This Month

It’s time for my 11th annual summary of leading research and developments that have occurred during the past 12 months in the field of blindness and low vision.

As usual, the summary offers brief descriptions of the work done in every category of interest to the lay person. For those with functional vision who would like to follow along, the presentation outline begins on page 3 of this newsletter. If you would like the entire transcript, which includes source references, your group leader has a copy, or it is available for download from:


As you will hear, science and technology are moving at an amazing pace. It may not feel that way to some of us who are waiting for cures and treatments, but more progress has been made in the past decade than in the entire history of ophthalmic research and technological advances.

I hope you are as excited as I am about living during this important age of science. We may not live long enough to see all of the work come to final fruition, but we are indeed fortunate to be able to take advantage of the developments that have come our way.

Dan Roberts
Visual Impairment and Blindness in U.S. May Double by 2050

With the youngest of the baby boomers hitting 65 by 2029, the number of people with visual impairment or blindness in the United States is expected to double to more than 8 million by 2050. Another 16.4 million Americans are expected to have difficulty seeing due to correctable refractive errors such as myopia (nearsightedness) or hyperopia (farsightedness) that can be fixed with glasses, contacts or surgery.

Researchers at the University of Southern California’s Roski Eye Institute estimate that 1 million Americans were legally blind (20/200 vision or worse) in 2015. In addition, 3.2 million Americans had visual impairment in 2015, and another 8.2 million had vision problems uncorrected by glasses.

The research team projects that the number of people with legal blindness will increase by 21 percent each decade to 2 million by 2050. Likewise, best-corrected visual impairment will grow by 25 percent each decade, doubling to 6.95 million. The greatest burden of visual impairment and blindness will affect those 80 years or older as advanced age is a key risk factor for diseases such as age-related macular degeneration and cataract.

The findings of this study suggest that there is a need for increased screening and interventions to identify and address treatable causes of vision loss.

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AMD Since Anti-VEGF

A National Eye Institute (NEI) study confirms that anti-VEGF treatments have greatly improved the prognosis for patients with the wet form of age-related macular degeneration (wAMD) during the past decade.

In the study of nearly 650 people, half still had vision 20/40 or better, typically good enough to drive or to read standard print, after five years of treatment with anti-VEGF drugs that are injected
into the eye. The authors of the study say those outcomes would have been unimaginable about 10 years ago, prior to the drugs’ availability. At that time, laser coagulation and photodynamic therapy were the only treatments for wAMD.

Researchers looked at people with wAMD who had regular treatment with drugs designed to block VEGF (vascular endothelial growth factor) that causes blood vessel growth. After five years, 50 percent of them had 20/40 vision or better, 20 percent had 20/200 vision or worse, and the rest were in-between. In the U.S., state drivers’ licenses generally require 20/40 vision in at least one eye. A best-corrected vision of 20/200 in both eyes is considered legally blind for the purpose of federal disability benefits.

Research is still moving forward to find cures for the dry form of AMD that can develop into wAMD.

Summary of Research and Development -- 2016
(Presentation Outline)

I. INTRODUCTION

II. PHARMACEUTICAL INTERVENTIONS
   A. RXI-109 May Reduce Retinal Scarring
   B. Iluvien Similar to Anti-VEGF Drugs as Treatment for Diabetic Retinopathy
   C. High Dose Statins May Be Effective In Treating Dry AMD

III. ANTI-VEGF THERAPY FOR NEOVASCULAR CONDITIONS
   A. AMD Since Anti-VEGF
   B. In vitro anti-VEGF agent safety profile: apoptosis in ARPE-19 cells treated with ranibizumab, bevacizumab, aflibercept and ziv-aflibercept
   C. A 2-year study comparing the efficacy and safety of brolucizumab vs aflibercept in subjects with neovascular
age-related macular degeneration: testing an alternative treatment regimen
D. OPT-302 Enters Phase 2A Trials for Wet AMD

IV. SUSTAINED DRUG THERAPY FOR WET (NEOVASCULAR) CONDITIONS
A. Comparison of the regimens of “Treat and Extend” and “As Needed” Treatment With Anti-VEGF Drugs
B. Future Sustained Drug Delivery Methods for Choroidal Neovascularization
C. Extended Release of anti-VEGF Biologics from Biodegradable Hydrogel Implants for the Treatment of Age Related Macular Degeneration
D. Sustained Delivery of Ranibizumab: The LADDER Trial of the Ranibizumab Port Delivery System

V. ALTERNATIVE DELIVERY METHODS
A. X-82 Oral Medication May Reduce Number of Intravitreal Injections for Wet AMD
B. Eye Drops for Wet AMD Enter Phase 3 Trials

VI. COMBINATION THERAPIES FOR NEOVASCULARIZATION
A. Triple Therapy with Zeaxanthin Lessens Burden of Treatment for Wet AMD
B. Two-year results of a randomized prospective sham-controlled study comparing proton beam irradiation combined with ranibizumab with ranibizumab monotherapy for exudative age-related macular degeneration.
C. New Combination Therapy Treats Retinal Damage in Diabetics
D. Similarity of Anti-VEGF Drugs Confirmed For DME Treatment

VII. DRY AMD
A. Delayed Dark Adaptation Predicts Onset of Dry AMD
VIII. Minocycline May Slow Damage from Retinitis Pigmentosa

IX. STEM CELL THERAPY
   A. Phase I/II clinical trial of human embryonic stem cell (hESC)-
      derived retinal pigmented epithelium (RPE) transplantation in
      Stargardt disease (STGD): One-year results
   B. Ocata’s Stem Cell Trials Entering Phase 2
   C. An Important Caveat About Ophthalmic Stem Cells

X. GENE THERAPY
   A. Experimental Gene Therapies Still Raising Hopes
   B. Inactivation of VEGFR2 using CRISPR/Cas9 provides superior
      inhibition to the anti-VEGF drugs
   C. AVA-101 May Extend Time Between Wet AMD Treatments

XI. BIONIC IMPLANTS

XII. SURGICAL PROCEDURES
   A. A novel biosynthetic RPE-BrM (Retinal Pigment Epithelium-
      Bruch’s Membrane) assembly suitable for retinal
      transplantation therapy
   B. Studies of Structure and Function in Whole Eye
      Transplantation

XIII. NEW TECHNOLOGY
   A. New Device Helps Blind People See With Their Tongues
   B. LowViz Guide Completes Successful Pilot Program

XIV. HEALTH & NUTRITION
   A. Diet, exercise, smoking habits, and genes interact to affect
      AMD risk
   B. Smoking and AMD—Are E-Cigarettes the Answer?
XV. DAILY LIVING
Prevalence of Visual Hallucinations in a National Low Vision Client Population

XVI. LOW VISION DEVICES
Effectiveness and cost-effectiveness of portable electronic vision enhancement systems (p-EVES) compared to optical magnifiers for near vision activities in visual impairment

XVII. CONCLUSION

-- NEXT MONTH --

"Gene Therapy 101"
What is gene therapy, and how can it lead to healthy vision?

Presenters:
Dr. Shannon Boye
(University of Florida)
and
Dr. John Flannery
(University of California, Berkley)