends out a signal to the patient's own adult stem cells to come to the site of the damage to start tissue repair. The problem is that this signal stops after 3 or 4 days. Marc Penn, M.D., Ph.D., Lerner Research Institute's Department of Stem Cell Biology and Regenerative Medicine, is investigating ways to keep the signal "turned on" so the body heals the heart more naturally and efficiently and over a longer period of time. It also might be possible to turn on this signal after it's been off, allowing the body to heal the damaged heart tissue weeks or months after a heart attack.



### Pushing Parkinson's to the Extreme

While bicycling across Iowa one summer to raise funds and awareness of Parkinson's disease (PD), Jay Alberts, Ph.D., Lerner Research Institute's Department of Biomedical Engineering, heard of an interesting observation from a colleague. The colleague and a Parkinson's patient were riding a tandem bicycle, and the exertion seemed to reduce if not eliminate the patient's Parkinson's symptoms. That led Dr. Alberts down a new research road. He is now investigating whether pushing Parkinson's patients beyond their normal exercise limit can reduce symptoms of the movement disorder. The goal is to create equipment and exercise regimens that PD patients can do on their own to improve their quality of life.

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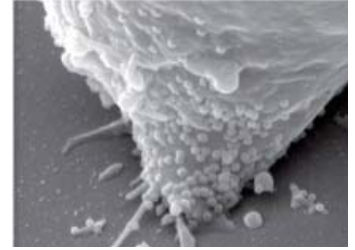


## Defying Diabetes

The body needs sugar (or glucose) to function. The pancreas is home to pancreatic B cells, which are essential to processing glucose. When these B cells function improperly, or not at all, the body can no longer process glucose. The result is diabetes. For many people, this means daily insulin injections. Jan Jensen, Ph.D., Lerner Research Institute's Department of Stem Cell Biology and Regenerative Medicine, is looking at ways for the body to use its own adult pancreatic stem cells to become new B cells. The goal is to make the need for insulin injections obsolete and to cure diabetes and the resulting health complications.

## Viral Cancer

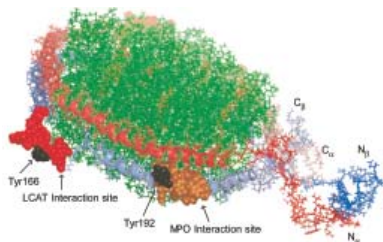
Cancer can be caused several different ways – genetics, environmental influences, and in some cases by viruses. Robert Silverman, Ph.D., Lerner Research Institute's Department of Cancer Biology, led a team of researchers who discovered a human virus that is present in about 13% of prostate cancer cases. Investigators are now focusing on the exact cause-and-effect relationship between the virus and prostate cancer. The discovery could lead to new diagnostic tools for men that could be as simple as a blood test for evidence of the virus. Earlier detection could mean less drastic therapies and treatments and higher survival rates.



## Bioartificial Kidney

End stage renal disease is devastating. Patients must undergo dialysis treatments three times weekly. There are too few donated kidneys available for transplants and not everyone is a candidate for a transplant. The costs are overwhelming and the effects on health and physical well-being force many to quit jobs. New research into nanotechnology (medical devices measured in the billionth of an inch) could lead to a bioartificial kidney – a device no larger than a soda pop can that combines both natural tissue and medical devices to provide 24/7 dialysis. The goal is to create a bioartificial kidney that can be implanted in patients within the next 10 years. Leading development of the kidney are William Fissell, M.D., Aaron Fleischman, Ph.D., and Shuvo Roy, Ph.D., all in Lerner Research Institute's Department of Biomedical Engineering.

## Predicting Heart Attacks Months in Advance



The build-up of plaque on the inside of arteries – hardening of the arteries – is a chronic inflammatory disease. The body responds to this inflammation by generating an enzyme called myeloperoxidase (MPO). Stanley Hazen, M.D., Ph.D., Lerner Research Institute's Department of Cell Biology, has developed a blood test to detect MPO in a patient's blood plasma. Results of the test, along with the clinical history and electrocardiogram, can predict the likelihood of a heart attack months

before the event. This advance notice can allow closer monitoring of the patient and the ability to make healthy lifestyle choices before it's too late.

“Our laboratory discoveries today represent the new therapies, the new drugs and the new treatments for patients five, ten, fifteen years from now. In a sense, our mission in the Lerner Research Institute is to treat the patients of tomorrow.”

Paul E. DiCorleto, Ph.D.  
Institute Chair