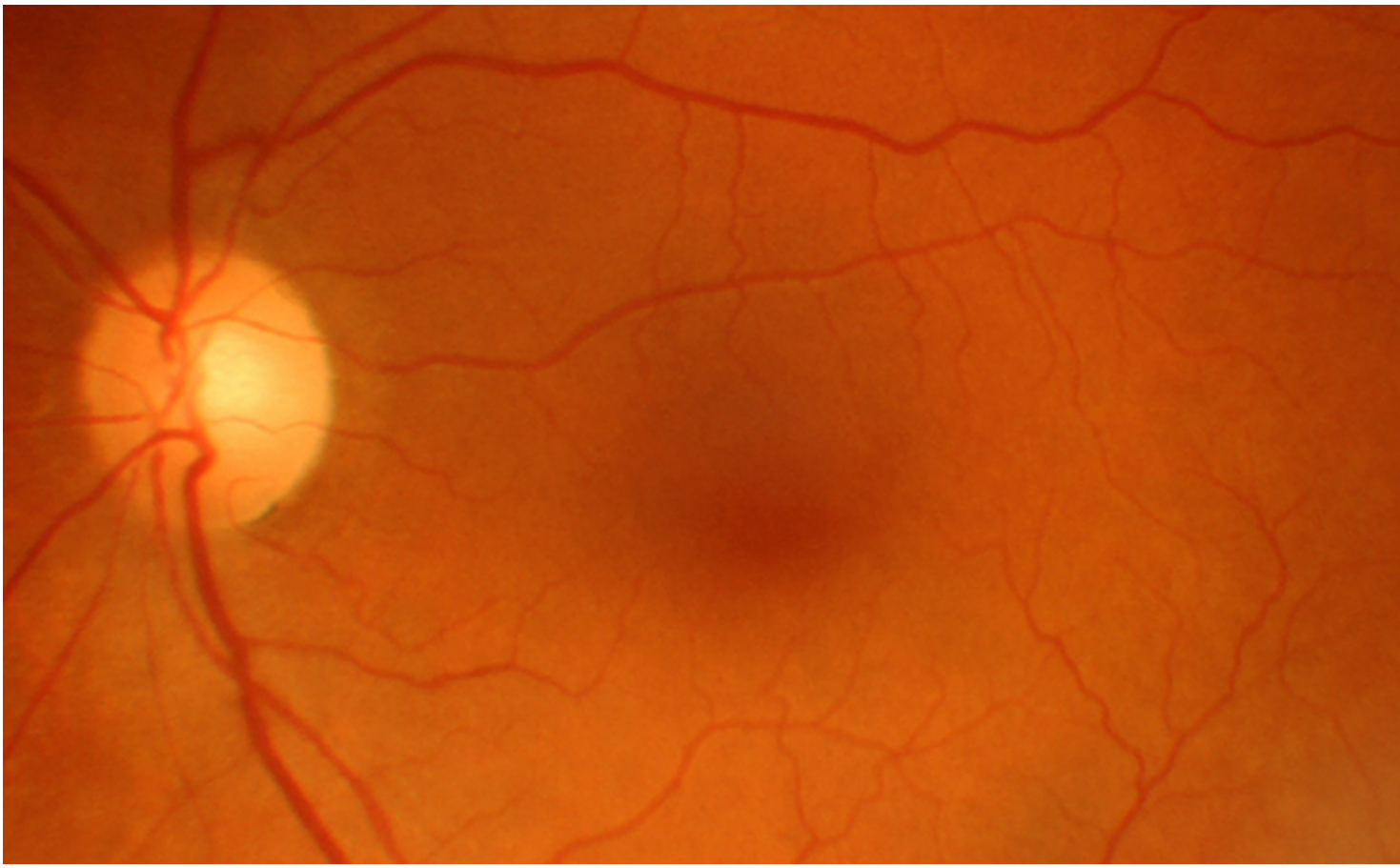
Ophthalmology [1]

Most people will tell you they value eyesight more than any other sense. And yet approximately 285 million people around the world suffer from vision loss, including 39 million individuals who are blind.[1]



Our ophthalmology team focuses on understanding the biology of eye diseases such as diabetic retinopathy, retinitis pigmentosa, dry eye disease, uveitis, glaucoma, and age-related macular degeneration (AMD). We strive to develop therapies that will halt—or even reverse—the ocular damage and degeneration that eventually leads to blindness.

A major focus of the group is AMD, projected to affect 196 million people worldwide by 2020.[2] One of the advanced forms of the disease is caused by the growth of abnormal, leaky blood vessels under the retina. Therapies that are injected into the eye reduce both the growth of the blood vessels and their leakage, preventing blindness in the majority of newly diagnosed cases of wet AMD. But patients must get 4 to 12 eye exams per year to determine when they need to receive injections. Many patients are unable to maintain the visits to their ophthalmologists necessary for the optimal dose frequency, so the visual outcome is often not

ideal.

NIBR's ophthalmology group is exploring long-lasting drugs for wet AMD with the potential to dramatically reduce the frequency of injections and need for follow-up visits. The idea is to 'treat and forget' the disease, with most patients requiring doses only twice per year. The ultimate goal is to eliminate blindness from the wet form of AMD, and we have a clear path toward that goal.

Therapies that reduce blood vessel growth also work in some patients with diabetic retinopathy, in which chronically high blood glucose damages retinal blood vessels. But many patients have poor vision despite treatment. The biological pathways involved in diabetic retinopathy are complex and still poorly understood, prompting the group to investigate novel drug targets and combinations of drugs.

Much research is also underway to understand and potentially treat other blinding diseases such as geographic atrophy (another form of advanced AMD) and glaucoma (a major cause of blindness globally)[3]. In addition, a gene therapy treatment is being investigated for a form of retinitis pigmentosa, a rare, hereditary, currently incurable, blinding disease.

NIBR Ophthalmology researchers' intense focus on blinding diseases comes with a sober realization that their work is critical to millions of people.

Footnotes:

1. Visual impairment and blindness facts. World Health Organization. Updated August 2014.
2. "Global prevalence of age-related macular degeneration." Jonas JB. Lancet Glob Health. 2014 Feb;2(2):e65-6. doi: 10.1016/S2214-109X(13)70163-3. Epub 2014 Jan 3.
3. Priority eye diseases. World Health Organization. http://www.who.int/blindness/causes/priority/en/index7.html [2]

Selected Publications:

Reliability of the mouse model of choroidal neovascularization induced by laser photocoagulation [3]
Investigative Ophthalmology & Visual Science, October 2014

AAV-mediated RLBP1 gene therapy improves the rate of dark adaptation in Rlbp1 knockout mice [4]
Molecular Therapy – Methods and Clinical Development, July 2015

Lack of involvement of CEP adducts in TLR activation and in angiogenesis. [5]
PLoS One, October 2014

Links
[1] https://www.novartis.com/our-science/research-disease-areas/ophthalmology
[2] http://www.who.int/blindness/causes/priority/en/index7.html
[3] http://www.ncbi.nlm.nih.gov/pubmed/25205860
[4] http://www.nature.com/articles/mtm201522
[5] http://www.ncbi.nlm.nih.gov/pubmed/25343517