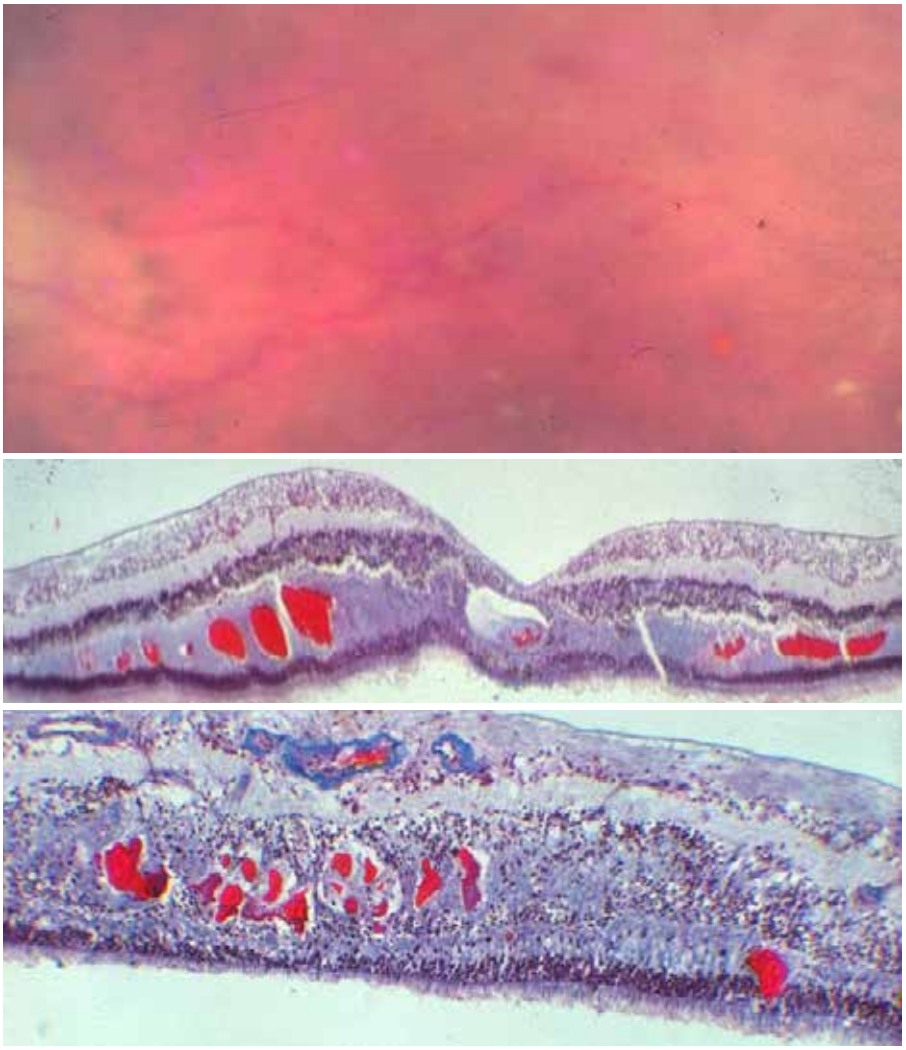

An eye with branch retinal vein and artery occlusions from the archive – the clinical photograph at the top can be used to guide examination of microscopic tissue pathology (bottom two images). Immunohistochemical and ultrastructural studies on the tissue will help us to better understand the retina in health and disease.

Contact Us:

Laboratory Team
(02) 9382 7270

Clinical Team
(02) 9382 7309

FRB! Team
(02) 9382 7272

Save Sight Institute is a centre of The University of Sydney.

SAVE SIGHT INSTITUTE

THE UNIVERSITY OF SYDNEY

If you would like to make a tax-deductible donation or a bequest to support macular research please contact us:

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Autumn 2014 : Edition 8

Macular*NEWS*

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Welcome to the 8th edition of Macular*News*.

In our last newsletter we described the "Fight Retinal Blindness!" project in which we have developed an innovative new computer program to track across Australia the responses to treatment with the new drugs for wet macular degeneration.

In this newsletter we will describe a collection of eyes with macular disease that has been donated to our group and how we propose to study them in an effort to develop new insights and treatments for macular disease.

Prof. Mark Gillies
Macular Research Group

The Laboratory Research Unit

This critical group undertakes studies in test tubes and animal models which are designed to understand and develop new treatments for macular disease. The group includes three scientists, four postgraduate students and a research assistant.

In our first newsletter we described our laboratory research which aimed to develop stem cell treatments for advanced diabetic retinopathy.

In our laboratory we are also trying to identify new pathways that lead to macular diseases, such as macular degeneration, diabetic retinopathy and retinal vein occlusion.

The Macular Lab Team

Back: Weiyong Shen, Svetlana Cherepanoff, Ling Zhu, Brian Lyons, Nathan Coorey, Ying Wang,

Front: So-Ra Lee, Mark Gillies, Sook Chung

Diary Date: Friday 14th November (10am - 12 midday)

Macular Information and Research Update

Places limited. To register email renee.okane@sydney.edu.au or call (02) 9382 7316.

Our aim is to develop new treatments that reduce blindness from macular disease, through multi-disciplinary patient-oriented, world-class research

Our group has recently become the recipients of an important archive of human eye tissue. This collection incorporates more than 400 human eyes.

Each eye comes with clinical information obtained during life. This unique clinicopathological archive is the result of a lifetime of dedicated work by two ophthalmologists, Shirley and John Sarks.

No other archive of this size and completeness exists in the world.

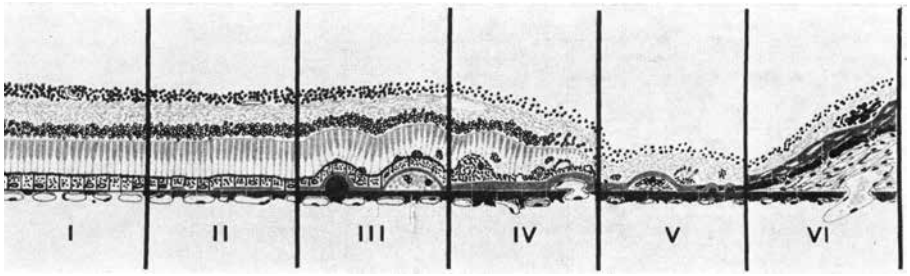
The collection, annotation and maintenance of the archive has been a labour of love for Shirley and John. Begun in the 1960's, the initiative has been almost exclusively self-funded. Each eye belonged to a patient of Shirley or John, who chose to donate their eyes after death for research into diseases that cause blindness.

A resource that has produced pioneering observations

The archive consists of tissue embedded in paraffin or resin as well as stained glass microscopic slides, clinical photos and electron microscopic photos. In 1976, Shirley published a survey of 378 eyes from this archive and established for the first time the histopathological grading system for age-related macula degeneration. This article now ranks as one of the top ten ophthalmology publications of all time. The archive has generated numerous published studies since, including many novel observations that have stood the test of time. These include establishing the specific lesions of AMD in human tissue, paving the way for biochemical characterisation and determination of cellular and genetic mechanisms.

Dr Shirley Sarks and Dr John Sarks

Tissue from the collection also established that vitelliform lesions consisted of photoreceptor outer segments, documented changes in the choriocapillaris and Bruch's membrane with age and established the natural history of the development of abnormal new blood vessels in AMD. Data from the collection also led to the pioneering observation that macrophages and other cells of the immune system were involved in the development of the lesions of AMD, a major paradigm shift that re-cast AMD as a disease of abnormal immune regulation rather than "senile degeneration". This work laid the necessary foundations for more recent ground breaking discoveries, including those involving the complement factor H gene.



The histopathological grading scheme for age-related macula degeneration established by Dr Shriley Sarks in 1976. This article is one of the top 10 most cited in the history of ophthalmology. Sarks BJO 1976: 60: 324

The wealth of information in the collection will enable us to answer important questions about ageing and disease in the human eye.

In 2007, Shirley, John and Dr Svetlana Cherepanoff examined tissue in the collection with others to establish the threshold at

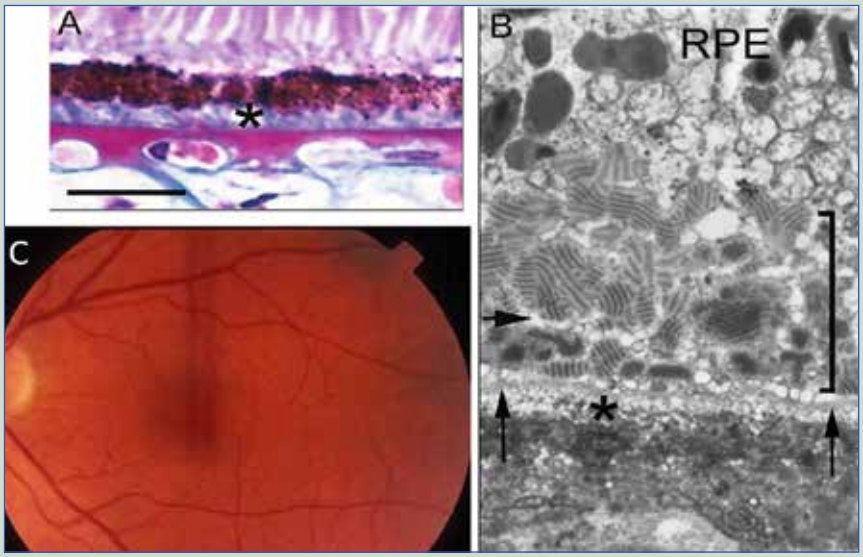
which normal ageing becomes AMD. This is a critical point in disease development and the focus of research for potential treatments. The gift of the collection to our research group allows us to continue this important work.

The archive also represents many other retinal diseases, including diabetic retinopathy and retinal artery or vein occlusion. A number of eye tumours are also included.

The Sarks have not only generously shared their tissue with us, they have provided funding for a research assistant to digitise the collection, so that valuable slides, images and clinical information can be preserved in perpetuity and made available to researchers and doctors.

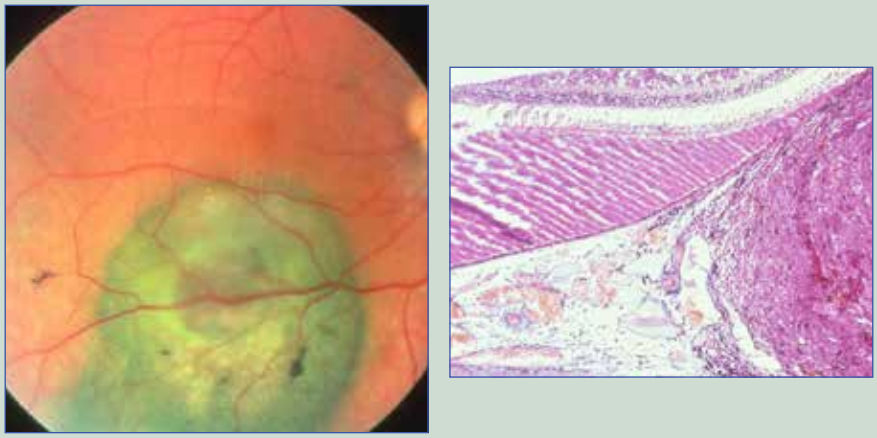
Tissue in paraffin blocks from the collection can now be studied at the genetic and molecular level using techniques such as DNA extraction, RNA extraction and laser capture microdissection. Tissue in resin blocks can be studied using immnogold labelling and electron microscopic examination of sub-cellular stuctures.

Prof Mark Gillies, together with Dr Cherepanoff and Prof Peter McCluskey (Director of Save Sight Institute) will share in the stewardship of this unique and valuable collection to ensure current and future generations of eye researchers and doctors benefit from the data and help find cures for blinding diseases.



The archive helped establish the specific lesions of age-related macula degeneration – basal laminar deposit (shown in A with asterix and B with horizongal arrohead) and basal linear deposit (shown in B with asterix).

In 2007, it was used to show that the majority of eyes with these early lesions appear normal on clinical examination (shown in C). This was only possible because all eyes in the collection were examined and documented during life. Sarks, Cherepanoff et al., IOVS 2007; 48(3): 968-77.



The collection includes eye tumours, like this unusual case in a young patient with a choroidal naevus which underwent malignant transformation to become melanoma.

The clinical photo is to the left, the tissue pathology (after the eye was removed for tumour) is to the right. Tissue from this eye is preserved in a paraffin block, and can be studied using modern techniques, such as extraction of DNA to examine the molecular genetic differences between tumour and naevus.