

INNOVATIONS IN RETINALAND



A great man once said, “The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking.” Albert Einstein was right, and his observation applies to personal life, science, and

medicine, to name a few. In order to march forward and continue improving, we must keep the blinders off and open our minds to new possibilities—even those that may seem far-fetched. This type of mindset primes our creativity and facilitates the development of innovative solutions to many of life’s challenges. And for our profession, those challenges can be great.

Innovations, whether simple or complex, possess the ability to revolutionize the way we treat patients and, consequently, to influence and improve our patients’ outcomes. For this issue’s cover focus on innovation, we turn our attention to three areas: retinal implants, gene therapy, and 3-D heads-up surgery.

RETINAL IMPLANTS

Brindley and Lewin developed the first implantable stimulator for vision restoration in 1968.¹ Today, a number of companies are chasing the dream of restoring sight to individuals blinded by retinal degeneration. Contributors on this topic offer insights on two epiretinal implants.

Mahi Muqit, PhD, FRCOphth, explains how the Iris II bionic vision system (Pixium Vision) creates light perception in individuals with vision loss from outer retinal degeneration using epiretinal stimulation of their remaining functional retinal nerve cells (“Restoring Visual Function With a Bionic Retinal Implant: Mission Impossible?” beginning on page 50).

In his article “Five-Year Results With a Retinal Prosthesis System” (page 46), Lyndon da Cruz, MA, MD, PhD, reviews the nuts and bolts of the Argus II Retinal Prosthesis (Second Sight Medical Products) and provides highlights of 5-year data from a clinical study with the implant in patients with retinitis pigmentosa. More than 150 patients worldwide have received this device and long-term data from the original surgical trial demonstrate continued benefit.

GENE THERAPY

Changing the expression of a target gene or genes through gene therapy, although still a novel concept, is a fascinating area of development that appears to hold great promise for improving the quality of life of those with inherited retinal

diseases. Although *RT* has covered this topic in the past, the article “Gene Therapy in a Drop” (page 61) by Kuan Jiang and Gang Wei, PhD, in this issue takes a bit of a different angle. The authors discuss the possibility of delivering gene therapy for the treatment of such diseases as age-related macular degeneration and proliferative diabetic retinopathy in a topical drop. Mr. Jiang and Dr. Wei describe a study in which they constructed and evaluated a noninvasive gene delivery system composed of the cell-penetrating peptide penetratin and G3 PAMAM, a low molecular weight poly(amidoamine).

In an editorial commentary on this article, “Ocular Gene Therapy: Clinical Triumphs and Remaining Challenges” on page 62, *Retina Today* contributor and editorial board member Szilárd Kiss, MD, offers his take on the concept. He notes that, regardless of which gene delivery method or methods become part of the accepted standard, “we stand at the cusp of a gene therapy revolution in the treatment of ocular disorders.”

3-D HEADS-UP SURGERY

Heads-up surgery is not a new idea in medicine, but add in the element of 3-D viewing and you have a whole other story. According to Yoshihiro Yonekawa, MD, “We may be on the verge of a paradigm shift: away from microscope ocular-based visualization, and toward being able to sit back in the operating chair and view a large 3-D high-definition monitor that is powered by various image processing tools and diagnostic overlays.” In his article on page 54, “Seeing the World Through 3-D Glasses,” Dr. Yonekawa discusses the concept and basic technology behind 3-D heads-up vitreoretinal surgery.

OTHER DEVELOPMENTS

To round out this issue’s cover focus on new developments in retina, Richard Watson, MD, and *RT*’s Editor-in-Chief, Karen Roman, report on some sessions of note from the recent Euretina meeting in Copenhagen, Denmark, and the annual Vit-Buckle Society meeting earlier this year in Miami Beach, Fla. (page 65). In their innovation roundup, read about a new device developed for the injection of dyes and perfluorocarbon liquids, image-assisted and image-guided vitreoretinal surgery, and customized instrument grips that accommodate the variability in size and shape among surgeons’ hands.

It is an exciting time to be in retina. There has been and continues to be much innovation and improvement in our instruments, devices, and procedures, and we cannot wait to see what else our industry has up its sleeve. ■


Robert L. Avery, MD,
Associate Medical Editor


Allen C. Ho, MD,
Chief Medical Editor

1. Brindley GS, Lewin WS. The sensations produced by electrical stimulation of the visual cortex. *J Physiol.* 1968;196(2):479-493.