

NORTHWESTERN INTERNATIONAL HEALTH

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STEM CELL THERAPY SHOWS PROMISE FOR MS PATIENTS

A preliminary Northwestern study suggests that nonmyeloablative hematopoietic stem cell transplantation may reverse disability and improve quality of life for patients with relapsing-remitting multiple sclerosis (MS).

MS is an immune-mediated disorder of the central nervous system often arising in young adulthood. It damages the nerve cells in the brain and spinal cord, causing symptoms that range from fatigue to paralysis throughout life.

The study, published in the *Journal of the American Medical Association* included 145 patients with MS who underwent nonmyeloablative hematopoietic stem cell transplantation, a low-intensity stem cell therapy that uses a patient's own blood-forming cells to reset the immune system.

"The drugs currently used to treat MS slow progression of disability," says Richard Burt, MD, chief of medicine: immunotherapy and autoimmune diseases. "We show that one-time stem cell treatment can not only slow progression, but also reverse disability."

Burt and colleagues examined the association between the stem cell transplantation and outcomes for patients with relapsing-remitting MS (the most common subtype of the disease, which is marked by periodic attacks followed by partial or complete recovery) and secondary-progressive MS (a more severe form of the disease without relapses, which follows relapsing-remitting MS).

Measuring disability on the Expanded Disability Status Scale, the study showed significant improvement for 50 percent of patients tested two years after treatment and for 64 percent of those tested after 4 years. There were also improvements in physical and cognitive function, quality of life scores, and volume of brain lesions seen in MRI. These findings were seen only in patients with relapsing-remitting MS.



"These results are very promising and they could change the goal-line in this disease," Burt says. "But a caveat is that you have to select the right group of patients."

In order to confirm these preliminary results, Dr. Burt directed a randomization trial of stem cell transplant versus best FDA approved conventional therapy in Chicago and at Universities in Sheffield (United Kingdom), Uppsala (Sweden), and Sao Paulo (Brazil). The trial has completed enrollment, and Dr. Burt will be working on summarizing and publishing the results in the near future."

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THE DESTINATION FOR HIGHLY SPECIALIZED CARDIOVASCULAR CARE

The Northwestern Medicine Bluhm Cardiovascular Institute is a nationally recognized program that is a destination for those requiring highly specialized cardiac and vascular care.

Patients benefit from the expertise of physicians, nurses and a range of multidisciplinary specialists working together in a variety of areas including cardiology, cardiac surgery, vascular medicine, vascular surgery and cardiac behavioral medicine.

Clinical centers

The Bluhm Cardiovascular Institute is comprised of six highly specialized clinical centers:

- Center for Coronary Disease
- Center for Heart Failure
- Center for Heart Rhythm Disorders
- Center for Heart Valve Disease
- Center for Preventive Cardiology
- Center for Vascular Disease



Physicians in these Centers are addressing the prevention and treatment of cardiac and vascular disease through the investigation of new technologies, drugs, techniques and devices that ultimately translate into the best patient care.

Rankings and accomplishments

Since the inception of the Bluhm Cardiovascular Institute we have achieved among the best survival in the country from the most commonly occurring cardiovascular conditions to the most complex – a reason why the Bluhm Cardiovascular Institute is a leading destination for both initial diagnoses and second opinions.

The Bluhm Cardiovascular Institute has ascended from unranked by *U.S. News & World Report* in 2005 to 9th in the nation in 2015. In addition, we have the largest heart valve surgery volume and the largest transcatheter aortic valve replacement (TAVR) program in Illinois. From 2004-15, the number of complex cardiac surgeries at Bluhm Cardiovascular Institute has increased by over 600 percent.

Niche clinical programs

What sets us apart is that we continue to evolve and create niche clinical programs for patients with complex diagnoses and disorders such as those with atrial fibrillation, high-risk aneurysms, congenital heart disease, chronically occluded coronary arteries, heart failure, and pulmonary vascular disease and advanced valvar heart disease. These niche programs include dedicated nurse coordinators who work with physicians and patients to navigate the complex health care system, ensuring continuity of care and a seamless shift from inpatient to outpatient services and ultimately home.

Research and clinical trials

The many benefits that our patients receive are in large part due to the shared commitment between the Northwestern University Feinberg School of Medicine and the Bluhm Cardiovascular Institute. The partnership has led to the creation of the Clinical Trials Unit of Northwestern. This unique facility is dedicated specifically to innovative research and the evaluation of clinical outcomes in order to provide the most advanced treatment options and improve the quality of care for the cardiovascular patient.

Our research efforts include multicenter clinical trials studying the multiple applications of 4D MRI, transcatheter valve replacement therapy, endovascular stent grafting for aneurysms and dissections and advanced heart failure therapies including ventricular assist devices.

Referring physician relationships

It goes without saying that the strength of the relationship that we have with referring physicians is imperative to a positive patient outcome and experience. This collaboration is a critical component of eliminating the challenges that come with providing complex cardiovascular care. We are extremely grateful for the trust that referring physicians have in our team as we strive to benefit patients with the treatments and services available at the Bluhm Cardiovascular Institute.

Targeted recruitment

A targeted physician recruitment effort, along with the retention and development of existing team members, has been a successful catalyst to advancing the exceptional care we offer our patients. Our staff features nationally renowned and highly recognized leaders. We are proud to have two past presidents of the American Heart Association on staff and a number of our physicians have authored national guidelines that guide clinical care across the United States. •For more information, visit internationalhealth.nm.org or call +1 312-926-1089.

COLD VIRUS, STEM CELLS TESTED TO DESTROY DEADLY BRAIN CANCER

CHICAGO – A first-of-a-kind neural stem cell therapy that works with a common cold virus to seek out and attack a lethal and aggressive brain cancer is being tested at Northwestern Medicine in a Phase I clinical trial for patients newly diagnosed with malignant glioma.

The novel drug to treat malignant glioma, notorious for recurring after typical bouts of standard cancer treatment, was developed by a Northwestern scientist and has been approved as an investigational drug by the U.S. Food and Drug Administration.

This investigational new drug contains neural stem cells to deliver a potent virus responsible for the common cold, oncolytic adenovirus, which is engineered to kill brain cancer cells. The novel treatment works synergistically with chemotherapy and radiation to enhance the standard cancer treatments effectiveness.



“We have discovered that combining stem cells with a virus causes the new drug to react like a cancer-seeking missile targeting cancerous cells in the brain” said principal investigator, Dr. Maciej Lesniak, the Michael J. Marchese Professor and chair of neurological surgery at Northwestern University Feinberg School of Medicine and a neuro-oncologist at Northwestern Medicine. “If it works in humans, it could be a powerful weapon against brain cancer and an option that our patients are desperate for.”

The pre-clinical work done by Lesniak and his team has shown that the approach being tested at Northwestern Medicine can target this population of therapy resistant cells, further delaying and sometimes even preventing tumor recurrence.

Lesniak plans to enroll up to 36 newly diagnosed patients with glioma. These patients will be divided into two groups: those with tumors that can be removed and those where the tumors are not removable by surgery.

Next step, Northwestern Memorial will extend this research to the collaborating partners at City of Hope Comprehensive Cancer Center in Duarte, California. The study was funded by the National Institutes of Health and the National Institute of Neurological Disorders and Stroke grant U01NS069997.

To read full article refer to: <https://www.nm.org/about-us/northwestern-medicine-newsroom/press-releases/2017/cold-virus-stem-cells-tested-to-destroy-deadly-brain-cancer>

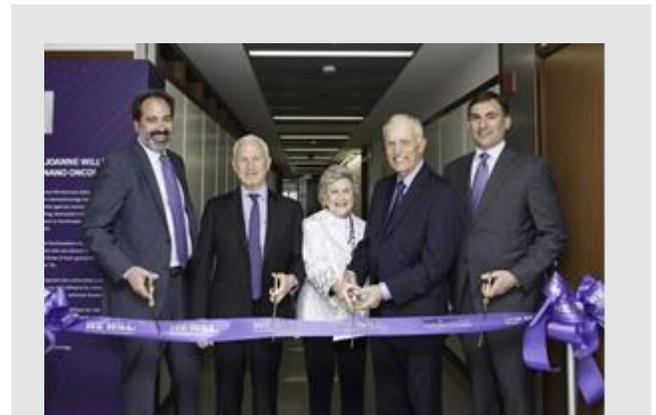
NORTHWESTERN LAUNCHES RONALD AND JOANNE WILLENS CENTER FOR NANO ONCOLOGY

Northwestern University marked the official grand opening of the Ronald and JoAnne Willens Center for Nano Oncology with a ribbon-cutting ceremony Wednesday, April 26. Headquartered within the International Institute for Nanotechnology (IIN) at Northwestern, the center is named in recognition of a \$10 million gift from Ronald and JoAnne Willens '81 P, '84 P, '11 GP, '15 GP, and '19 GP in 2015.

Led by Chad A. Mirkin, George B. Rathmann Professor of Chemistry in the Weinberg College of Arts and Sciences and director of the IIN, the Willens Center supports interdisciplinary research focused on developing and applying advances in nanotechnology to treat the most aggressive types of cancer.

“The potential for using nanotechnology in the fight against cancer is vast,” Mirkin said. “The generous support from the Willens family is enabling researchers to work toward the development of new medicines that can attack the disease at its genetic roots. Certain types of nanostructures, spherical nucleic acids in particular, can deliver therapeutics into tissues many drugs normally will not enter, including the brain and skin.”

At the ribbon-cutting ceremony, Ron Willens said he and his wife were humbled by the University’s achievements in research. “Ten or 15 years ago, who would have imagined that a tiny submicroscopic particle could be used to transport the means to potentially treat and cure many cancers? With this gift, we are grateful that we are able to contribute to this endeavor where minds can do research, innovate and stretch their imagination to find new frontiers to help humanity,” he said.



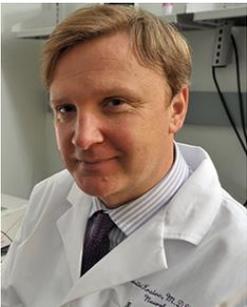
Ronald and JoAnne Willens (center) mark the ceremonial grand opening of the Ronald and JoAnne Willens Center for Nano Oncology with (left) Chad Mirkin and President Morton Schapiro and (right) Milan Mrksich.

NORTHWESTERN FACULTY AWARDS AND HONORS



Amy Paller, MD, '83 GME, the Walter J. Hamlin Professor of Dermatology and professor of Pediatrics, is the 2017 recipient of the Stephen Rothman Award, the most prestigious award of the Society for Investigative Dermatology. It is presented for distinguished service to investigative dermatology, in particular for outstanding research contributions and mentoring of the next generation of dermatologists and researchers. Paller is only the fourth woman to be honored by this award. One of the previous female recipients, Ruth K. Fienkel (1994), was one of Paller's mentors and the first full-time investigative dermatologists at Northwestern.

<http://www.feinberg.northwestern.edu/sites/dermatology/>



Dimitri Krainc, MD, PhD, Aaron Montgomery Ward Professor and chair of Neurology, and director of the Center for Rare Neurological Diseases, has received the Javits Neuroscience Investigator Award from the National Institute of Neurological Disorders and Stroke. The Javits Award is presented to investigators who have made exceptional achievements in the field of neurological science and are expected to continue to produce cutting-edge research in the coming years.

<http://www.neurology.northwestern.edu/>



Aruna Ganju, MD, associate professor of Neurological Surgery, was named a "Female Spine Surgeon Leader to Know" by Becker's Spine Review. Ganju is a neurosurgeon specializing in spinal column and spinal cord disease treatments. Her research investigates surgical outcomes of patients with conditions spanning post-traumatic syringomyelia to lumbar spondylolisthesis.

<http://www.feinberg.northwestern.edu/sites/neurosurgery/>



Michael Markl, PhD, the Lester B. and Frances T. Knight Professor of Cardiac Imaging in the Departments of Radiology and Biomedical Engineering, was named a fellow of the International Society of Magnetic Resonance in Medicine. His research group has been instrumental in establishing 4D Flow MR imaging methods and data analysis tools for the comprehensive assessment of 3D blood flow and cardiovascular function. Further accomplishments include the development, validation and application of novel imaging tools for the evaluation of structure and function of the heart.

<http://www.radiology.northwestern.edu/>

MESSAGE FROM: DR. DANIEL DERMAN,

PRESIDENT, NORTHWESTERN INTERNATIONAL
HEALTH



In our June newsletter we've highlighted innovations in clinical care notably in the use of hematopoietic stem cell transplants to significantly help patients with Multiple Sclerosis as well as the use of a new neural stem cell therapy that works with a common cold virus to seek out and attack malignant glioma which is so lethal and aggressive for patients.

We have also highlighted some cutting edge research that is putting Northwestern Medicine on the map. Our all-female Northwestern University research team is the first to use a 3-D printer to create a fully functioning prosthetic ovary in mice. The artificial organ has the potential to change the way human infertility is treated.

In addition, we are happy to inform you about the grand opening of the Ronald and JoAnne Willens Center for Nano Oncology. This Center is one of the reasons that Northwestern Medicine is positioned as a leader in the field. With our new Center we are looking forward to making a great impact on the most aggressive types of cancer.