News in Review

A LOOK AT TODAY'S IDEAS AND TRENDS

Trends in Ophthalmic Journal Publishing

If you've done a Medline search recently, you might be surprised at the number of citations you find from two new journals, *BMC Ophthalmology* and *PLoS Medicine*. What you might not realize, though, is that neither of those journals is located on library shelves.

BMC Ophthalmology and *PLoS Medicine* represent the latest wrinkle in the research publishing world—open-access publishing.

The ophthalmology journal is published by BioMed Central, a British electronic publisher of more than 100 e-journals that pay for themselves through institutional memberships, $500 author fees and value-added services such as commentaries and software.

The second is from the Public Library of Science (PloS), and it published its first issue Oct. 19. This American e-publishing initiative charges authors up to $1,500 to cover article costs and was founded by former NIH director Harold E. Varmus, MD.

With both, articles are peer-reviewed, author fees are reduced or waived as needed, and accepted papers and voluminous supporting materials are posted rapidly on the Web.

Will such online-only journals benefit ophthalmology by increasing the amount of peer-reviewed information freely available in every nook and cranny of the world? Or will they doom subscription-based paper journals to oblivion, ultimately decreasing the amount and quality of information clinicians have available?

Probably the outcome will lie somewhere between those two extremes. But the challenges posed by this new model for disseminating scientific information are real, say current and former editors-in-chief of long-standing ophthalmic journals.

For an upcoming addition to a series of articles on ophthalmic publishing, the editors of *Archives of Ophthalmology, American Journal of Ophthalmology* and *Ophthalmology* have been examining the financial and other problems posed by trying to maintain both paper-based and electronic publishing systems, said Thomas J. Liesegang, MD, the *AJO*'s editor-in-chief.

"It would be very unfortunate to lose the archive and retrieval capabilities that have built up over many years in paper-based journals, without assuring that an electronic replacement preserves scientific knowledge indefinitely," Dr. Liesegang said.

He noted that a 2003 study in *Science* reported that up to 21 percent of the Internet references cited in articles published in *The New England Journal of Medicine, Science* and *The Journal of the American Medical Association* were no longer retrievable within 27 months after publication.[1]

Preserving peer-review standards is important.

The high expense of publishing a paper journal makes e-publishing attractive, said Donald S. Minckler, MD, professor of ophthalmology at the University of Southern California and former editor of *Ophthalmology*. "You could just put the abstract in the

For More Info

www.biomedcentral.com/bmcophthalmol/

www.plosmedicine.org/medicine/index.html/

News compiled by Linda Roach.

paper journal and then put the details on the Internet," Dr. Minckler said. "That would save a huge amount of space and money, and then a journal like *Ophthalmology* could publish many more research studies."

But preserving peer-review standards is important, he added. "As long as everybody keeps up the quality of the material these electronic journals accept, online publishing will be a good thing," Dr. Minckler said.

Andrew P. Schachat, MD, the current editor of *Ophthalmology*, doesn't expect the paper version of the journal to disappear. But he hopes to begin broadening its focus by, for instance, augmenting published papers with electronic supporting materials. He hopes also to begin Web-only publication of research that, although well done, would interest only a small subspecialty audience rather than the broad clinical base at which the journal is aimed, he said.

1 Dellavalle, R. P. et al. *Science* 2003;302:787–788.

Cornea Update

Mouth Gives Hope for Eyes

You don't need to harvest limbal stem cells to repair corneas damaged by ocular surface disease, two Japanese research groups reported recently. You just need to open the patient's mouth.

The scientists used 2- to 3-millimeter bits of oral mucosal epithelium to grow the patient's own epithelial cells for placement onto the cornea. These autologous transplants looked and performed like corneal epithelium for up to 17 months. The patients' visual acuity improved from at best 20/2000 and at worst hand-motion, to as good as 20/25 a few weeks after transplant.[1,2]

If the grafts' long-term survival were proved in further research, this approach not only would present a new therapeutic option for reconstructing the corneal surface of patients with bilateral disease, but also would avoid the immunological challenges of allografts.

The human trials in Japan, in 10 eyes of eight patients, were the logical extension of a series of studies in recent years showing that limbal stem cells can be taken from a patient's healthy eye, grown in the lab on amniotic membrane and then transplanted to the diseased eye. In 2000, Ivan R. Schwab, MD, and colleagues at the University of California, Davis first reported doing this.[3]

In this more recent research, however, the patients had bilateral disease, so the stem cells that apparently contributed to the graft's survival for more than a year came from the patients' oral mucosa. Various surrogate biochemical markers indicated that stem cells or their progenitors were present in the grafted tissue and were functioning many months after transplant, the Japanese researchers reported.

The two Japanese groups adopted two different approaches to growing the multilayered sheets of epithelial cells. Nishida et al.,[1] of Tokyo Women's University, grew theirs on a novel polymer substrate, which releases the cultivated cell sheets when the temperature is lowered below 30 degrees Celsius. Consequently, their three-to-five-layer grafts were carrier-free, containing only epithelial cells.

Despite not having a carrier attached, the sheets of contiguous cells retained their cell-to-cell junctions and an extracellular matrix on the basal surface, the researchers report. The sheets displayed the same structure as native corneal epithelium, including microvilli, tight junctions, desmosomes and basement membrane. They also had the optical transparency of corneal epithelial sheets grown in the same way from limbal stem cells.

The other group, from Kyoto Prefectural University of Medicine,[2] grew five-to-six-layer sheets of mucosal epithelial cells on an amniotic membrane substrate. They transplanted both the carrier and the expanded cells—which also had the required transparency and microstructure—to the patients' corneas.

In both studies, there was slight postoperative neovascularization, but it was concentrated along the corneal periphery and was controlled with topical medication.

1 *N Engl J Med* 2004;351(12):1187–1196.

2 Nakamura, T. et al. *Br J Ophthalmol* 2004;88(10):1280–1284.

3 *Cornea* 2000;19(4):421–426.

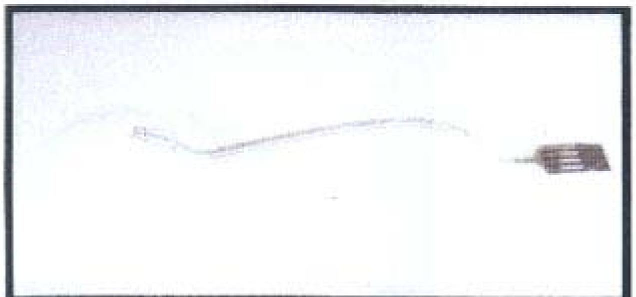
PEOPLE
Charles D. Kelman, MD, Wins Lasker

In the 1960s, Charles D. Kelman, MD, saw the future of cataract surgery in an ultrasonic dental drill. Why not, he imagined, apply the pulverizing force of ultrasound to the pesky clouded lens? His review of this breakthrough technology appeared in the *American Journal of Ophthalmology* in 1967.[1] Dr. Kelman's idea for phacoemulsification is now used in 97 percent of cataract surgeries in the United States.

This fall, the Albert Lasker Foundation honored Dr. Kelman's work with a posthumous award. The prize's honorarium was donated to the International Retinal Research Foundation. Last year, the Academy honored Dr. Kelman with its Laureate Recognition Award.

At the time of his death from lung cancer at 74, the energetic and opinionated Dr. Kelman was continuing his innovative path, working on artificial arteries and a magnet system for cataract removal that preserves the patient's accommodative abilities.

1 *Am J Ophthalmol* 1967;64(1):23–35.



This prototype contact lens, under development in Switzerland, contains a sensing device that measures changes in corneal curvature, which correlate to IOP.

Glaucoma Report

Contact Lenses Keep an Eye on Intraocular Pressure

If your glaucoma patient's IOP looks good in the office, is that also true for the remainder of the day?

One way to answer this fundamental clinical question would be some kind of continuous IOP monitoring —if such a system existed.

And perhaps one is on the near horizon, according to a group of European researchers.

The group, located at the Swiss Federal Institute of Technology's Microsystem Laboratory in Lausanne, reported this fall that it has designed an IOP-sensing contact lens.[1] The idea would be for glaucoma patients to wear the device for hours or even overnight to track their IOP in real life.

"Recently, we presented our device at the conference of the European Glaucoma Society in Florence, and the reaction was absolutely positive," said Matteo Leonardi, a PhD student at the institute who was the lead author on the paper about the device.[1] "Ophthalmologists were very excited about the idea of finally having a device such as this, which is capable of monitoring IOP and helping them in diagnosis and management of glaucoma."

The device consists of a 6-micron-thick microfabricated strain gauge embedded in a silicone contact lens. It measures changes in corneal curvature, which correlate to IOP. It currently must be connected by wires to an external power and recording unit, which can be placed on eyeglass frames, but the wires don't seem to bother patients who have worn the device for up to an hour, Mr. Leonardi said.

Mr. Leonardi said a wireless version, containing a microprocessor and an antenna, is being developed by the European Union's Healthy Aims initiative (www.healthyaims.org), which creates new biomedical devices.

1 *Invest Ophthalmol Vis Sci* 2004; 45(9):3113–3117.

MEETING REPORT
Excitement in the World of Refractive Surgery

Should every LASIK surgeon buy a femtosecond laser? Will new devices for lifting corneal epithelium make the issue moot by eliminating the lamellar flap and improving wavefront-based refractive correction? Or does a new generation of IOLs offer the best hope for aberration-reducing refractive surgery?

The Academy's 2004 Joint Meeting was abuzz with discussions of fundamental, paradigm-shifting questions like these—the kind that haven't been posed since the transition from PRK to LASIK, or from conventional LASIK to customized.

"I won't be surprised if 10 years from now we aren't using corneal ablation for refractive correction at all," said R. Doyle Stulting, MD, PhD, professor of ophthalmology at Emory University.

The trend toward LASIK alternatives is strong enough that cataract surgeons have begun discussing how early they can medically recommend IOL surgery to their middle-aged patients. Richard L. Lindstrom, MD, adjunct professor emeritus at the University of Minnesota, said he believes that phacoemulsification and IOL implantation would be medically indicated for a 55-year-old myope with 20/40 BCVA because of an early cataract.

Meanwhile, LASIK also faces a challenge from epi-LASIK, which uses a dull, oscillating separator to peel a 50-micron sheet of epithelium from the Bowman's layer. At least three exhibitors' booths at the Joint Meeting touted these "epikeratomes."

Ioannis G. Pallikaris, MD, PhD, president of the University of Crete, spoke in favor of his Centurion SES Epikeratome, which has a plastic separator. Dr. Pallikaris said epi-LASIK leaves 95 percent of the epithelial cells viable, compared with 40 percent with alcohol-assisted LASEK, and the intact basement membrane prevents cytokines from causing stromal haze.

Do epikeratomes signal the end of lamellar flaps and the rebirth of surface ablation? Marguerite B. McDonald, MD, FACS, clinical professor of ophthalmology at Tulane University and a consultant to Norwood Eye Care, said she stopped doing LASIK about a year ago because cutting through stroma limits the results attainable with wavefront-based corrections.

"If I were still making flaps, I would probably use the IntraLase," she said. "But no matter how elegantly a lamellar flap is made, you still get all those unpredictable biomechanical changes to the cornea, which lead to unpredictable changes in the wavefront, which cannot be programmed, preoperatively, into the ablation pattern."

But, as with clear lens extraction and phakic IOLs for presbyopes, how will patients react? Stay tuned.