



Viewpoint

Stem Cell Research: Promise for the Future

Since the Obama administration proposed plans to reverse limits on federal funding for embryonic stem cell research, the subject of stem cells has regained the attention of the media and reinvigorated the public debate on their use in medical treatment. Although the subject presents difficult ethical and political issues, most of the scientific community cheered the news. It is hoped that stem cells can be made to replicate tissues that will be used to treat a variety of diseases and conditions including those of the eye.

Researchers in the Department of Ophthalmology have been engaged in stem cell research for years. Lucian V. Del Priore, M.D., Ph.D. and Stephen H. Tsang, M.D., Ph.D.

are the two physician-scientists leading the department's research on some of the most promising treatments for macular degeneration, retinitis pigmentosa, and other retinal diseases.



Lucian V. Del Priore, M.D., Ph.D.

Stem cells are immature and undifferentiated cells that have the potential to become any of the body's cells – brain, liver, heart, etc. What kind of cells they become depends on which of their genes “turn on” and which do not. In order for stem cells to become

neural cells, the kind needed for retinal therapy, they must be coaxed along a specific path. Influencing stem cells so that they become neural cells, growing enough of them, and successfully transplanting them into patients with retinal diseases, is the basis of Dr. Del Priore's and Dr. Tsang's research.

Age-related macular degeneration (AMD) affects about eight million Americans, and its incidence is expected to double by 2020. The disease affects the macula, the area

in the center of the retina in the back of the eye that gives us our finely detailed central vision. In the retina, the spacing between cells determines the degree of visual resolution. Because the macula has the most densely-packed cells, loss of cells within

▶ continued on page 2

Clinical Trials: From Bench to Bedside

Most of today's state-of-the-art drugs and treatments were once labeled “experimental.”

If it were not for seven to ten years of laboratory research, pre-clinical testing, and trials with volunteer subjects, many original medications and therapies that allow diseases to be managed in new ways would never have become available. The persistent search for therapies that balance high efficacy, acceptable compliance rates, and safety lead our researchers and clinicians on an ongoing journey of investigation and invention.

Two of the driving forces behind the discovery and development of new drugs, screening programs, and diagnostic modalities, are clinician-scientists and bench researchers. The Department of Ophthalmology at Columbia University is fortunate to be home to both.

New ideas are tested extensively in pre-clinical laboratory trials. After this period of challenging work, regulatory agencies such as the U.S. Food and Drug Administration (FDA) are approached to register new products for investigation. Upon FDA review and approval, a

new product or device is ready for “real life” safety and efficacy testing in Phase I, II, and III clinical trials.

The investigational setting of a clinical trial is considerably different from one that exists in standard patient care – both in the amount of data that is gathered and in the highly rigorous manner in which it is recorded. The initial clinical knowledge on a certain diagnostic machine's validity or a certain treatment's safety and effectiveness comes precisely from data painstakingly collected, monitored, reported, analyzed, and interpreted in these trials.

The resulting data is evaluated by the FDA, and if the drug or treatment has been shown to be safe

INSIDE	
View from the Chair	2
Science Insight:	3
<i>Cross-linking of Collagen in the Cornea</i>	
News	4
<i>Laser Innovator Delivers 12th Annual Ollendorff Lecture</i>	
<i>Hugh Moss, M.D. 50th Anniversary</i>	
Faculty Spotlight	6
<i>James D. Auran, M.D.</i>	
Young Talent	7
<i>Ron Margolis, M.D.</i>	

and effective, approval is given for Phase IV trials. Safety and efficacy are tested more extensively in these longer trials and expected and unexpected side effects and interactions are observed and reported by clinicians. As we well know, many medications fail the test of time because when they are used by millions of people, rather than by a carefully selected cohort of study patients, they reveal unanticipated adverse events that can warrant their removal from the market. Although every patient in the department has access to physicians at any time, study subjects are followed extra-scrupulously. A clinician-scientist must be a master at multi-tasking. He or she must

▶ continued on page 4

Dear Friends,

With this issue of *Viewpoint*, we continue to keep you updated on activities in the Department of Ophthalmology. Along with our commitment to providing the best possible care for our patients and to developing new resources through clinical research, an important departmental objective is educating the next generation of physicians and scientists.

Every year, we hold a month-long Basic Science Course to prepare residents and graduate students for their board exams. This year's enrollment was the largest ever! You can read about how the faculty covered the required material and then took extra steps to give participants an overview of some of the most innovative ideas in ophthalmology today.

Mentoring, which I refer to as a professional "growth factor," benefited me greatly in my own training. I hope to have succeeded in encouraging an environment within the department that recognizes its value at every level. Three examples of fine mentoring are highlighted in these pages.



Charles Kennedy

The clinical trial is a critical stage of the journey that a new drug or treatment takes as it moves from the laboratory to common use. In this issue, we provide insight into the clinical trials process and give you an opportunity to learn about the experience from a patient's point of view.

We have a deep commitment to, and respect for, science, even when the political wind blows against it. Stem cell research is one of the most exciting, yet controversial, areas of exploration, especially now that the government's ban on embryonic stem cells is being eased. Our strong stem cell research program has been in place for many years, and in this issue, we focus on the work of Lucian V. Del Priore, M.D., Ph.D. and Stephen H. Tsang, M.D., Ph.D.

Much of what we do has been made possible by the loyal people who have supported our programs, expansion, and faculty over the years. Every faculty and staff member joins me in thanking you for the interest you have shown in the department and for your ongoing generosity. Your philanthropy is particularly important as we all struggle to understand the impact of the current economic climate. Together, we have forged a true and lasting partnership, and we are grateful.

My sincerest good wishes,



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

Promise for the Future *continued from page 1*

this "high resolution center" seriously impairs a patient's ability to see what is directly in front of him or her – to read, drive, or even recognize familiar faces.

As we age, debris builds up under a layer in the back of the eye and small yellowish deposits, called drusen, become visible on examination. Some drusen are common, but larger deposits, especially on or near the macula, are a symptom of macular degeneration. The disease can take either of two forms, wet or dry, and stem cell therapy can be applicable to both.

Retinitis pigmentosa, on the other hand, is frequently diagnosed in childhood. It is an inherited disease that causes night blindness and failure of peripheral sight before it affects central vision. As cells within the retina die, patients with this disorder gradually lose the ability to see on the outer part of their visual field, and loss of vision progresses in toward the center.

Both conditions are progressive and have an enormous impact on the activities of daily living. Diverse research in stem cell-based therapies illustrates how this area of exploration can be applied to different medical conditions. Dr. Del Priore's interest is in macular degeneration and Dr. Tsang's is in retinitis pigmentosa. Both view stem cells as holding great promise for breakthrough treatments.

Stem cells can come from several sources. Fetal tissue, most of which is donated from in vitro fertilization, may become a more reliable and

accessible supply, but one that may cause immune-rejection. Adult stem cells are present in the eye, but in a limited amount, making it difficult to grow a sufficient number for transplantation. Bone marrow is another potential source, but there are questions about whether these cells, which are already aimed towards becoming blood cells, can be redirected to become nerve cells. Adult stem and bone marrow cells have a significant advantage in that they can be harvested from the patient, grown or modified in tissue culture, and transplanted into the same patient without concern about immune rejection.

Dr. Del Priore is concentrating his research on a different source – induced pluripotent stem cells (iPS) manufactured from skin biopsies and other readily accessible tissue. "A patient can undergo skin biopsy and genes can be inserted into the skin cells to make them act as if they were embryonic stem cells," he described. "This procedure would also eliminate immune system rejection and avoid ethical concerns."

In his research on retinitis pigmentosa, Dr. Tsang has established a mouse stem cell line with which he conducts pre-clinical laboratory trials. "The goal of our initiative," he explained, "is to develop stem cell-based treatments for patients with retinitis pigmentosa and pave the way toward 'retinoplasty' – the reconstruction of interfaces between light-sensing photoreceptor neurons and their environment after the onset of deterioration. Stem cell transplantation has the

potential to restore lost vision and provide treatment for advanced stages of retinal degeneration, even in cases of significant photoreceptor loss."

Dr. Tsang's research also uses human retinal stem cells from the ciliary body in eye-bank globes. The ciliary body is an area that surrounds the lens of the eye and is crucial in maintaining proper pressure in the eyeball. In humans, photoreceptors that die are never replaced. Interestingly, this is not the case with most amphibians and bony fish. They can regenerate photoreceptors from stem cells that are in the ciliary body and functionally restore vision after existing photoreceptors die – spontaneously achieving what modern ophthalmology cannot yet offer. Dr. Tsang believes that in the near future, retinal stem cells will be taken from the ciliary body of a patient's own eye, manipulated in the laboratory to reprogram into light-sensing photoreceptors, and transplanted into the same patient with no risk of host rejection.

A major part of Dr. Del Priore's stem cell research is funded by a grant from a private foundation. He is also supported by a grant from the Foundation Fighting Blindness. Dr. Tsang's stem cell research is funded by the John Hartford Foundation-American Geriatrics Society, Gale and Richard Siegel Stem Cell Fund, Schneeweiss Stem Cell Fund, Bernard and Anne Spitzer Stem Cell Fund, and the Foundation Fighting Blindness. ■

Science Insight: Cross-linking of Collagen in the Cornea

Keratoconus is an ophthalmic condition characterized by progressive thinning and weakening of the cornea;

the cornea bulges outward, the optical properties degrade, and vision becomes increasingly impaired. A similar condition, keratectasia, has been observed in some patients who develop complications after LASIK surgery. Although the causes of these conditions are different, the focus of treatments to help these patients retain their sight is the same: stabilizing the cornea by cross-linking (or binding) collagen proteins.

David Paik, M.D. has been studying ways to strengthen eye tissue using chemically-induced cross-linking of collagen and other proteins. When collagen is cross-linked, it assumes new properties – it becomes stiffer, it resists enzymatic digestion, and it withstands heat-induced shrinkage. “Our aim is to strengthen the cornea in patients with keratoconus and post-LASIK keratectasia,” he said, “and cross-linking is a way to get exactly the result we want.”

There are problems associated with current therapies for keratoconus and post surgical corneal ectasia. Hard contact lenses compensate for the corneal deformations and are most helpful in the early stages of the disease. However, as these conditions progress, contact lenses may not be tolerated by many patients, especially those with advanced disease. Corneal trans-

plantation is performed when there is severe scarring or topographical deformation of the cornea, or after contact lens failure. There are risks with corneal transplantation surgery – infection, graft failure, and lack of visual improvement.

A new treatment for keratoconus combines UVA light and riboflavin drops (UVAR) to prevent the progressive deterioration of the corneal structure. UVAR is widely accepted throughout Europe, Asia, and Africa; however, because of concern about the dangers of shining UVA light directly into the eye, and the potential for damage to key structures within the cornea, it has only recently been approved for an FDA-regulated clinical trial in the U.S. Columbia University is one of a handful of approved trial sites.

UVAR therapy is usually a one-time procedure. The thickness of the cornea is evaluated, the outer layer (epithelium) is removed, riboflavin is applied, and the

eye is exposed to UVA light for 30 minutes. During that time, additional riboflavin is administered. The risks range from discomfort and infection, to the uncertainty of long- and short-term side effects of UVA light on the eye.

The treatment is not recommended for patients with very thin corneas, as it might cause damage to the endothelium. The endothelium, which is only one layer thick, regulates water balance in the cornea, a crucial function that prevents clouding.

UVAR therapy must also be limited to the central area of the cornea to prevent any damage to the limbus, where important stem cells reside. These stem cells are undifferentiated and have the potential to heal injured parts of the cornea. If they are damaged, they can reduce the eye’s ability to repair itself. Finally, UVAR therapy kills all the cells that produce collagen (keratocytes) in the area of exposure, although these cells regenerate within four to six months.

Building on his previous work, Dr. Paik and his team are looking at an alternative, non-toxic ways of cross-linking without using UVA light or photochemistry. He has developed a group of compounds that, when joined, stiffen and strengthen collagen in the cornea. The compounds can be applied topically in drops, as an ointment, or in drug-saturated contact lenses.

Collagen stiffens as we age. Dr. Paik’s therapy enhances that natural process to halt corneal deterioration and improve vision. He is currently overseeing pre-clinical testing on animal subjects. The first rounds to test safety, efficacy, and penetration have shown encouraging results with no eye irritation or problems with subjects’ tolerance. “The compounds we are using are believed to be very safe,” he reported.

As Dr. Paik continues his research, the possibilities of applying cross-linking technology in vivo expand. “It might be used in the treatment of bullous keratopathy, which causes swelling of the cornea,” he said, “or in corneal infections.” Additional applications may present researchers, in fields far removed from ophthalmology, with therapies that are less toxic and more effective than those currently in use, especially in the areas of heart valves and skin grafts. Columbia University has filed U.S. and international patents stemming from Dr. Paik’s research, a process that underscores the uniqueness and potential therapeutic use of this technology.

The early stages of Dr. Paik’s work on cross-linking in the cornea were supported by the Department of Ophthalmology and a grant from the clinical trials office at Columbia. Dr. Paik recently received a two-year Exploratory Grant from the National Eye Institute. The NIH Exploratory Grants are designed to encourage innovation and high-impact research. ■



David Paik, M.D.

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Expanded Laser Center to Open

The new Columbia Laser Vision Correction Center is in its final stage of completion and is scheduled to open in late summer of 2009. In order to offer patients the highest quality of care, the department is consolidating the laser vision correction facilities so that all laser surgery will be performed in a new surgical suite on the third floor of the Eye Institute.

Two types of lasers will be used at the new facility that will enable specialists to expand the range of treatments they can offer and custom-select tools according to each patient’s needs. The center will also house a bladeless IntraLase IFF machine, the most recent technology for safety and accuracy in corneal flap creation. In addition to laser vision correction, the new suite will provide

accommodations for corneal transplantation surgeries and will function as a laboratory for the development of new techniques. Patients will continue to have the option of receiving all pre- and post-operative care at the Laser Center or at the East 60th Street offices.

Richard Braunstein, M.D., Miranda Wong Tang Associate Professor of Clinical Ophthalmology, chief, division of anterior section, and director of refractive surgery, is enthusiastic about the expansion. “The addition of these new technologies in a state-of-the-art facility,” he said, “will allow our physicians to provide patients with improved outcomes for laser vision correction and corneal transplantation.” ■

Laser Innovator Delivers 12th Annual Ollendorff Lecture

The 12th Annual Ulrich Ollendorff, M.D., Lecture was delivered on Thursday, April 2, 2009, in the Gloria and Louis Flanzer Auditorium of the Harkness Eye Institute. David Huang, M.D., Ph.D., Director of the Doheny Laser Vision Center at the Doheny Eye Institute, was this year's distinguished Visiting Lecturer.

Dr. Huang is well known for his research and teaching in refractive surgery and for his innovations in applying laser and optical technology to the detection and treatment of eye diseases. He is a co-inventor of optical coherence tomography (OCT), a high-resolution cross-sectional imaging technology



L to R: Bjorg Ollendorff, Stephen Ollendorff, David Huang, M.D., Ph.D., and Stanley Chang, M.D.

that enables ophthalmologists to evaluate the integrity and health of the macula and the optic nerve. Dr. Huang has received four research grants from the National Institute of Health (NIH). He has published more than seventy scientific articles and book chapters, he has edited two books, and has produced eight patented inventions relating to OCT, tissue engineering, and corneal laser surgery.

Dr. Huang's presentation on how innovations in technology will impact the future of vision care was informative and inspiring to the residents, fellows, faculty, and guests in attendance. Following the lecture, the residents and fellows, ophthalmologists-in-training, and the Ollendorff family and friends, joined Dr. Huang for a casual dinner and informal discussion of the lecture. ■



L to R: Elena Velazquez, M.D., Joseph Tseng, M.D., Stanley Chang, M.D., David Huang, M.D., Ph.D., John Hwang, M.D., Michael Weisberg, M.D., Loh-Shan Leung, M.D., Vinod Voleti, M.D., Rony Gelman, M.D., Tommaso Verdino, M.D., and Irene Barbazetto, M.D.

Hugh Moss, M.D. 50th Anniversary

Hugh Moss, M.D. arrived at Columbia for his residency in 1958 when the Eye Institute was celebrating its 25th anniversary. He has been keeping up-to-date with changes in the practice of ophthalmology for more than half a century caring for patients with ophthalmic conditions ranging from cataracts and glaucoma to ptosis and ocular motility. Although he no longer performs surgery, Dr. Moss spends two half-days supervising residents in the Children's Eye Clinic and another two half-days in private practice in New Jersey.

According to Dr. Moss, "Developments in technology, diagnostics, and therapeutics have completely transformed the field. What has not changed over the years is Columbia's very selective program for high-quality residents. I value the time I spend with them and I find them inspirational." The feeling must be mutual because Dr. Moss received the 2004-2005 Philip Knapp Memorial Teaching Award in recognition of excellence and dedication to resident teaching. The recipient of the award is selected by the residents.

"Dr. Moss has been a member of the department for 50 years," observed Stanley Chang, M.D., "and I commend his lasting dedication, patient care, mentoring residents, and earning the high esteem of colleagues, students, and staff." ■



Charles Mumby

Hugh Moss, M.D.

From Bench to Bedside

continued from page 1

weigh standard treatment options against the unknowns of a drug in a clinical trial, help patients understand that they might be receiving a placebo, monitor the progress of each patient, and be on constant alert for unexpected adverse effects. Any negative trend, even if it is part of the natural history of a disease, must be assessed, treated, and reported promptly. Our physicians who supervise clinical trials demonstrate a level of attention to detail and commitment to science and good clinical practice that are unmatched. Their genuine scientific enthusiasm in investigating new treatments must always be in perfect balance with their concern for patients. The safety and wellbeing of every clinical trials patient in the department is given the highest priority in recognition of the patient's willingness to engage in an experimental procedure that may further science.

Vitreoretinal and macular diseases and treatment account for the majority of the clinical trials at the Department of Ophthalmology, and there are also several that focus on corneal

► *continued on page 6*

Basic Science Course

Every January, the department offers a month-long Basic Science Course for Columbia residents, colleagues from hospitals and schools in the New York City area, and for international students in ophthalmic training programs. Under the direction of Stephen Tsang M.D., Ph.D., (Director), Lama Al-Aswad, M.D., John Flynn, M.D., Carol Mason, Ph.D., and John Merriam, M.D., the course covers the material required for the American Board of Ophthalmology (ABO) exams.

Five Basic Science Courses are offered in different parts of the country, and only Columbia's course exceeds the ABO requirements. In addition to covering the standard curriculum of basic biology, anatomy of the eye, and physiology of eye diseases, the course directors invite guest physicians and scientists, who are advancing the field, to speak about their initiatives. These prominent visitors offer young doctors and investigators exposure to cutting edge research, and inspire ideas about how to apply these innovations in the future.

There are eighty lectures presented throughout the course. Among the distinguished presenters this year was Oliver Sacks, M.D., neurologist, researcher, and author, who described his work on the phenomena of visual hallucinations that can occur in patients with advanced macular degeneration. On a second occasion, he spoke about his own experiences as a patient at the Eye Institute.

Alan C. Bird, M.D., a world-renowned retina specialist from Moorfields Eye Hospital, London, lectured in the program and also spent several days consulting with Eye Institute second- and third-year residents and examining their patients. In addition to sharing his clinical knowledge, Professor Bird demonstrated his sensitivity in the art of doctor-patient interactions. "Professor Bird may have spent more time seeing patients with our residents than he does with his own," mused Dr. Tsang. "At Moorfields, consultants teach fellows and fellows teach residents in a style that is a bit more hierarchical than ours."

Another prominent researcher who presented during the course was Anthony T. Moore, M.B., who holds the Sir Stewart Duke-Elder professorship, perhaps the highest academic rank in European ophthalmology. Professor Moore conducts gene therapy trials in inherited eye diseases at University College

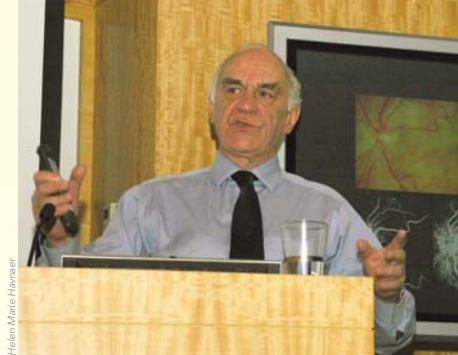
London and Moorfields Eye Hospital and has a special interest in pediatric ophthalmology.

The course has been offered for sixty years, and the 2009 enrollment of fifty M.D.s and ten Ph.D.s was the highest in the department's history. (Columbia has an NIH Training Grant for vision that supports attendance of the Ph.D.s in the course.) Participants arrived from

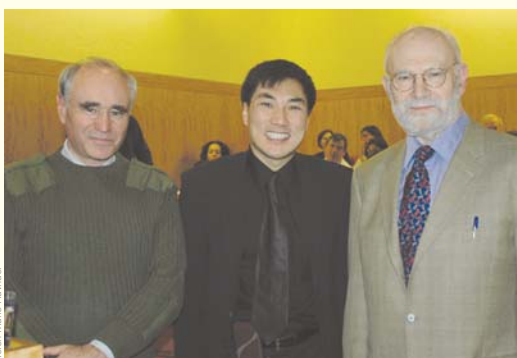
Spain, Portugal, Austria, Sweden, Switzerland, Germany, Brazil, Mexico, and Albania, as well as from local universities and hospitals with smaller departments and fewer resources than Columbia.

One of the reasons that international enrollment is increasing is that the course provides ophthalmologists-in-training with opportunities for surgical experience. The initial three years of training in most European ophthalmic departments does not. In the Basic Science Course, residents perform cataract surgery on pigs' eyes and practice several additional eye and facial surgical techniques on cadavers.

The department has expanded the scope of the Basic Science Course, so that in addition to fulfilling its original mission to teach the material required by the ABO, it has enriched the learning experience of the next generation of clinicians and researchers. The conversation that begins in the classroom continues after hours when medical students, Ph.D. students, residents, and visiting professors discuss, in a more informal setting, issues regarding academic career development, the balance of work and family life, mentoring, and practice choices. ■



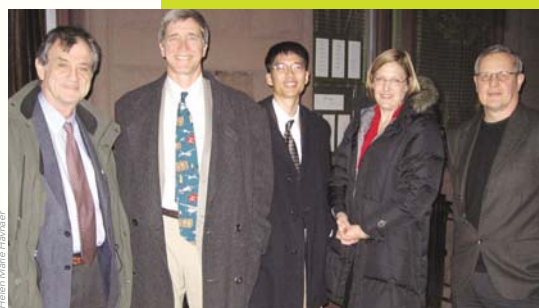
Alan C. Bird, M.D.



Left, L to R:
Jeffrey Odel, M.D.,
Andrew G. Lee, M.D.,
Oliver Sacks, M.D.

Below left, L to R:
Stephen Tsang, M.D., Ph.D.,
Renata Puertas, M.D.,
Anthony T. Moore, M.B.

Below, L to R:
Hyung Don Ryoo, Ph.D.,
Michael Woodruff, Ph.D.,
Christopher Min, M.D., Ph.D.,
Thomas P. Sakmer, M.D.,
Stephen Tsang, M.D., Ph.D.



Above, L to R:
Stephen Trokel, M.D.,
Joe Derner, M.D., Ph.D.,
Michael Chiang, M.D., M.A.,
Elizabeth Engel, M.D.,
Ian MacDonald, M.D.

Below left, L to R:
Irene Maumenee, M.D.,
Veronika Vaclavik, M.D.,
Andrew Kaines, M.D.,
Stephen Tsang, M.D., Ph.D.,
Jorge Morales, M.D.



James D. Auran, M.D.

Charles Merriam

Faculty Spotlight: James D. Auran, M.D.

James D. Auran, M.D., Clinical Professor of Ophthalmology, came to Columbia in 1987 to complete a fellowship in anterior segment disease with Anthony Donn, M.D., and he never left. Twenty-two years later, he is a comprehensive ophthalmologist – a self-described “G.P. for the Eye,” with sub-specialties in cataract surgery, cornea disease and surgery, and external diseases such as dry eye and blepharitis (eyelid inflammation).

During his years at Columbia, Dr. Auran has witnessed the dramatic evolution in visual science technology and procedures that have advanced the treatment of eye diseases. Sophisticated instruments, such as the department’s confocal microscope, have allowed him to study living cornea, observe cell movement, corneal

deposits, and agents that cause infection. This equipment has made diagnosing and treating eye conditions much less invasive than in the past. He expects the future of ophthalmology to continue to be marked by rapid change, advances in pharmacology, and improved techniques that will provide him and others with never-ending opportunities to learn. “The speed with which innovations are introduced,” he added, “continually changes the way I treat patients medically.”

Dr. Auran is currently researching the effects of eye medication in pregnancy. Mercury, a neurotoxin especially harmful to fetuses, children, and the elderly, is a component of several older ophthalmic medications. “It has been removed from all vaccines and should be removed from all eye drops and ointments as well,” he said. “There is no longer any need for mercury-based preservatives when alternatives are available.”

Dr. Auran also expressed concern about a new cosmetic product, bimatoprost, which is being promoted to enhance eyelash growth. It is currently used as a glaucoma medicine, although it is not recommended for use by pregnant women because it is derived from a prostaglandin known to contribute to miscarriage in animals. Dr. Auran believes that there has been too little discussion of potential harm to a fetus

when the drug is used cosmetically and that the product labeling is inadequate. “It is important,” he stated, “that patients, especially women of child-bearing age, are aware of all potential side effects of the medications they take.”

In addition to his clinical practice and research, Dr. Auran is a gifted instructor who trains residents in advanced cataract surgery techniques. On the days he operates, he schedules his own cases for the morning, leaving many hours to give hands-on operating room supervision to residents. “When you’re working with an area as small as the eye,” he said, “every nuance of technique and every moment-to-moment move has tremendous importance. Our residents are extraordinary at Columbia. By the end of their time here, they’ve made such gigantic strides that they’re teaching me!”

Dr. Auran describes the Department of Ophthalmology as “an extraordinary place to practice” and the support from colleagues as “our remarkable departmental strength.” When a patient has a particularly challenging eye problem, a brain trust of specialists can help to provide that patient with a continuum of excellent care. After twenty-two years, I still feel a great deal of satisfaction knowing that – especially when I’m part of a team that has done a good job managing a tough case. ■

From Bench to Bedside *continued from page 4*

diseases and glaucoma. Gaetano Barile, M.D., Stanley Chang, M.D., William Schiff, M.D., Lucian V. Del Priore, M.D., Ph.D., Richard Braunstein, M.D., Stephen Trokel, M.D., Lama A. Al-Aswad, M.D. and their colleagues have, during the last six years, completed more than 20 industry and/or NIH-sponsored studies, and over 50 departmentally supported smaller studies. At least 15 of the latter are still active. The clinician-scientists are assisted by Clinical Research Coordinators, such as Elona Gavazi, M.D. who tracks the progress of patients throughout the study and makes certain all of the regulatory requirements are fulfilled.

Researchers are currently screening, enrolling, and treating patients in ten industry NIH-sponsored retina trials, four industry-sponsored glaucoma trials, and two industry-initiated cornea trials. Areas under investigation include: medications delivered inside the eye for the treatment of wet age-related macular

degeneration; the efficacy of a chip implanted in the macula of retinitis pigmentosa patients with severe visual impairment; microplasmin, an enzyme delivered into the eye to pharmacologically release vitreous traction on the retina in conditions such as early macular holes and vitreo-macular traction syndrome, with the aim of restoring vision without surgery; and the safety and effectiveness of a collagen cross-linking system that employs riboflavin (Vitamin B2) drops and UVA light to strengthen the corneal structure, reduce corneal thinning, and improve vision in diseases such as keratoconus, post-LASIK keratectasia, refractory corneal infections and bullous keratopathy. At Columbia, where research and patient care are two sides of the same coin, clinical trials provide the means for investigating innovations developed in the laboratory. These are the indispensable experiments that advance medicine and raise the standards of care. ■

A Personal Story

When Richard Sostheim was diagnosed with keratoconus, a degenerative disease of the cornea that causes progressive vision impairment, doctors offered no hope of restoring his sight. The only treatment they could provide might slow down the progression of the disease; but that was little consolation for a man in his early 40s who had just learned he had the disease and whose vision was worsening rapidly.

Keratoconus is usually diagnosed early in life, and slowly over time, as the cornea wears thin, a patient’s vision deteriorates. In typical cases, the deterioration stabilizes and patients are left with whatever level of vision they have at that point. However, because Mr. Sostheim was older when he was diagnosed, and his vision was worsening rapidly, there was no way to predict the course his condition would take.

While searching the Internet for information about the disease, he learned that Richard Braunstein, M.D.

Mentoring in Medicine

In a lecture presented at the New York Academy of Medicine entitled “A Brief History of Mentoring,” Jeremiah A. Barondess, M.D., President Emeritus of the Academy, shared an anecdote about two famous catchers from the New York Yankees, Bill Dickey and Yogi Berra. “Toward the end of Dickey’s playing days,” said Barondess, “a young catcher named Yogi Berra had been brought up from the Yankees to serve as his successor. He was coached extensively by Dickey, sometimes in private, and one day a reporter asked Berra what it was that Dickey was saying to him during those tete-a-tetes. Yogi said in response, Bill is learnin’ me his experience.” Barondess continued: “As I reflected, I saw that mentoring was the process at issue, and, further, that mentoring is a central force in the replication of key elements of professionalism represented in medicine in a particularly powerful way. In particular, it seemed to emerge as having special importance in the academic enterprise in medicine, in which the pursuit of excellence and of accomplishment behaves to a significant degree as a transmissible characteristic.”

In the Department of Ophthalmology, mentoring is integrated into the teaching and learning experience at every level of training. Faculty members mentor students, and as the students develop, they mentor their younger colleagues. “It’s not at all unusual for a second-year resident to mentor a first-year resident or for a first-year

resident to mentor a medical student,” said Stephen H. Tsang, M.D., Ph.D. “There is a lot of give and take among faculty and students here.” Dr. Tsang’s commitment to mentoring began during the five years of his own studies in the NIH-funded Medical Scientists Training Program at Columbia’s College of Physicians and Surgeons. During that time, he taught a high school science class on Saturdays for disadvantaged, minority students from the local Washington Heights community. The students were participants in the State Pre-College Enrichment Program (S-PREP). Today, he is a mentor to Columbia undergraduates and graduate students, medical students, residents, and post-doctoral fellows. Recently, two of Dr. Tsang’s mentees, a student and a post-doctoral fellow, received travel awards to attend the annual spring meeting of the Association for Research in Vision and Ophthalmology (ARVO) where they presented papers based on the submission of outstanding abstracts.

Ilyas Washington, Ph.D. is just starting his career and has been associated with the department for less than two years. Dr. Washington is working on ways to cure or prevent age-related vision loss and translate those ideas from the lab into clinical practice. During his years as a post-doc in chemistry at Columbia, he taught students in a high school science honors program. Now, he mentors a high school student from Brooklyn, a senior from John Jay College of Criminal Justice, and a science teacher from one of the City’s specialized high schools, Talent Unlimited. He finds working one-on-one even more rewarding than teaching a group. Dr. Washington had many mentors of his own during his student years. “There was always a teacher who took an interest in me,” he said. “I learned from my teachers

Ron Margolis, M.D. is a Vitreoretinal Clinical Fellow working with Stanley Chang, M.D. and the retina team at the Harkness Eye Institute.

Dr. Margolis received a B.A. with distinction in chemistry from Cornell University and his medical degree with honors in research from Weill Cornell Medical College. He completed an ophthalmology residency at the Cole Eye Institute of the Cleveland Clinic, where he was chief resident.



Ron Margolis, M.D.

His publications on vitrectomy, uveitis, and diabetic retinopathy merited a Heed Fellowship that will support his continuing research during his time at Columbia. Most recently, he was awarded a grant from the Association for Research in Vision and Ophthalmology

(ARVO) for his study of optical coherence tomography (OCT) to image the choroid (the layer of the eye that supplies blood to the outer retina) in eyes with central serous chorioretinopathy or advanced myopia.

“I am happy to be working in a field that is so technology and surgery driven, that it is constantly advancing,” said Dr. Margolis. “And I am grateful for the outstanding opportunity to train in surgical management under the direction of Dr. Chang and the retina team at the Harkness Eye Institute.”

that science is driven by both imagination and logic. That was a gift my teachers gave to me – their joy and enthusiasm for science. Now, I want to share my joy with others.”



Lawrence Shapiro, Ph.D. working with Research Specialist, Fabiana Bahna.

Several Ph.D. candidates in the lab of Lawrence Shapiro, Ph.D. were the subjects of a recently completed documentary film, *Naturally Obsessed, The Making of a Scientist*

(www.naturallyobsessed.com). For three years, cameras followed them in the lab and recorded their development from students into scientists. “I place tremendous value on the relationships I had, and continue to have, with my mentors,” Dr. Shapiro commented. “Now that I’m in the position of mentoring others, I want to give them the best guidance I can. When students first come into my lab, they don’t necessarily think analytically. I strive to teach them the tradition of rational, scientific thought. When they leave, they look at the world differently – they have become critical, analytical thinkers... and friends for life.”

was conducting a clinical trial for people with keratoconus at Columbia University’s Department of Ophthalmology. The treatment would combine UVA light and riboflavin drops (UVAR) a technique that was widely used in other parts of the world, but had just been approved for testing in the United States. Mr. Sostheim was accepted into the trial and was the first patient to undergo (UVAR) treatment at Columbia.

Two weeks after the procedure, Mr. Sostheim’s vision worsened. After three months, it returned to the level it had been before treatment. Then, as the weeks progressed, he began to see profound improvement. Now, approximately eight months after treatment on one eye, and four months after treatment on the other, Mr. Sostheim’s vision is normal.

“It was very difficult to learn that I was losing my vision,” he said. “But now, thanks to Dr. Braunstein and the staff, I can see again. I am so grateful to all of them. I cannot tell you how much the work of this department means to me. My family has a tradition of giving. Now I know, first-hand, what that generosity can mean to others.”

Donor Highlight

Lindsey Steinwand

Lindsey Steinwand was 14 when she was diagnosed with Stargardt's disease, an early-onset, inherited form of macular degeneration that begins in late childhood and affects one in 10,000 children. Last year, after graduating from college with a degree in communications, she was hired as an event planner for The Crossroads, a club in New Jersey that features live music. When Lindsey suggested that the club hold a fundraiser to support research in gene therapy for Stargardt's disease and macular

degeneration, the club owners agreed, and the hard work of organizing a fundraiser began.

Lindsey planned the entire event. She hired a staff, booked bands, made flyers, arranged for public service ads to be aired, wrote and distributed press releases, and contacted local businesses. The fundraiser was a complete success. The Crossroads filled to capacity with 250 guests who enjoyed the evening and donated money for a meaningful cause. Lindsey collected many checks that night, which she then presented to Stanley Chang,



Lindsey Steinwand

M.D., chair of the department. The donations from the event will help to fund the research of vision scientists at the Edward S. Harkness Eye Institute.

"I wanted to do something that would help research on Stargardt's disease and also show my

appreciation for the care I have received at the Eye Institute," Ms. Steinwand explained. "It was amazing to be able to do my job and direct the results toward something that was so important to me." ■

For information about how a planned gift or bequest to the Department of Ophthalmology may benefit your estate plan, please contact Jane Heffner, Director of Development, at (212) 305-7827.

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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