Gerstner Clinical Research Center Opens

"Today, my dream has come true," voiced Dr. Stanley Chang with visible emotion at the July 8 dedication ceremony of the new Louis V. Gerstner, Jr. Clinical Research Center in Vision at Columbia University, located at the Harkness Eye Institute.

"We have been planning this Center for nine years, and now the dream has become a reality," Dr. Chang explained. "Thanks to the tremendous leadership and generosity of Louis and Robin Gerstner, The Starr Foundation and The Russell Berrie Foundation, we have an incredibly modern and well-equipped environment in which to conduct our clinical research and translate basic scientific research into new and innovative treatments for diseases of the eye."

Crystal Clear Vision

Lawrence Shapiro, Ph.D. is on top of the world. Literally. From his office on the top floor of the Harkness Eye Institute in the recently completed Russ and Angelica Berrie Diabetic Retinopathy Research Laboratory, one can view an extraordinary panorama extending from the New Jersey shore of the Hudson River to the George Washington Bridge.
View From the Chair

Dear Friends,

The crispness of the autumn air and the start of the new academic year always fill me with brisk energy, eagerness and great anticipation.

My anticipation this year is heightened with the opening of The Louis V. Gerstner, Jr. Clinical Research Center in Vision at Columbia University on the fifth floor of the Harkness Eye Institute. This Center, funded by the Louis V. Gerstner, Jr. Foundation, The Starr Foundation and The Russell Berrie Foundation, is the epitome of functional beauty. With state-of-the-art research and clinical facilities now at the hub of our clinical research endeavors, our faculty can more readily integrate laboratory discoveries with clinical research for faster development of new treatments.

For the past ten years, Lou Gerstner has been my trusted advisor, an exacting mentor and most importantly, a deeply cherished friend. It has been gratifying to see the physical manifestation of our "dream research center," and profoundly moving to witness Lou's single-minded, unwavering dedication as he brought this dream to life. I admire his tenacity and determination, and I am truly humbled by his commitment to the Department and his leadership of the Board of Advisors.

With this issue of Viewpoint, we also delve into the fascinating research taking place in the Russ and Angelica Berrie Diabetic Retinopathy Research Laboratory on the ninth floor and other exciting work in corneal research and genetics.

I want to thank each of you for your truly generous response to the Spring 2004 Annual Fund appeal. Your unrestricted gifts give us the flexibility to initiate plans and programs as they arise, and we are deeply grateful for your support. Thank you again.

With all good wishes to you and yours for a beautiful fall,
"New Frontiers" Conference Honors Dr. Max Forbes, Glaucoma Pioneer

With the publication of his landmark paper on a technique called "indentation gonioscopy" in the *Archives of Ophthalmology* in 1966, Max Forbes, M.D. revolutionized the way ophthalmologists now diagnose and treat patients with narrow angle and angle closure glaucoma.

For more than 30 years, Dr. Forbes led the Glaucoma Division of Columbia's ophthalmology department. Now semi-retired, Dr. Forbes remains active as a professor emeritus—teaching residents and fellows, and engaging in glaucoma research.

James C. Tsai, M.D., who inherited the directorship of the Glaucoma Division from Dr. Forbes in 2001, co-chaired with Dr. Stanley Chang Columbia's first-ever glaucoma conference titled "New Frontiers in Glaucoma", held in mid-September. They created the First Annual Max Forbes, M.D. Lectureship in Glaucoma to honor and celebrate Dr. Forbes' contributions to the field.

Gerstner Clinical Research Center Opens (con’t. from page 1)

Occupying the entire fifth floor of the Harkness building, the new Gerstner Center includes The Russell Berrie Diabetic Retinopathy Research Unit and The Starr Foundation Retinal Research Unit. Additionally, Alcon, Bausch & Lomb and Leica Microsystems provided the equipment and supplies for a new surgical wet lab for training clinical residents and fellows.

Gerald Fischbach, Executive Vice President for Health & Biomedical Sciences and Dean of the Faculty of Medicine, thanked Dr. Chang for "being himself," and expressed the importance of conducting clinical research in ophthalmology.

"Embedded within this great medical center is the Department of Ophthalmology," Dean Fischbach explained. "There is true excitement in academic circles around the country about the world-class work being done here at Columbia, and we are particularly grateful to Lou Gerstner for his vision and leadership."

Louis V. Gerstner, Jr., deeply passionate about education and scientific research, is also renowned for transforming IBM during his nine-year tenure as its chair and chief executive officer. Since 1998, he has chaired the Department of Ophthalmology’s Board of Advisors with the business acumen and wisdom for which he is known. With Dean Fischbach's introduction, Mr. Gerstner stepped in and spoke powerfully about his commitment to ophthalmic research and the Department of Ophthalmology at Columbia.
"Stanley saved my eyesight and I'm forever grateful to him," Mr. Gerstner declared after relating the story of his emergency retinal surgery with Dr. Chang. "We are on the cusp of an extraordinary revolution in molecular and genetic science. This revolution is leading toward remarkable breakthroughs in disease management. Historically, ophthalmology has not attracted enough attention in terms of basic research, but we are here to change that. In my opinion, there is nothing more important than supporting those who can bring this scientific revolution to conquer diseases of the eye."

Mr. Gerstner continued. "Although we now know how the human genome works, it doesn't automatically mean we can translate that discovery to clinical care. The purpose of this clinical research center is to get the research out of the discovery phase and into the clinic. Dr. Chang and his colleagues in the Department of Ophthalmology are leading this initiative, and I believe that with the support of each of us here, along with other friends and grateful patients, we will realize our vision."

With that, Jane Heffner, Development Officer for Ophthalmology, handed Mr. and Mrs. Gerstner a pair of giant scissors for the ribbon-cutting. Good-natured laughter erupted from the crowd as they struggled with the unwieldy scissors. Finally, Mr. Gerstner pulled out his pocketknife to complete the job, quipping, "Stanley, I sure hope you don't operate with these scissors!"

Afterwards, as guests mingled and toured the facilities, Robin Gerstner beamed. "We are so glad to see this project come to fruition," she said. "Stanley and Lou have become such good friends and this work is so important to both of them."

Mr. Gerstner agreed. "I really care about what this team is accomplishing and I couldn't be more excited. We are in the early stages of a campaign—we need more faculty, more research funding and better facilities. Today is a step in an important direction and it is my hope that this Center will inspire others who care about this work to do their share."
If the Flanzer Eye Center is the heart of the Harkness Eye Institute, then the Gerstner Clinical Research Center must be its soul.

Immediately upon stepping out of the elevator on the fifth floor, one senses the serenity of the new and functionally beautiful facility. Spacious clean lines and warm wood tones create a simultaneously professional and calming atmosphere. Framed geometric artwork lines the halls—upon closer inspection one discovers that the seemingly minimalist circular shapes are actually drawings depicting the eye under various disease conditions. The drawings were originally created for teaching purposes by former Columbia medical illustrator Gus Bethke in the early 1930s, prior to the use of modern photographic techniques. These archival images, beautifully framed and displayed, subtly underscore the Department of Ophthalmology's legacy of innovation in the field of ophthalmology and in the discovery of new treatments for diseases of the eye.

"The Starr Foundation supports efforts to prevent and cure blindness around the world. The Starr Foundation Retinal Research Unit will further our mission to address visual impairment," explained Florence Davis, President of the Foundation, speaking about the Foundation's support for the project. "It all comes down to excellence, and Stanley Chang has a top-notch team. We are very excited to support this work because we too want to ensure that New York is at the center of clinical research and scientific discovery in ophthalmology."

"The new facilities are an indication of how one can renovate in a fashion that is both beautiful and functional. We couldn't be more pleased," Ms. Davis continued, speaking for herself and T.C. Hsu, a Foundation Director and a member of the Department of Ophthalmology's Board of Advisors.

Vivienne Greenstein, Ph.D., Professor of Clinical Ophthalmology, is a critical member...
Martin and Helen Kimmel see the big picture. As members of the Board of Advisors, they are quite familiar with the Department of Ophthalmology’s ground-breaking research. They also have deep empathy for those who have endured vision loss as a result of genetic corneal diseases. When they learned of an opportunity to support a landmark study led by Columbia's Richard Braunstein, M.D., they had the vision to invest in Dr. Braunstein's research team, knowing that the outcomes of the study, in both knowledge and new directions for gene therapies, will yield critical results in completing the genetic puzzle for many individuals and families who suffer from Fuchs' dystrophy.

First diagnosed in 1910 by Ernest Fuchs of Vienna, Fuchs' dystrophy is often hereditary and therefore tends to affect both eyes. According to the National Eye Institute, it is more common in women than men. Patients often do not begin experiencing visual decline until their 50s and 60s, although it can be diagnosed much earlier. Fuchs' endothelial dystrophy is one of more than 20 similar corneal dystrophies that cause such devastating vision loss that most patients eventually undergo corneal transplants.

The cornea is the major refracting structure of the anterior (or frontal) segment of the eye, and works together with the iris and lens to create "normal" vision. The cornea itself is a layered structure comprised of the epithelium, stroma and endothelium. The endothelium is the innermost layer of the cornea responsible for maintaining the clarity of the eye's "window."

When the endothelial cells deteriorate, they stop pumping impurities and fluids out of the stroma, causing swelling in the cornea and resulting in vision distortion and pain. The swelling also can produce painful blisters on the epithelium (the outer surface of the cornea). Visual clarity declines as the cornea becomes progressively more opaque. Endothelial dystrophy is the second most common reason for corneal transplants performed in developed countries.

"Thanks to Mr. and Mrs. Kimmel's very generous gift, we are..."
Barile Named Glaubinger Scholar

Lawrence Glaubinger is so impressed with Dr. Gaetano "Guy" Barile's knowledge and presence as a physician and surgeon that he has created the new Glaubinger Scholar program with Dr. Barile as its inaugural recipient. The Glaubinger Scholar is the fifth such ophthalmology research award created by appreciative donors in recent years.

A long-time patient of Dr. Chang's and Dr. Barile's, Mr. Glaubinger is President of Lawrence Economic Consulting and the former chairman of Stern & Stern Industries (an industrial textiles manufacturer). His strong interest in supporting educational endeavors has led him to active leadership with the foundation board of his alma mater, Indiana University. In addition to supporting Columbia's ophthalmology department, Mr. Glaubinger is a member of the Board of Overseers of the Columbia University School of Business, where he has established an endowed chair and several fellowships.

"My interest in creating an ophthalmology scholar program at Columbia stems from my personal experience with Dr. Barile. His surgical skill saved my retina," Mr. Glaubinger said. "For that, I am deeply grateful, and I am pleased to support the research of Dr. Barile and his team, as well as the development of the future generation of ophthalmologists and clinical scientists."

Dr. Barile, the Herbert Irving Assistant Professor and a highly respected retinal specialist and scientist, is researching diabetic retinopathy and proliferative vitreoretinopathy (the formation of scar tissue within the eye, usually as a result of retinal detachment). He and his research team have developed a genetic mouse model that mimics the neural and vascular changes of diabetic retinopathy in humans, the leading cause of blindness in the working-age population of the western world. This mouse model allows scientists to better understand the physiological mechanisms underlying diabetic retinopathy.

"We are hoping to develop innovative therapeutic interventions for the prevention and treatment of retinal complications of human diabetes," explained Dr. Barile. "Mr. Glaubinger's interest in our work is deeply gratifying. His support is vital to our quest to preserve vision by understanding, preventing and reversing the devastation of diabetic retinopathy."
Promotions and New Staff

Rando Allikmets, Ph.D., promoted to William and Donna Acquavella Associate Professor of Ophthalmic Science (in Ophthalmology and in Pathology).

Richard Braunstein, M.D., promoted to the Miranda Wong Tang Associate Professor of Clinical Ophthalmology.

Robert Braunstein, M.D., promoted to Clinical Professor of Ophthalmology.

Martin Lederman, M.D., promoted to Associate Clinical Professor.

Peter Reinach, Ph.D., promoted to Adjunct Professor of Ophthalmic Science (in Ophthalmology).

Those calling Dr. Chang’s office will hear new voices…

Maria Fernandez, formerly of the CUMC faculty medical practice, joined Ophthalmology in August as administrative assistant for Dr. Chang. She replaces Kerry Rogers, who has been promoted to the position of Education Coordinator. Francesca Savia, formerly of Dermatology, joined Ophthalmology in May in the dual role of Administrative Coordinator for the department’s development and administrative areas. Ivy Chen joined the finance division as Staff Coordinator in June, followed by Kara Bauer in September as Grants Manager for the research division.

Faculty News

Gaetano Barile, M.D., Herbert Irving Assistant Professor of Clinical Ophthalmology and the new Glaubinger Scholar [see page 7], and William Schiff, M.D., Assistant Professor of Clinical Ophthalmology, were recently honored with Achievement Awards from the American Academy of Ophthalmology for their years of volunteer service to the Academy and its scientific and continuing education programs.

Stanley Chang, M.D., Chairman of the Department of Ophthalmology and Director of the Edward S. Harkness Eye Institute, and also the Edward S. Harkness Professor and K.K. Tse and Ku Teh Ying Professor, spent two weeks in June lecturing in Hong Kong, Taiwan and China on current issues in retinal disease, including the progression of macular degeneration after cataract surgery.

Lucian Del Priore, M.D., Ph.D., Associate Professor of Ophthalmology, the Robert L. Burch III Scholar and Director of the Bruch Membrane Laboratory, recently received an honor award from The American Society of Retina Specialists. Additionally, he was interviewed for television segment on macular degeneration that aired on CNBC News at the end of August.
R. Linsky Farris, M.D., Professor of Clinical Ophthalmology, has joined Columbia Ophthalmology Consultants, the faculty practice of the Department of Ophthalmology at CUMC. Also the Chief of Ophthalmology at Harlem Hospital, Dr. Farris recently received a generous grant from the Friends of The Congressional Glaucoma Caucus Foundation to support the Save Sight Screening Program at Harlem Hospital, an affiliate division of Columbia's ophthalmology department. Save Sight offers free glaucoma screening, as well as follow-up care and treatment on a sliding scale fee basis, to the surrounding community. This service is especially important to the elderly and African Americans, both populations at high risk of developing glaucoma. Save Sight reaches nearly 1000 individuals annually, preventing unnecessary loss of sight through early detection and treatment. Medical residents benefit from additional opportunities to hone their clinical skills.

Janet Sparrow, Ph.D., Associate Professor in Ophthalmic Science (in Ophthalmology, Anatomy and Cell Biology) and Director of the Retinal Cell Biology Laboratory, has been named one of six recipients of the 2004 Alcon Research Institute Award. Alcon, a leading global ophthalmic corporation, presents this award annually to outstanding clinicians and scientists for their contributions to vision research. Dr. Sparrow is the eighth member of Columbia's Ophthalmology faculty to receive this award; past recipients include Lawrence Yannuzzi, M.D. (2003); Stanley Chang, M.D. (1998); Abraham Spector, Ph.D. (1994); James Dillon, Ph.D. (1991); Jorge Fischbarg, M.D., Ph.D. (1986); Lazlo Bito, Ph.D. (1985); and Peter Gouras, M.D. (1983).

James C. Tsai, M.D., Associate Professor of Ophthalmology, Homer McK. Rees Scholar in Glaucoma Research and Director of the Glaucoma Division, received an ORBIS Medical Faculty Award earlier in 2004. Dr. Tsai went to Shenyang, China, to teach, demonstrate glaucoma surgery and introduce the ORBIS Cyber Sight telemedicine program. Cyber Sight is a volunteer program that allows partner ophthalmologists anywhere in the world to connect with an ORBIS Telementor for professional consultation, with the goal of fighting blindness worldwide.
Columbia University Medical Center attracts many of the world’s best and brightest post-doctoral fellows, and the newest fellows to join the Department of Ophthalmology are no exception.

**Lynda Kleiman, M.D.**, a New Orleans native, is a Fellow in Cornea and External Disease. Dr. Kleiman completed her undergraduate studies at Emory University, a post-baccalaureate premedical program at New York University, and worked at Beth Israel Medical Center’s AIDS Clinical Trials Unit as a research coordinator prior to earning her M.D. from Tulane University School of Medicine. After an internal medicine internship at Cabrini Medical Center in New York, she served as a resident in ophthalmology at Manhattan Eye, Ear and Throat Hospital/NYU Medical Center.

At Columbia, Dr. Kleiman is working with Dr. Richard Braunstein and Dr. George Florakis, performing corneal and anterior segment surgery, in addition to seeing patients and teaching residents in the cornea clinic.

"I am so grateful to be at Columbia and to have this opportunity to train with leaders in the field," said Dr. Kleiman. "I am finding that I really enjoy the teaching aspect of my fellowship."

Richard Braunstein, M.D., who supervises Dr. Kleiman, is equally pleased. "Since joining us in July, Lynda has proven to be a valuable asset to the practice. She is seeing patients, pursuing research opportunities in lamellar keratoplasty and assisting with a book chapter. We are pleased to have her with us."

**Gian Marco Tosi, M.D.** is the newest Flanzer Fellow in Retina. Italian-born, Dr. Tosi earned both his M.D. (summa cum laude) and Ph.D. in ophthalmology from the University of Siena Medical School in Italy, where he completed an internship and residency in ophthalmology. Dr. Tosi has also studied as an intern at Thomas Jefferson University in Philadelphia, Scheie Eye Institute at the University of Pennsylvania and Nijmegen Hospital in the Netherlands. More recently, he has held appointments as a visiting doctor in Frankfurt, Nijmegen and at Wilmer Eye Institute of Johns Hopkins University. In 2003, he was appointed Assistant Professor of Ophthalmology at the University of Siena.

Under the supervision of Drs. Chang, Del Priore, Schiff, Barile, Lopez and Flynn, Dr. Tosi sees patients and performs vitreoretinal surgery at various CUMC locations, includ-
ing the Flanzer Eye Center, the retinal clinic, St. Luke's-Roosevelt Hospital and the Columbia Ophthalmology Consultants office on 71st Street.

"It is an honor and a privilege to have been selected for the Flanzer Fellowship, and to have the opportunity to work with some of the world's finest retinal specialists," Dr. Tosi remarked. "I feel very lucky to be here. It is an outstanding experience from which I will be extremely enriched both as man and as a doctor. I will work very hard to meet my expectations and those of the people, to whom I express all my gratitude, who have made this dream come true."

Argentinean-born Valeria Rubinstein, M.D. is a Fellow in Glaucoma. She holds an undergraduate degree in psychology from the University of Chicago and a graduate degree in biology from New York University. Dr. Rubinstein worked as a research assistant in the areas of pulmonology, cardiology and neurology prior to earning her M.D. from Northwestern University Medical School. Following a medical internship at Cabrini Medical Center, she completed her ophthalmology residency under Dr. M. Bruce Shields at Yale University and served as Chief Resident and a member of the graduate medical education committee at Yale-New Haven Hospital.

Dr. Rubinstein is supervised by Dr. James C. Tsai, head of the Glaucoma Division. She is experiencing all phases of clinical practice and research in glaucoma with Dr. Tsai, Dr. Max Forbes, Dr. Lama Al-Aswad and Dr. Rajendra Bansal. She thanks Dr. Shields, a long-time colleague of Dr. Forbes [see page 3] and her mentor at Yale, for guiding her toward this glaucoma fellowship.

"I feel so fortunate to be at Columbia—this is such a tremendous opportunity. Dr. Tsai's leadership of the Glaucoma Division is second to none, and I am so excited to be involved in his vision of integrating scientific research in glaucoma with clinical practice," explained Dr. Rubinstein. "I also feel lucky to be learning from such incredible teachers, particularly Dr. Forbes, whose clinical skills are legendary, and Dr. Al-Aswad with her specialty in pediatric ophthalmology."

According to Dr. Tsai, "This new fellowship is designed to maximize training opportunities and collaborative research in glaucoma. Valeria is serving in the dual role of teaching residents as they work in the ITT Eye Clinic [see Spring 2004 issue] while simultaneously receiving advanced training in her glaucoma sub-specialty. She is a tremendous addition to our program at Columbia."
Dr. Shapiro is also at the top of his field. An Associate Professor in the Departments of Ophthalmology and Biochemistry & Molecular Biophysics at Columbia, he chairs the User Executive Committee of the National Synchrotron Light Source at Brookhaven National Laboratory and is a co-principal investigator in the New York Structural Genomics Research Consortium, part of the NIH Protein Structure Initiative. Dr. Shapiro is also a recent recipient of the prestigious Jules and Doris Stein Professorship awarded by Research to Prevent Blindness, a non-profit foundation supporting vision research.

The Berrie Diabetic Retinopathy Research Laboratory was created with funding from The Russell Berrie Foundation and Research to Prevent Blindness. In the lab, Dr. Shapiro and his team of post-doctoral research fellows, graduate students and technicians are researching the structural biology and protein biochemistry of how cells adhere, interact and regulate energy in the body to understand the pathological conditions and cellular actions that lead to the effects of diabetes in the retina and other human tissues. Their work is supported in part by grants from the National Institutes of Health and the American Diabetes Association.

"When President Nixon declared war on cancer in 1971, scientists had little understanding of uncontrolled cell division and growth—we needed to gain that knowledge before we could make drugs against cell proliferation," Dr. Shapiro explained. "It is similar with diabetes—before we can develop a cure, we must first understand the underlying functioning mechanisms to fully comprehend its pathological impact on tissues."

"We now see that fat cells are part of the endocrine system, and we know that hormones secreted by fat cells—such as leptin, adiponectin and resistin—help tissues communicate," said Dr. Shapiro, describing his research interests. "Genetic susceptibility plays a role in diabetes, but we are still investigating the general biological mechanism. We know these hormones are connected to type-II diabetes, obesity and sedentary lifestyles. The surprising news is that these hormones work differently from other hormones."

Dr. Shapiro continued. "We also know that only a few types of tissues are susceptible to the negative effects of these hormones—the photoreceptor cells of the retina and vascular cells. These special cells are particularly sensitive to high levels of intra-cell sugar, and when placed in a solution with a high concentration of sugar, they absorb the excess sugar. Other tissues, like epithelial skin cells, do not. Excess sugar in retinal and vascular cells causes their mitochondria to burn more fuel, creating excessive oxygen free radicals."

Lawrence Shapiro, Ph.D.
Dr. Forbes’ insight, wisdom and tremendous contributions to the field of ophthalmology.

Dr. Forbes also co-founded the American Glaucoma Society in the late 1980s with colleagues M. Bruce Shields, M.D., Chairman of the Department of Ophthalmology at Yale University, George L. Spaeth, M.D., Director of the Glaucoma Service at Wills Eye Hospital in Philadelphia and Richard J. Simmons, M.D., of Boston. Over the years, the American Glaucoma Society has grown from a group of four glaucoma specialists into a highly esteemed membership organization of over 400 domestic and international leaders in the field of glaucoma.

"Dr. Forbes is a pioneer in modern ophthalmology. Columbia’s first glaucoma conference was the perfect opportunity to honor and celebrate his genius and expertise," Dr. Tsai explained, describing his mentor and friend. "Dr. George Spaeth's delivery of the inaugural Forbes lecture on gonioscopy and glaucoma and Dr. Richard Wilson's historical perspective on the creation of the American Glaucoma Society brought the tribute full circle."

Held at the New York Academy of Medicine and sponsored by Alcon Laboratories, the glaucoma conference drew ophthalmologists from all over the country with its prestigious guest faculty. In addition to the Forbes Lectureship, the agenda included case studies, panel discussions and guest lectures on glaucoma concepts, pathophysiology, diagnostic principles and research innovations.

Treatment options were also discussed, including medications, neuroprotective remedies, laser therapies and surgical procedures.

"The world-class 'New Frontiers' glaucoma conference was a brilliant success due to the organizational skill and tireless effort of Jim Tsai," remarked Dr. Forbes. "I am delighted that Dr. Chang was able to recruit such a talented leader for our Columbia Glaucoma Division. It has been my good fortune to have the opportunity to extend my career and participate in the outstanding programs developed under Dr. Tsai’s leadership."

"With the support of Dr. Chang, the Glaucoma Division at Columbia has grown to include both clinical research and basic science research staff to augment our work," Dr. Tsai remarked. "This first annual glaucoma conference has been a milestone for the Department—acknowledging our history and reinforcing our commitment to the future of ophthalmology."
These radicals damage the tissue, resulting in the various physical complications of diabetes."

Dr. Shapiro and his team are using x-ray crystallography to view and analyze the behavior of protein molecules at their most basic atomic resolution. The experimentation process is complex—protein molecules are extracted from bacteria and then purified to create a specific protein crystal. The crystal is then transported to the National Synchrotron Light Source at Brookhaven National Laboratory where x-rays are harnessed to illuminate the atomic structure of the protein crystal. Analysis of the crystal data yields the information upon which a three-dimensional computer model is built. After statistically verifying the model, Dr. Shapiro and his team examine the unique patterns of the protein model.

The focus of one research study is to understand insulin resistance, an impaired metabolic response to the body’s natural insulin often seen with obesity and type-II diabetes.

Dr. Shapiro has discovered that the hormone resistin, a protein which floats in the bloodstream, has a hexamer form in its inactive state. When resistin breaks into a trimer form, it becomes active. In its active state, resistin appears to adhere to receptors on cell surfaces, causing increased insulin resistance.

Another hormone, adiponectin, has a different shape than resistin, but x-ray crystallography has shown that it behaves similarly, with an inactive hexamer form and an active trimer form. Interestingly, adiponectin in its active form appears to have exactly the opposite effect of resistin—it causes increased sensitivity to insulin.

With x-ray insight and the sophisticated design, equipment and computer modeling capabilities of the new Berrie Diabetic Retinopathy Research Lab, Dr. Shapiro's work is providing medical and ophthalmic science with a new understanding of the way diabetes affects the body and the eye. Each specific molecular target they identify strengthens and deepens our understanding of the disease and provides a foundation for the development of more effective medications and treatment protocols to counteract its devastating complications. With each new discovery, we take another step towards Russ and Angelica Berrie’s vision of a world without diabetes.
Windows... (con’t. from page 5)

of that top-notch research team, leading much of the clinical research that is occurring in The Starr Foundation Retinal Research Unit.

The clinical research studies carried out by Dr. Greenstein are designed to increase our understanding of the mechanisms involved in diseases affecting the retina and optic nerve, and to improve methods for detecting retinal and optic nerve damage caused by these diseases. The patients who participate in the studies are volunteers referred by their ophthalmologists. They are followed over a period of several years using a variety of measures to assess disease-related changes in retinal structure and function.

Dr. Greenstein has three clinical studies currently in progress: assessing the effects of photodynamic therapy on retinal function and structure in patients with age-related macular degeneration; measuring visual function following retinal surgery for macular holes and macular pucker; and, detecting early retinal and ganglion cell/optic nerve damage in glaucoma suspects. All have the potential to influence the treatments of these causes of blindness.

Dr. Greenstein and the research team are very grateful to the donors who have provided such a superb facility in which to do their work and examine patients. Dr. Greenstein comments, "It makes such a difference—both for our patients' ease and comfort and for our work. We are so grateful for their support and interest."

Florence Davis and T.C. Hsu of The Starr Foundation

One Gene... (con’t. from page 6)

investigating the traits, risk factors and specific genes responsible for Fuchs' dystrophy," explained Richard Braunstein, M.D., Chief of Anterior Segment Division and the Miranda Wong Tang Associate Professor of Ophthalmology. "Our study involves setting up a protocol to screen large numbers of patients with Fuchs' dystrophy—both sporadic and familial cases—to create a 'cornea chip' diagnostic tool that will contain all mutations of already known corneal dystrophy genes and all those potentially discovered. The chip will provide one-step screening of at-risk individuals to streamline diagnosis and early detection. Of course, once we have created this comprehensive genetic database, the next step involves creating gene therapies for prevention and treatment."

"We are excited by the possibility of making a real difference in the lives of patients with Fuchs' dystrophy and those at risk of developing the condition," said Mr. Kimmel. "It is gratifying to know that we can be a part of the solution."
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