

Eyelights

The Newsletter of **GLAUCOMA NZ**
TO SAVE SIGHT

About Glaucoma New Zealand

Glaucoma NZ has committed to a busy 2005 to further the cause of reducing visual loss from this blinding eye disease. A major effort is being centred on our public meetings in the main cities to increase awareness of glaucoma. These meetings provide an informative presentation that includes the scientific foundation for our approach to glaucoma. It would be super to have these presentations held throughout NZ. Glaucoma NZ can offer advice, provide resource material and find a professional speaker on glaucoma for a meeting in your area. However to provide wide coverage throughout NZ we require volunteers, including a lead person, to organise meetings at the local level. Organising a local meeting is a great way to contribute to our aims of increased awareness and understanding about glaucoma and to provide support for Glaucoma NZ. Contact Gael (09 373 8779) if this interests you.

Eyelights will continue to be produced to give you information on glaucoma issues and related

scientific topics. The articles range from the personal accounts about glaucoma and the daily impact of living with it to the extensive research that is being directed towards understanding and treating this disease. If you would like to read articles published in earlier Eyelights you will find most of them now posted on our web site:

www.glaucoma.org.nz

Glaucoma NZ is very grateful to its sponsors. Without them we could not have made the rapid progress that we have over the past two years. We thank them! Most of our sponsors have links to

eye care and they all understand the need to raise awareness of glaucoma in our community. They have supported all our activities and because of their generosity Glaucoma NZ can provide enrolment with us free to you all. Our aim is that every person with glaucoma, or who is a glaucoma "suspect", be enrolled with us.

2005 will be an exciting year for Glaucoma NZ as we venture into new activities. I look forward to introducing these to you in future Eyelights.



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My Experience with Glaucoma - a member's story -

I was diagnosed with glaucoma around five years ago when undergoing a regular check-up with my ophthalmologist. As I was only aged in my early 50's and with no previous family history of glaucoma I was surprised at the diagnosis as I thought it only affected older people. Initially I thought it could be cured quite quickly and with minimal after effects. However, as I realized I knew very little about the disease and its implications I decided to use the Internet to find out as much about it as I could. This was before the formation of Glaucoma NZ and their very helpful and informative 'Eyelights' newsletters.

I did not know that the damage to the optic nerve is irreversible and the absence of pain or any real symptoms were normal. I also did not realize that if left untreated it was quite conceivable I could go blind. One interesting fact that I learnt is that glaucoma frequently runs in families and hence if one family member has the disease it's essential all other family members have a regular specialist check-up.



You might ask, how has glaucoma affected me? The main area is as a regular golfer. I find that quite often I cannot see the flight of the ball in the air because of my loss of peripheral vision, and I therefore need to rely on my golfing partners to let me know where it has landed. This especially applies when playing in

difficult light conditions such as facing into the sun. Sometimes after a round of golf I find my eyes are quite tired after being out in the sun for a few hours, especially on a very hot day.

However from a positive viewpoint at least I can continue playing a sport I really enjoy and it could be a lot worse. My golfing partners all know I have glaucoma and from general chats with them when wandering along the fairways they also have learned from me much about the disease. Most didn't know that it's gradual and painless and hence they now appreciate that many people who may be affected don't know if they have glaucoma.

I know that I have to live with glaucoma for the remainder of my life but have now got into a routine of taking regular medication night and morning. The only circumstance where I need to think of using the medication is when my routine changes such as on long haul flights and then afterwards moving into unfamiliar accommodation. Last year I went on a tour through Vietnam where each night we stayed somewhere different and I made a point of ensuring I changed my habits so the drops were not overlooked.



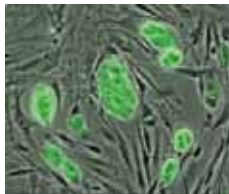
Glaucoma also affects my night driving in heavy traffic and wet conditions on slick motorways with bright sodium lights. Here I need to be extra vigilant, as my peripheral vision has been adversely affected. I have got used to this factor and adjusted my driving accordingly.

I now undergo regular check-ups and am lucky that my eye pressures have stabilized. I cannot stress enough the importance for everyone of maintaining regular eye check-ups with their specialist so that if they are diagnosed with glaucoma it can be treated at an early date.

Focus on Research

Stem Cell Research

Stem cells have the remarkable potential to develop into many different cell types in the body. Serving as a sort of repair system for the body, they can theoretically divide without limit to replenish other cells as long as the person or animal is still alive. When a stem cell divides, each new cell has the potential to either remain a stem cell or become another type of cell with a more specialized function, such as a muscle cell, a red blood cell, or a brain cell.



Research on stem cells is advancing knowledge about how an organism develops from a single cell and how healthy cells replace damaged cells in adult organisms. This promising area of research is also leading scientists to investigate the possibility of cell-based therapies to treat disease, which is often referred to as regenerative or reparative medicine.

Stem cells are one of the most fascinating areas of biology today. But like many expanding fields of scientific inquiry, research on stem cells raises scientific questions as rapidly as it generates new discoveries.

Scientists primarily work with two kinds of stem cells from animals and humans: embryonic stem cells and adult stem cells, which have different functions and characteristics

What are embryonic stem cells?

Embryonic stem cells, as their name suggests, are derived from embryos. In the 3 to 5 day-old embryo, called a blastocyst, stem cells in developing tissues give rise to the multiple specialized cell types that make up the heart, lung, skin, and other tissues.

What are adult stem cells?

An adult stem cell is an undifferentiated cell found among differentiated cells in a tissue or organ, it can renew itself, and can differentiate to yield the major specialized cell types of the tissue or organ. The primary roles of adult stem cells in a living organism are to maintain and repair the tissue in which they are found. For instance, in some adult tissues, such as bone marrow, muscle, and brain, discrete populations of adult stem cells generate replacements for cells that are lost through normal wear and tear, injury or disease.

What are the unique properties of all stem cells?

One of the fundamental properties of a stem cell is that it does not have any tissue-specific structures that allow it to perform specialized functions. A stem cell cannot work with its neighbors to pump blood through the body (like a heart muscle cell); it cannot carry molecules of oxygen through the bloodstream (like a red blood cell); and it cannot fire electrochemical signals to other cells that allow the body to move or speak (like a nerve cell). However, unspecialized stem cells can give rise to specialized cells, including heart muscle cells, blood cells, or nerve cells in a process called differentiation. Scientists are just beginning to understand the signals inside and outside cells that trigger stem cell differentiation.

Unlike muscle cells, blood cells, or nerve cells—which do not normally replicate themselves—stem cells may replicate many times. When cells replicate themselves many times over it is called proliferation. A starting population of stem cells that proliferates for many months in the laboratory can yield millions of cells.

What are the potential uses of human stem cells and the obstacles that must be overcome before these potential uses will be realized?

It has been hypothesized by scientists that stem cells may, at some point in the future, become the basis for treating diseases such as Parkinson's disease, diabetes, and heart disease.

Studies of human embryonic stem cells may yield information about the complex events that occur during human development. A primary goal of this work is to identify how undifferentiated stem cells become differentiated (specialised) cells. Some of the most serious medical conditions, such as cancer and birth defects, are due to abnormal cell division and differentiation. A better understanding of the genetic and molecular controls of these processes may yield information about how such diseases arise and suggest new strategies for therapy. Although scientists know that turning certain genes on or off is central to controlling differentiation, they do not yet fully understand the signals that modulate this process

Perhaps the most important potential application of human stem cells is the generation of cells and tissues that could be used for cell-based therapies. Today, donated organs and tissues are often used to replace ailing or destroyed tissue, but the need for transplantable tissues and organs far outweighs the available supply. Stem cells, directed to differentiate into specific cell types, offer the possibility of a renewable source of replacement cells and tissues to treat diseases including Parkinson's and Alzheimer's diseases, spinal cord injury, stroke, burns, heart disease, diabetes, osteoarthritis, and rheumatoid arthritis.



Stem Cells and Glaucoma

There is a new interest in research targeting stem cell therapies to treat glaucoma. Researchers now believe that there is a potential for using stem cells as a renewable source of replacement cells and tissue to treat glaucoma. It is believed that adult stem cells will work by replacing retinal ganglion cells, the cells that die in glaucoma.

Scientists have identified a number of different sources and types of stem cells and precursor cells that can target at least three areas for cell restoration —the retinal ganglion cells, the optic nerve head and the trabecular meshwork.

Stem cell therapy is still a long way off, but it certainly has potential. Currently, there is no way of restoring any damaged nerve tissue. Stem cells have potential not just for the optic nerve, but also for pressure control. It is thought that pressure gets elevated because the cells in the drains of the eye are not functioning well. They show senescence or aging and appear much older than they should be. In the future, stem cells may be able to regenerate these cells, which may help control eye pressure better because drains will function better.

To summarize, the promise of stem cell therapies is an exciting one, but significant technical hurdles remain that will only be overcome through years of intensive research.

Some of the research outlined in this article raises potential ethical issues. These issues are addressed in part on the N Z Bioethics Council Web Site. For more information see

<http://www.bioethics.org.nz/about-bioethics/issues-in-focus/stem-cells/>

Examining the Angle

Gonioscopy

Most people with glaucoma will be aware that there are two major types of the condition, they are commonly referred to as chronic open angle glaucoma and acute closed angle glaucoma. But what does the term angle actually mean? It refers to an area of your eye which is probably best described as the plug hole out of which the fluid known as the aqueous drains. It is actually a circular plug hole situated around the perimeter of your iris, which is the coloured part of the eye. Another way of locating it is at the base of the cornea, the curved clear part at the front which is rather sensitive to touch. The angle is actually inside the eye and it is located between the iris and the cornea. The aqueous drains away into a circular canal referred to as the Canal of Schlemm and this is covered by a sort of a grating just like over a drain, which is called the trabecular meshwork.

Unfortunately this part of the eye is very difficult to see. Anybody who wants to examine it would normally be looking at it through an instrument called the slit-lamp but it can't be visualised directly. As soon as the optometrist or the ophthalmologist tries to look into the angle all of the light from that area undergoes what is called total internal reflection by the cornea. In other words the light from it can't actually leave the eye. This means that a direct view of the angle is impossible.

Examination of the angle is important because the condition of the angle determines the type and severity of the glaucoma. The examination also enables decisions to be made regarding the likely future course of the disease, the sort of treatment required and whether or not that treatment is working.



From the patient's point of view having the angle examined is a rather unpleasant procedure. It involves the use of a thing called a gonio lens which looks a bit like a cross between a small egg cup and a thimble. The gonio lens or the gonio contact lens is placed directly onto the cornea and as already mentioned, the cornea is a rather sensitive part of the eye so it has to be anaesthetised first. In order that there be no air gaps, or no obstructions to the observer's vision, fluid has to bridge the gap between the contact lens and the cornea. This fluid has to be held in the gonio lens just before it is inserted and the gonio lens has to be put in quickly so that it doesn't all drain away. Unfortunately the fluid sometimes does dribble down the patient's face and feels rather unpleasant. It doesn't taste very good either! Nevertheless, if this is all accomplished successfully the little mirror inside the gonio lens enables the optometrist or ophthalmologist to see the angle in one location, to see the rest of the angle they simply have to rotate the gonio lens around to where they need to look. This should take about 2 or 3 minutes at the most and an assessment of the angle can be made. This is documented at the time and may be re-examined on subsequent occasions to see if there have been any changes or if anything needs to be altered regarding the treatment.



There are a variety of gonio lenses available. The ones described here are probably the most common but there are some others which look a little bit different but do essentially the same job. Understanding why your angles are being examined with gonioscopy might make it easier for you to tolerate this rather unpleasant examination experience!

What You Know and What You Don't

Glaucoma knowledge in new glaucoma patients

Patients have a right to be informed about their condition to help them take better care of themselves and to make well-informed decisions. This education needs to be tailored for the individual in order to adequately meet their needs. Last year an Auckland study by Rachael L Niederer and Helen V Danesh-Meyer assessed the level of knowledge of glaucoma in new patients attending their first appointment at a glaucoma clinic. The study aimed to identify any groups who had poor knowledge about their disease and to identify common misconceptions about glaucoma.

103 patients answered the questionnaire. The questionnaire consisted of 15 true/false questions assessing knowledge of glaucoma symptoms, treatment, cause and outcome.

The overall knowledge of glaucoma found in new glaucoma patients was high, with a median score of 13 out of 15 correct responses. Patient scores were not affected by age or gender. Interestingly, patients with family or friends with glaucoma did not score significantly higher.

Patients had gathered their information from a wide range of sources, including books, family, friends, health professionals and the internet. Most groups scored highly for their level of knowledge of glaucoma, although patients who stated that friends were their primary source of information answered more questions incorrectly compared to the rest of the group.



Whilst the overall knowledge levels were high, this study identified several common misconceptions.

1. 41% believed that glaucoma affects central vision before side vision.

The truth is: *Glaucoma attacks your side vision, the vision you tend to take for granted. As a result, you may not notice until large portions of vision have been lost. Consequently, it is important to attend regular follow-up appointments to monitor glaucoma.*

2. 53% of patients believed that they would get symptoms to warn them that their glaucoma was getting worse.

The truth is: *There are usually no symptoms associated with glaucoma to warn you that your glaucoma is getting worse. 50% of people with glaucoma are unaware that they have the disease. Screening for glaucoma is really important so that glaucoma can be detected and treated before further vision is lost.*

3. 25% believed that the lost vision from glaucoma could be restored

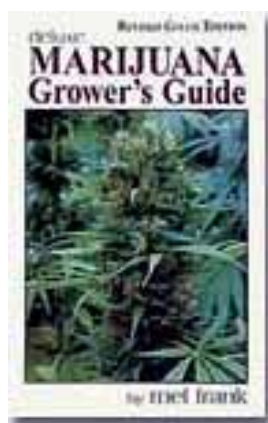
The truth is: *Glaucoma causes permanent changes at the optic nerve and the vision loss from glaucoma cannot be restored. It is important to take medications on a daily, regular basis, to prevent permanent loss of vision.* This study identified a high overall level of knowledge of new glaucoma patients about their disease and detected several common misconceptions. The second stage of this study aims to look at larger numbers, and will look at patients who have a long history of glaucoma, as well as new glaucoma patients, and knowledge levels in the community.

Natural Remedies for Glaucoma?

There have been a number of alternative remedies suggested for glaucoma with the most potential coming from Marijuana, Ginkgo Biloba and Antioxidants such as vitamins A, C and E. There are others but not with any vaguely theoretical benefit let alone a proven one.

Marijuana is an interesting substance as it actually lowers eye pressure! Unfortunately the effect is very short lived and one would have to smoke 8 to 12 joints per day to keep eye pressure down enough to control glaucoma. That would mean being completely stoned all day for 365 days of the year to prevent blindness. It could be suggested that the effect would be to make one not care about going blind any way! The cost would be tremendous and the public health system would be unlikely to fund the treatment.

Marijuana will also degrade the colour vision and central sight. It is definitely not a good treatment if smoked. Much research has been directed in to marijuana as an eye drop treatment for glaucoma but it has some major disadvantages mainly because it is lipid (fat) soluble and therefore can not be given in an ordinary drop. As a lipid it will not easily cross the surface of the eye to penetrate to the inside where it can have an effect.



As marijuana has such a short duration of effect any eye drop would have to be instilled into the eye at least four times a day. That would make it very difficult for people to use as it becomes terribly inconvenient to take any medication more frequently than twice a day, just morning and night. Newer glaucoma treatments are required only once a day which is far better for compliance, meaning that the treatment is actually used.

Who knows what treatments will be discovered in the future to make glaucoma more easily managed, treated and hopefully one day reversed. We will give you some details on Ginkgo Biloba in the next publication of Eyalights. The research world wide is tremendous, with every possible alternative remedy being investigated including those found in nature such as Ginkgo and Marijuana. Watch the future Eyalights as we will let you know what develops, "hot off the press".

Contact Us with Your Questions & Comments

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I am interested in becoming a volunteer for Glaucoma NZ

I would like information on leaving a bequest for Glaucoma NZ

Public Meetings

Hamilton 26th February

Our first meeting for 2005 will be in Hamilton on 26th February. The venue is the Celebrating Age Centre, 30 Victoria Street, Hamilton. There is parking underneath the building and public parking across the road. The start time is 10.00am and guest speakers will be Hamilton Glaucoma experts Dr Mike Merriman and Dr Jim Stewart. Dr Mike O'Rourke, Ophthalmologist and Glaucoma NZ Trustee will also be at the meeting. There will be a question and answer panel to conclude the meeting.

We look forward to greeting those who attended our last meeting in Hamilton and

also welcoming our new members and all others who have an interest in glaucoma.

If you have a friend or family member who would like to attend please pass on details of the time and venue to them.

Meetings in Other Centres

We will also be having meetings in Dunedin, Christchurch, Wellington, Palmerston North and Auckland. The date for the Dunedin Meeting has been set for April 30th. Check our website soon for start time and venue and for all details of other meetings, or telephone (09) 3738779.

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