



Viewpoint

Clinical Corner: Expert Care for Growing Eyes

"Children are not small adults," states John T. Flynn, M.D., Anne S. Cohen Professor of Pediatric Ophthalmology and Vice Chairman of the Department of Ophthalmology. "You can't just downsize from what you know

about adults. Children are developing human beings who are very much in a dynamic state." He emphasizes that the pediatric ophthalmology division has a threefold mission of service, research and education.



John T. Flynn, M.D.

Service to the Tri-State Area and Beyond

Pamela Gallin, M.D., Associate Clinical Professor of Ophthalmology and Pediatrics, is highly involved in the service mission. "One of the great things about pediatric ophthalmology at the



Charles Manby

Pamela Gallin, M.D. examines Ava Cyruli, age 6, to determine if her eyes are properly aligned.

Edward Harkness Eye Institute and the Morgan Stanley Children's Hospital is the depth and breadth of expertise its physicians provide. Renowned internationally, the Children's Hospital has every pediatric subspecialty that exists," she explains. "With kids, medical problems tend to be more complex. While a general ophthalmologist can handle your child's problem adequately, a pediatric ophthalmologist can expertly define

the problem and apply a more individualized treatment paradigm and approach."

Dr. Gallin points out that many children's diseases, such as pediatric arthritis, affect the eye and require coordinated teams of subspecialists. Her strengths lie in her diagnostic abilities and a nuanced understanding of her colleagues' expertise in order to assemble the correct

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Science Insight: Green Energy for the Eye

Ilyas Washington, Ph.D. is going green. A newly appointed assistant professor in the Department of Ophthalmology, Dr. Washington and his Columbia colleagues in ophthalmology and chemistry are investigating how derivatives of the green chlorophyll molecules found in plants such as grass or spinach can improve vision and possibly delay eye disease.

"In studying how plant 'technology' can be adapted to

power human processes relating to vision, we are thinking about novel ways to exploit light," says Dr. Washington, an organic chemist who most recently has worked as a post-doctoral research fellow in Columbia's Department of Chemistry. "One aspect of our research involves the study of ways to increase the spectral sensitivity of the eye to see wavelengths of light toward the infrared region that we cannot normally see."

Dr. Washington's initial research, recently published in *Nature*, the *Journal of the American Chemical Society* and *Photochemical and Photobiological Sciences*, showed that chlorophyll derivatives help mammals capture and see longer wavelengths of red light. In the eye, these artificial pigments are believed to initiate the transformation of light into an electrical signal, performing the primary event

Ilyas Washington, Ph.D.

Charles Manby

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Amilia Schrier, M.D.



Dear Friends,

The gift of vision is precious at any age, but especially so for children. Prompt and proper ophthalmic treatment in children can make the difference between a lifetime of joyful sight and a debilitating, isolating and costly disability. At the Edward Harkness Eye Institute, we recognize that children are not just “small adults” – they are growing and changing human beings who require specialized and vigilant care that respects their unique developmental needs.

In this issue of *Viewpoint*, we showcase our stellar pediatric ophthalmology team, led by John Flynn, M.D. He and his team, including Michael Chiang, M.D., Howard Eggers, M.D., Pamela Gallin, M.D. and Robert Lopez, M.D., are leading the way in providing comprehensive, highly individualized and coordinated care for children and babies with eye and orbital diseases.

We also profile Amilia Schrier, M.D., the new A. Gerard DeVoe–B. Dobl Srinivasan Director of Ambulatory Eye Care for the ITT Eye Clinic, and Ilyas Washington, Ph.D., an organic chemist and the newest member of our research staff. Dr. Washington, who recently completed a post-doctoral fellowship with Columbia’s Department of Chemistry, is combining



Charles Albrecht

the study of sunlight, chlorophyll derivatives and nanotechnology in innovative ways to stem age-related vision loss.

Finally, Mr. and Mrs. Bernard Brown, treasured members of our Advisory Board, have established the Shirlee and Bernard Brown Professorship, an endowed professorship in glaucoma, to complement their already generous support for the Brown Glaucoma Laboratory. We are tremendously grateful for their leadership role in the *Vision for the Future* campaign and their unwavering support for glaucoma research. Robert L. Burch III, another esteemed Advisory Board member, has made an equally impressive gift to underwrite laboratory renovations and research support for Kosta Petrukhin, Ph.D. in his quest for new treatments for age-related macular degeneration.

With appreciation for the blooms of spring and the dedication and commitment behind our donors’ altruism, I extend renewed thanks to each of you for your continued generosity and support of the Harkness Eye Institute’s clinical and research endeavors. Every gift truly makes a difference as we work together to treat and conquer diseases of the eye. Thank you again for all that you do.

With best wishes to you and yours,

A handwritten signature in blue ink that reads "Stanley Chang". The signature is fluid and cursive.

Stanley Chang, M.D.
K.K. Tse and Ku Teh Ying Professor
Edward S. Harkness Professor
Chairman, Department of Ophthalmology

Green Energy for the Eye *continued from page 1*

in vision, a function previously attributed exclusively to the visual protein rhodopsin. Chlorophyll derivatives provide something akin to near infrared vision that may improve the ability to drive at night and under adverse conditions such as fog, haze, smoke, rain or snow.

“Carrots get all the credit,” Dr. Washington quips. “But the chlorophyll molecules in green vegetables may actually help improve long-wavelength vision. The next step is to investigate how many of these chlorophyll molecules actually get to the eye via the digestive process.”

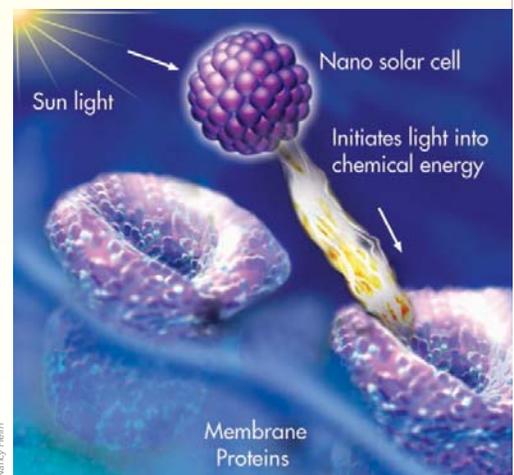
These promising results also suggest that chlorophyll derivatives can be used to capture light and convert it into chemical energy to power cellular processes of the eye. His next research avenue involves combining chlorophyll derivatives with nanotechnology to initiate the transformation of sunlight into energy for the eye. He hypothesizes that special nano solar cells could be introduced into the eye via eye drops to provide auxiliary energy to combat age-related vision loss.

“As people age, there seems to be a drop in adenosine triphosphate [ATP] synthesis,

which is the energy currency of cells. When that drops, the cells begin to die. If we can develop ways to increase ATP synthesis in the eye, we may be able to impede cellular death and even help eyes heal more quickly following injury or surgery,” explains Dr. Washington.

“I find the eye fascinating because it is an area of study where many disciplines come together. I try not to look at science as separate disciplines. Rather, we need to step back and let the problem be the catalyst that combines all these sciences,” Dr. Washington says. “We are living in a revolutionary time for science. In the past, lack of access to information was a barrier to collaboration across fields. Now, with ingenuity and easy access to information via the Internet, real potential for new discoveries exists. I am deeply honored to join the Department of Ophthalmology because it presents tremendous opportunities to collaborate with world-class faculty from diverse scientific backgrounds.”

With a Ph.D. from the University of California at Los Angeles and a broad background in computational, physical organic, photo and bio-organic chemistry, Dr.



A nano solar cell targets a cellular compartment where it initiates the transformation of light into chemical energy.

Washington is looking forward to continued collaboration with Columbia researchers and clinicians to translate such novel discoveries into clinical treatments. He continues, “To cure these eye diseases, or any disease, it will take all of science, not just one discipline.” ■

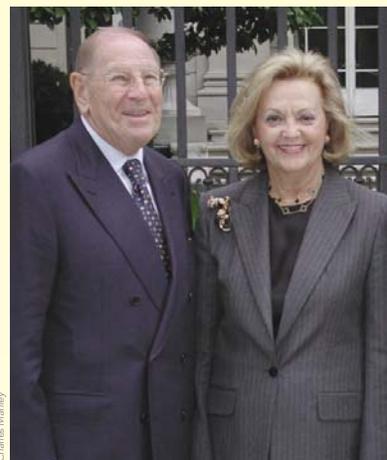
Philanthropic Focus: Browns Endow New Glaucoma Professorship

Shirlee and Bernard Brown, loyal members of the Department of Ophthalmology's Board of Advisors and staunch advocates for glaucoma research, have endowed the Shirlee and Bernard Brown Professorship in glaucoma.

"We have the utmost admiration and respect for Dr. Chang and are very pleased to be able to support his vision to make the Harkness Eye Institute the premiere institution for vision care and research in the Northeast," states Mrs. Brown. She acknowledges that her husband's and her interest in glaucoma research stems from their overwhelmingly positive experiences as glaucoma patients of Dr. Chang. "Not only is Dr. Chang outstanding in his field, he is a genuinely warm and compassionate person. That very rare combination inspires us to want to

help in any way we can," she reflects. This new endowed professorship builds on a previous gift that established the Brown Glaucoma Laboratory and supports the research initiatives of physician-scientist Stephen Tsang, M.D., Ph.D. [see *Visionaries & Luminaries*, page 5] and geneticist Chyuan-Sheng "Victor" Lin, Ph.D. "We are deeply invested in the success of the Glaucoma Division and the *Vision for the Future* campaign," she adds.

"The Browns' decision to endow this professorship is especially vital as we recruit a new Glaucoma Division Chief from amongst the top physician-scientists in the world," says Stanley Chang, M.D. "Those who have the privilege of holding an endowed professorship enjoy the academic prestige and additional grant support that accompanies such recognition, as well as addi-



Bernard and Shirlee Brown

tional time to conduct and publish their research. We are grateful beyond measure for Shirlee and Bernie's extraordinary and steadfast support of our glaucoma research initiatives and for their leadership role in the *Vision for the Future* campaign." ■

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Burch Funds AMD Drug Development Efforts

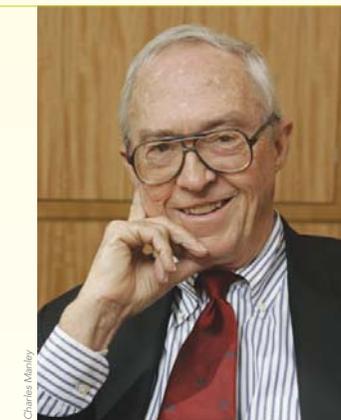
Robert L. Burch III knows what it's like to live with age-related macular degeneration (AMD). And he wants to see a cure developed – soon. "When Jane Heffner told me about an opportunity to fund the laboratory of a new faculty member whose work would be devoted to developing new treatments toward a cure for AMD, I knew I wanted to do it," says Mr. Burch, a member of the Board of Advisors of the Department of Ophthalmology and a long-time patient of Stanley Chang, M.D.

Vision loss from AMD is related to degeneration of the photoreceptor rods and cones of the macula, the tiny portion of the retina responsible for fine, central vision. At present, there is no cure for this insidious disease that destroys central vision. However, retina-specific nuclear receptor (RNR), a recently discovered protein expressed only in the retina's photoreceptor cells, is thought to play an important role in

photoreceptor development and health.

"RNR is the drug target for treatment of AMD and other diseases that involve the degeneration of photoreceptor cells. My research is focused on developing high throughput screening assays of small molecule agonists for RNR, which is expressed specifically in the rod cells," explains Konstantin "Kosta" Petrukhin, Ph.D., the new associate professor whose research, staff and laboratory renovation is supported by Mr. Burch's generosity [see Fall 2006 *Viewpoint*].

One of the most exciting pieces of equipment in Dr. Petrukhin's lab is a state-of-the-art microtiter



Robert L. Burch III

plate reader. "This particular microtiter plate reader is highly sophisticated and compact – it replaces three to five huge pieces of equipment. We are using it to perform homogeneous time-resolved fluorescence measurements, a process critical to developing high throughput assays," he notes.

This specialized fluorescence technique measures protein-to-protein interaction, with the objective of finding small molecules called "agonists" that are capable of binding to RNR, much like the way a key fits into a lock. A successful agonist is a potential compound that, once identified, can be modified and refined into a medication that will interact with RNR to halt photoreceptor degeneration.

To find a successful agonist, Dr. Petrukhin and his team must first purify RNR (the drug target) and a

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Konstantin "Kosta" Petrukhin, Ph.D.



The state-of-the-art microtiter plate reader funded by the Burch gift.

Eye Institute Nursing Staff Receives Highest Rating

The nursing staff of the Edward Harkness Eye Institute's Ambulatory Surgery Unit won the NewYork-Presbyterian Hospital Healthcare System's highest rating for excellence in patient care for 2006. An independent consultant conducted a review of patient feedback and other factors from all departments at NewYork-Presbyterian Hospital and the Allen Pavilion.

"This is a great and well-deserved honor for our nursing staff," states Dr. Stanley Chang. "They consistently go to great lengths to ensure that each and every patient receives the utmost in caring and individualized attention. They are the backbone of the Eye Institute and we salute their professionalism, strength and compassion." ■



Front row, left to right: Diane Wilson, R.N.; Corazon Algenio, R.N.; Melita Jonas; Ruth Young, R.N.; Modesta Lopez; Emilie Bondoc, R.N.; Violet Barlas, R.N.; Back row, left to right: Odetta Nurse; Debbie Caruth, R.N.; Rosemary Twumasi; Arvid Johnsen, R.N.; George Sandoval; Zorayda Lucca; Gail Anthofer, R.N.



Howard Fine, M.D.

Fine Appointed Clinical Research Center Medical Director

Howard Fine, M.D., M.H.Sc., currently a post-doctoral vitreoretinal clinical fellow, will become the Department's first Gerstner Clinical Research Center Medical Director in July. He will also join Columbia Ophthalmology Consultants as a vitreoretinal specialist.

Originally from Parsippany, New Jersey, Dr. Fine holds undergraduate degrees in chemical engineering and biology from the Massachusetts Institute of Technology, a graduate degree in clinical trials from Duke University and a medical degree from Harvard Medical School. He completed his residency at the Wilmer Eye Institute at Johns Hopkins University and also spent a year in the NIH Clinical Research Training Program in the uveitis division of the National Eye Institute.

"Columbia has become a worldwide leader in ophthalmic clinical research thanks to the vision of Dr. Stanley Chang and the generosity of the Gerstner family and other donors," says Dr. Fine. "I am thrilled to have this opportunity to expand efforts in clinical trials and translational research. Over the next decade, the team at Columbia is poised to make major contributions towards novel therapeutics, drug delivery systems, improvements in surgical instrumentation and imaging technology, and genetic characterization of disease states." Dr. Fine will be charged with testing these initiatives, bringing them from "bench to bedside." He also will continue to treat patients with retinal disorders.

"Howard Fine is an extraordinarily talented young physician. His leadership and expertise in conducting clinical trials will bring our expanded clinical research efforts to a new level," states Stanley Chang, M.D. ■



Charles Manley

Iranmanesh to Lead Resident Education Program

Reza Iranmanesh, M.D., Assistant Professor of Clinical Ophthalmology and a vitreoretinal specialist with Columbia Ophthalmology Consultants, will succeed **Richard Braunstein, M.D.** as Educational Program Director in July.

After more than six years of leading the Education Program, Dr. Braunstein, who is also Division Chief of Anterior Segment and Laser Vision Correction, is "passing the baton" to devote more time to other departmental initiatives. His many program enhancements, including a resident mentor system, a reorganized rotation structure and a full-time pediatric rotation, have propelled Columbia's highly competitive ophthalmology residency program to nationally recognized status. Dr. Braunstein says, "Dr. Iranmanesh is a gifted clinician and

surgeon with the ability to lead our resident training with finesse, integrity and high energy."

Dr. Iranmanesh, an Iranian native who grew up in California, held the prestigious Flanzer Retina Fellowship at Columbia under Drs. Chang, Del Priore, Barile and Schiff prior to joining Columbia Ophthalmology Consultants last July. As Education Program Director, he will oversee the content, structure and daily activities of ophthalmology resident training. "This opportunity is very exciting," he notes. "I certainly have big shoes to fill, as the Education Program has become substantially more prominent under Dr. Braunstein's leadership. It is both an honor and a welcome challenge to build upon the foundation that he and others have set." ■



Reza Iranmanesh, M.D.

Charles Marley



Richard Braunstein, M.D.

Charles Marley

Tsang Receives Culpeper Award

Stephen Tsang, M.D., Ph.D., Assistant Professor of Ophthalmology in the Brown Glaucoma Laboratory, is one of three national recipients of the 2007 Charles E. Culpeper Scholarship in Medical Science. These prestigious awards nurture the careers of "exceptionally promising" young physician-scientists with significant funding over three years in support of innovative research. Each university is allowed only one nomination.

Photoreceptor degeneration, including age-related macular degeneration (AMD) and retinitis pigmentosa (RP), is the most common form of degenerative disease in the central nervous system and has a profound impact on quality of life due to progressive and substantial vision loss. Over nine million Americans are affected with photoreceptor degeneration, far exceeding the number with Alzheimer's disease. Inherited forms of photoreceptor degeneration affect about one in 2,000 people. Currently there is no cure.

Dr. Tsang's research project titled "Can Neuronal Function be Recovered After Degeneration has Started?" involves the study and manipulation of gene expression in photoreceptor degeneration in mice, which closely parallels similar conditions in humans. The Culpeper Scholarship supports his efforts to find new treatments for photoreceptor degeneration in AMD, RP and allied retinal dystrophies. ■

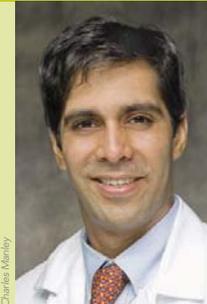
Stephen Tsang, M.D., Ph.D.



Rising Talent

Pawan Bhatnagar, M.D. is a Vitreoretinal Clinical Fellow from Park Ridge, New Jersey. Dr. Bhatnagar earned his undergraduate degree and medical degrees in a six-year combined degree program from the University of Missouri-Kansas City, where he received achievement awards for clinical excellence, medical education and pharmacology, and was elected to the Alpha Omega Alpha Honor Society. After an internal medicine internship at Winthrop University Hospital in Mineola, New York, he completed his residency in ophthalmology at the Cleveland Clinic Foundation, Cole Eye Institute.

"It is a privilege to train in this fellowship under the mentorship of Drs. Chang, Del Priore, Schiff, Barile and Iranmanesh, as well as Dr. Yannuzzi. These are the pioneers and thought-leaders who have shaped, and continue to shape vitreoretinal disease diagnosis, treatment and surgery," says Dr. Bhatnagar. "In addition to receiving outstanding surgical and clinical training, I have been exposed to the compassionate and empathetic approach they bring to patient care. I am grateful to have this opportunity." ■



Pawan Bhatnagar, M.D.

Charles Marley



Amilia Schrier, M.D.

Faculty Spotlight: Amilia Schrier, M.D.

the faculty of Manhattan Eye, Ear & Throat Hospital, rising to Assistant Chief of Service. In 1998, Dr. Schrier joined Columbia's Department of Ophthalmology.

As testimony to her gift for teaching, Dr. Schrier has been named "Outstanding Teacher of the Year" no less than six times since 1992 –

once at SUNY Downstate, three times at Manhattan Eye, Ear & Throat and twice at Columbia. "I love working with residents," she says with a warm smile. "I allow myself to be challenged by these brilliant young minds and open to their new ideas. I also feel a responsibility to teach medical ethics and compassion – the human side of being a physician. I learned the most through observing my mentors and hope to give our residents the same experience."

One of the most influential mentors in Dr. Schrier's career was Arthur Wolintz, M.D., the former ophthalmology chair of SUNY Downstate. "He is a brilliant and inspiring man. He didn't need to speak loudly to get his point across," she recalls. "I remember him most for his passion for ophthalmology and medicine, as well as his gentleness." Other important mentors include her husband, Edward Smith, M.D., and Eric Donnenfeld, M.D., Henry Perry,

M.D. and her entire team at Manhattan Eye, Ear & Throat. Speaking of her Columbia mentors, she notes, "Dr. Stanley Chang is a powerful, yet quiet leader whose expertise and perfection I admire tremendously. Of course, Dr. Srinivasan has been a profound mentor and inspiration. His gentlemanly guidance and 'medicine first' approach have prepared me for this new role in directing the Eye Clinic."

Dr. Schrier acknowledges that leading the ITT Eye Clinic is an enormous responsibility. In 2006, the Eye Clinic served a total of 22,500 people, up 7% from 2005. Approximately 95% of clinic patients are from the neighboring Washington Heights community and many are recent immigrants from the Dominican Republic.

"It takes a large machine to make it all work," Dr. Schrier says. The general and specialty clinics are staffed by 10 residents, numerous attending physicians, and a staff that includes three nurses, three medical assistants, two visual field technicians, seven patient representatives and one registration coordinator. She praises the staff, adding that they are "the backbone of the clinic."

"The general clinic is the intake point for all patients and the powerhouse of the whole program," Dr. Schrier explains. Specialty

clinics in retina, glaucoma, laser, neuro-ophthalmology, uveitis, cornea, orbit and plastics, contact lenses, and pediatrics run concurrently with the general clinic. Attending physicians staff the specialty clinics and mentor residents. "Our philosophy is 'teach by example.' We work together in tense and stressful situations, so we strive to be calm, rational and fair in our assessment of patients and evaluation of disease and treatment."

Dr. Schrier also maintains a practice specializing in cataract, cornea and external ocular disease. She mentors residents in clinical research based on observations of interesting cases from the clinic. Residents frequently present their findings at Grand Rounds, as well as at regional and international meetings.

"The most rewarding aspect of my job is that it is so multifaceted. Our residents are talented young doctors who experience tremendous personal and professional growth as they become excellent ophthalmologists. I also have the privilege of working with a brilliant group of colleagues and attending physicians. I am especially grateful to the patients who entrust us with their care," Dr. Schrier reflects. "The Eye Clinic is a wonderful place to work. I am a better person and a better doctor because of it."

"I feel lucky and honored to work here," says Amilia Schrier, M.D. with enthusiasm. Dr. Schrier is the new A. Gerard DeVoe–B. Doblí Srinivasan Director of Ambulatory Eye Care for the ITT Eye Clinic at the Harkness Eye Institute and an associate clinical professor of ophthalmology. As the former associate director of the Eye Clinic, she was a natural choice to succeed her mentor, B. Doblí Srinivasan, M.D., upon his retirement in 2006.

Dr. Schrier, who holds an undergraduate degree in biology from the University of Virginia, earned her medical degree from SUNY Downstate Medical School, where she also completed her residency. In 1992, following a fellowship in Cornea and External Disease at North Shore University Hospital/Cornell Medical College, she began a private ophthalmology practice on Long Island and joined

Burch Funds AMD Drug Development Efforts *continued from page 2*

co-repressor (a protein that binds with RNR in photoreceptors). Next, they tag each protein with a separate fluorescent marker. When mixed together, RNR and the co-repressor bind to form a complex, and the energy from one fluorescent tag is transferred to the other. However, when a successful agonist (or ligand) is added, the agonist binds to RNR, disrupting the interaction with the co-repressor. When the interaction between RNR and the co-repressor is interrupted, it is impossible for energy to transfer from one tag to another. When that occurs, it means that the agonist

(the potential drug compound) has bound to RNR (the drug target). In high throughput screening, Dr. Petrukhin can very quickly test a nanoplate assay of 3,456 potential agonists in two-microliter wells against the RNR/co-repressor mixture.

Concurrently, Dr. Petrukhin is collaborating with associate professor Lawrence Shapiro, Ph.D. to develop a three-dimensional computer model of the RNR protein through the process of x-ray crystallization [see Fall 2004 *Viewpoint*]. With this 3D model of RNR, they can

explore theoretical computer "docking" in which the molecular structure of the successful agonist (the "key") is matched to RNR's ligand and binding pocket (the "lock"). A medicinal chemist can then modify and optimize the molecular structure of the successful agonist for greater effectiveness.

"I'm thrilled to have the opportunity to help in this research effort to cure AMD and to support the department's *Vision for the Future* campaign," says Mr. Burch, who previously demonstrated his support by establishing the prestigious

Robert L. Burch III Professorship of Ophthalmology in 2005. "Attracting such a major talent as Dr. Petrukhin shows enormous progress toward enhancing the research capabilities of the Harkness Eye Institute and finding effective treatments for AMD."

Dr. Petrukhin is equally grateful. "Thanks to Mr. Burch's generosity, the lab is up and running with excellent equipment and I've been able to hire a research associate and a post-doctoral scientist to speed our efforts. This kind of support is very much appreciated."

Expert Care for Growing Eyes continued from page 1

team in sequence to address each child's individual needs. Dr. Gallin, the author of a textbook on pediatric ophthalmology, has also published *How To Survive Your Doctor's Care* to help patients proactively manage their health-care. Most recently, she authored the February 2007 cover story, "Ten Questions That Could Save Your Life," for *Reader's Digest*, and records "The Doctor Is In," a weekly podcast available on the magazine's website.

"It is terrifying when your child has a medical problem," Dr. Gallin says. "You want to know that you have a SWAT team outside the door, ready to leap into action at a moment's notice." She notes that Children's Hospital is the only institution in the metropolitan area that has a pediatric anesthesiologist in attendance at every surgery, and a pediatric ophthalmologist in attendance for even "routine" eye surgeries. She adds, "Eye surgery is never 'routine.' There's just a higher level of expertise here. If there's a problem, you know you have an army behind you."

The Children's Hospital Neonatal Intensive Care Unit (NICU) is a tertiary care center that is called upon to treat the most seriously ill babies from northern Manhattan, Westchester, New Jersey and southwestern Connecticut. Premature infants experience numerous medical challenges and are particularly susceptible to retinopathy of prematurity (ROP), a condition characterized by an overgrowth of retinal blood vessels that could be blinding if left untreated.

Robert Lopez, M.D., recognized as the tri-state area's leading pediatric retinal surgeon, treats many cases of severe ROP. "Many medical institutions in the New York area perform 'bedside' laser surgery on premature infants that does not require general anesthesia," he says. The most common intraocular surgery Dr. Lopez performs on premature babies with severe ROP is a procedure to remove blood and scar tissue from inside the eye in order to reattach the retina. This is done under general anesthesia and requires expert pediatric anesthesiology since the babies are medically unstable. He praises Children's Hospital, saying, "We have everything these babies need – a superior pediatric anesthesiology team, an excellent NICU, an operating room with state-of-the-art equipment, a highly trained nursing staff and an experienced pediatric retinal surgeon."

Dr. Lopez also treats children with retinal detachments, eye



Charles Marley

perforations and other diseases of the retina. When a child has combined cataract and retinal problems, he collaborates with colleague **Steven Kane, M.D., Ph.D.**, a pediatric ophthalmologist with subspecialties in pediatric glaucoma, cataracts and neuro-ophthalmology.

Answers to Tough Research Questions

Michael Chiang, M.D., M.A. is quickly becoming a leading national expert on telemedicine diagnosis of ROP. He is leading a groundbreaking ROP telemedicine collabora-



Robert Lopez, M.D. performs a follow-up examination on the eyes of seven-month old Peter Speciale, Jr., who is held by his father, Peter Speciale, Sr.

tion with several Columbia faculty members from ophthalmology, neonatology, biomedical informatics and the School of Public Health [see Spring 2004 *Viewpoint*], as well as with other academic medical centers.

"We've collected information from examinations of over 100 babies with ROP. It's the largest dataset of this nature that's been collected to date," says Dr. Chiang. Every patient in the study received both a traditional ophthalmic exam and diagnosis by a pediatric ophthalmologist and a set of retinal photographs taken by a NICU nurse trained in telemedicine photography. Standardized ROP grading scales make this disease amenable to telemedicine diagnosis. Each set of retinal photographs was read and graded by pediatric retinal specialists from partner institutions in Miami, Los Angeles and Vermont. Dr. Chiang and his team are now comparing the traditional diagnoses to the telemedicine diagnoses. "Our goal is to determine how well these telemedicine interpretations by experts correlate with findings from the traditional eye exams," he explains. "Our hypothesis is that there will be cases where the diagnosis was improved by having the photographs available. We are also studying the cost-effectiveness of telemedicine diagnosis of ROP. Is it faster, more accessible and less expensive?"

Michael Chiang, M.D., M.A.

Cost and accessibility of diagnosis and treatment are crucial issues in addressing this potentially blinding disease. Dr. Flynn explains the significance. "Every year, four million babies are born in the United States. Of that figure, 400,000 will be classified as premature and about 40,000 to 60,000 of those premies will be at risk for ROP. Some 60% of those at-risk babies will develop some form of ROP. About 4,000 will require treatment. In 75% of those cases, the treatment will be effective – if they get treated within a small window of time. But that leaves about 1,000 kids per year in the U.S. afflicted with anything from mild visual

impairment to complete blindness due to ROP. You don't have to be a rocket scientist to understand the difficulties ROP presents for young families and these kids. They will need eye care for the rest of their lives because they are more prone to retinal detachments, cataracts and glaucoma," Dr. Flynn notes grimly. "Economists estimate that it will cost in the range of

\$40 million annually for healthcare services for each year's class of ROP babies with vision loss. Multiply that by a lifespan of 50-80 years, and you get a sense of the exponential proportion of this growing, but not completely recognized public health problem. This telemedicine research project has tremendous potential to reduce the cases of preventable vision loss from ROP."

On another research front, Dr. Lopez is involved in an effort to determine if it is possible to detect any of the proteins associated with adult eye diseases in babies with retinal detachment diseases. Other researchers are investigating whether the neovascularization drugs used in adults are toxic or beneficial to retina development in newborn mice with an induced condition that mimics ROP. **Stephen Tsang, M.D., Ph.D.** has been developing treatments for inherited diseases of the retina affecting children and young adults.

Teaching Tomorrow's Ophthalmologists

"Our children's clinic serves the community in Washington Heights. We see between 2,500 to 3,000 kids each year. Some need glasses, some have cataracts, some have glaucoma," says Dr. Flynn. "We are available to the people in our neighborhood and take all comers, regardless of their ability to pay. Having a very busy children's clinic helps us train residents in the

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medical care and diagnosis of the eye conditions that affect children.”

Pediatric and adult strabismus specialist **Howard Eggers, M.D.** is the primary teacher of strabismus surgery techniques, a very important part of resident training. “He’s the best in the city,” notes Dr. Flynn.

“With congenital misalignments, it’s important to get the eyes straight as early as possible,” Dr.



Howard Eggers, M.D.

Eggers cautions. “Pediatricians normally send us babies at six months, but even earlier is better. The quality of the child’s binocular sensory experience is at stake.” New

research recommends straightening the eyes by four months, the age at which the brain develops depth perception. Motor alignment (both eyes moving together) is required for the brain’s sensory system to

develop properly. Untreated, strabismus can result in amblyopia (“lazy” eye) in which the child uses one eye more than the other. This condition can result in permanent vision loss because the brain suppresses the portion of vision that is ignored.

Dr. Eggers often uses corrective surgical alignment for children. However with teenagers and adults, he may employ adjustable sutures for more precise alignment and Botox for minimally invasive “micro” alignment. “Most people don’t know that Botox was invented for aligning eyes,” he explains. Dr. Eggers was in the first investigator group of the FDA study that approved the use of Botox for strabismus. “On teenagers and adults, Botox is easily tolerated and can rein in small deviations by relaxing the one muscle that is pulling harder than the opponent muscle.”

Dr. Chiang, who also treats patients with strabismus, feels one should not underestimate the emotional consequences of eye misalignment. “This is not simply a ‘cosmetic’



Robert Lopez, M.D. with two-year old Faith Bravo and her parents, Maria and Peter Bravo.

surgery. Direct eye contact is a crucial part of interpersonal communication. There is a growing body of literature exploring the negative impact of misaligned eyes on how one’s intelligence and honesty are perceived by others. Realignment of the eyes can make a tremendous difference in self-confidence and self-esteem.”

Many other attending physicians staff the specialty clinics and train residents in the diagnosis and treatment of both children and adults. **Michael Kazim, M.D.** specializes in diseases of the orbit. **Lama Al-Aswad, M.D.** treats pediatric and juvenile glaucoma. She emphasizes early screening. “Pediatric glaucoma is uncommon and juvenile glaucoma is very rare, but in both cases, the risk of blind-

ness is much greater because we have to manage the disease from childhood on through adulthood,” she says. “Sadly, many children go undiagnosed for too long. Early diagnosis and expedited treatment can make a tremendous difference in helping these children retain their sight.”

Dr. Flynn commends all who collaborate in the excellent care of children and their families at the Eye Institute and the Children’s Hospital. “The gift of vision is precious. It is our responsibility to care for all who come through our doors with knowledge, compassion and skill,” he says. “Every day, our physicians, residents and research staff are making a difference in the lives of these children. There is nothing more gratifying.” ■

Important Patient Care Telephone Numbers

Cornea/External Ocular Disease: 212.326.3320

Glaucoma: 212.342.0943

Pediatric Ophthalmology and Strabismus: 646.422.0200

Refractive Surgery/LASIK: 212.326.3320

Vitreoretinal and Uveitis: 646.422.0200

Viewpoint



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