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Mission

The key to our mission is research, for only through meaningful research will the causes of sight-threatening disorders be elucidated and new treatment strategies developed.

Eyes on a better sight

First programme ever to correct myopia by training the brain offers hope to school kids

CHEOW XIN YI
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A PAEDIATRIC study, the first of its kind, on primary school students has been launched in a bid to arrest the worsening myopia problem among Singaporean kids.

With one in four seven-year-olds suffering from myopia now, the study — a tie-up between the Singapore Eye Research Institute (Seri) and Evergreen Primary School, and supported by the Health Promotion Board — is a "first step towards the intervention of an escalating problem", said Seri director Prof Donald Tan, who heads the study.

From the end of next month, 40 lower primary students with myopia from Evergreen Primary School will be put on a 10-week programme using a customised computer programme that aims to decrease their dependency on wearing glasses, and even possibly slowing down myopia progression.

Created by NeuroVision, a company that specialises in non-invasive vision improvement with the use of technology, the programme uses a different approach to improving eye vision, said Prof Tan.

myopia progression. If the product proves successful, a child with a low myopia of 150 degrees could do without glasses in the near future, while another who has 800-degrees in his eyes may do just as well with 700-degree glasses, said Prof Tan.

One primary aim of the pilot study is to test the programme's operational and logistical feasibility, said Prof Tan.

"We are implementing this programme where children have to do these exercises in front of a computer for 30 minutes every other day. That is why we need to work this out starting with Evergreen Primary School, so that it doesn't affect the children's school curriculum or home life too much," he said.

If the study proves successful, a larger scale study involving 300 to 400 students may be carried out as early as next year, paving the way for an eventual inclusion in the school curriculum nation-wide.

Even though the adult and the child version is based on the same principle, there are some differences in the two programmes, said Mr Nir Ellebogen, the chief operating officer of NeuroVision.

As the treatment requires

Chairman's and Director's Report

Today, Tuesday, 15 August 2006, Pg 2

Seeing myopia through infants' eyes

COULD there be something during infancy that puts our children at higher risk of myopia? That's the question Singaporean researchers want to solve by launching a three-year research project, which will start next month.

According to Associate Professor Saw Seang Mei from the Yong Loo Lin School of Medicine at the National University of Singapore (NUS), a study conducted in 1999 had found that 28 per cent of

infants in Singapore, so we want to investigate that very closely," she added. This time, 3,000 children aged between six months and six years will be screened for myopia and parents will be interviewed to identify risk factors.

These factors could be related to pregnancy or birth, or due to time spent in school, or on indoor and outdoor activity, said Prof Saw, who is the lead investigator of the study. A referral system will also be in place

to slow the progression of myopia. The first study, which began three years ago, revealed that eye-drops with 1 per cent of Atropine proved "77 per cent effective" in preventing myopia from getting worse over a period of two years.

However, at this dosage, Atropine causes side effects such as blurred near vision and glare. Atom II will attempt to identify an ideal lower level of atropine which will be effective, yet have minimal side-effects. Researchers are seeking 200 more children with

The Straits Times, Tuesday, 2 January 2007, Pg 115

They turned to S'pore when their sight failed

Thai with mysterious eye infection sought help in Thailand, US before finding successful treatment here



EYE SAVIOUR: Prof Donald Tan performed both the operations.

"With an active infection, no doctor in the US or England would do a transplant."

MR KITTI ANANSONGVIT, 47, expressing his gratefulness after having successful cornea transplant surgery here

PHOTO: REPLENISH SIM and Brent Chapman both

IT PROBABLY happened at the golf course. A bit of mud from the soggy turf got into his left eye.

A trip to India immediately after did not help, and by the time Mr Kitti Anansongvitt, 47, returned to Bangkok, his eye was red and infected.

The businessman saw several ophthalmologists in Bangkok but they could not identify the problem.

He then sought treatment in the United States where he spent six weeks. Under the care of Associate Professor Kenneth Goin of the University of Iowa Hospitals, his infection improved.

But by then, most of his sight in the left eye was gone.

"It was very tiring using just one eye. I tried driving, but I couldn't judge the speed of oncoming cars. I also had trouble crossing the street," Mr Kitti recalled.

Two months after his return to Bangkok, the infection flared up again.

Prof Goin suggested that he see Professor Donald Tan, deputy director of the Singapore National Eye Centre, for a transplant.

By the time he got to Singa-

pore last month, his left eye was so badly infected he could see no more than 30cm in front of him.

The Singapore National Eye Centre too could not identify the organism at the root of the problem. By then, the infection had spread to almost the entire cornea.

Last week, Prof Tan decided to go ahead with the transplant. He removed all the upper part of the infected cornea, leaving only the thin epithelial layer which was still clear of infection. With this layer intact, there is practical-

ly no risk of rejection. But the infection could re-

cur, Prof Tan said it was all a "numbers game". With the transplant, much of the bacteria was destroyed or removed. The hope now is that a course of antibiotics will kill off any remaining bugs.

Even with this shadow hanging over him, Mr Kitti is grateful. He told the Straits Times: "With an active infection, no doctor in the US or England would do a transplant."

For him, the bill of between \$6,000 and \$10,000 is a small price to pay.

SALMA KHALIK



Ang Chong Lye
Chairman

Chairman's Message

As a centre of excellence championing ophthalmic and visual science research, SERI has performed remarkably well. The co-location of scientists and clinicians in the Outram campus, and all the supporting infrastructure has enhanced research in ophthalmology.

This has been amply demonstrated by the outbreak of fusarium keratitis in contact lens wearers.¹

The disease was first noted by the clinicians on the ground. A suspicion was raised. Questions were asked.

The team of ophthalmologists, researchers, laboratory specialists, epidemiologists huddled together and unravelled the cause of the disease. Many people were spared the ravages of the sight-threatening condition. SERI and SNEC made the breakthrough contributions together with invaluable support from specialists from Ministry of Health and Singapore General Hospital.

These are significant examples where research capabilities, hinged on a massive clinical facility has provided solutions and demonstrated the infinite capabilities for doing significant research

There are future challenges. I am sure SERI will rise to the occasion and reach new peaks! The task of management and board is to facilitate the endeavours of research and the nobler agenda of looking after the visual health of our citizens.

Thank you

A handwritten signature in black ink, consisting of a stylized 'A' followed by a cursive 'L' and 'Y'.

CLIN. PROFESSOR ANG CHONG LYE
Chairman

¹ An outbreak of Fusarium keratitis associated with contact lens wear in Singapore. JAMA. 2006; 295 (24): 2867-2873. Khor WB, Aung T, Saw SM, Wong TY, Tambyah PA, Tan AL, Beuerman R, Lim L, Chan WK, Heng WJ, Lim J, Loh RS, Lee SB, Tan DT.



Donald Tan
Director, SERI

Institute Director's Report

April 2006 – March 2007

Overview of the year's activities

This year, SERI continued to maintain the research momentum within budgetary constraints in the main four research divisions of SERI: Clinical Research Unit, the Epidemiological Unit, the Visual Psychophysics Unit and the Laboratory Sciences Unit. Initiatives supported by these units include several ocular disease population-based surveys, programs in ocular surface stem cell biology, ocular proteomics and genomics, development of animal models of ocular diseases, visual neuroscience studies and a variety of clinical trials in myopia, glaucoma, ophthalmic pharmaceuticals, lasers and surgery (Outcome report appended under Annex 1). Research priorities remain those most relevant to Asian eye disease such as myopia, angle closure glaucoma, ocular surface diseases and diabetes.

New research programs initiated in the work year include a) initiation of a retinal and retinal pigment epithelial stem cell biology program, b) development of new laser-assisted refractive surgery and corneal transplantation clinical procedures utilizing SNEC's new and experimental femtosecond laser, c) pilot development of an artificial keratoprosthesis based on prior clinical success of the osteo-odontokeratoprosthesis trial, and d) perceptual learning pilot studies on pediatric myopia trials utilizing NeuroVision technology.

Asia-ARVO meeting

The major highlight of the year is the inaugural Asia-ARVO meeting hosted by SERI in March 2007. After 2 years of preparations, the meeting was one of the best meetings, SERI has organized. This meeting is the culmination of our two previously successful SERI-ARVO meetings, which has been transformed into the official Asian version of ARVO, to be held every four years in Singapore, and to be rotated amongst other Asian sites every intervening two years. Over 1000 people from over 36 countries attended the 4 day Meeting held at the Suntec Singapore International Convention and Exhibition Centre from 2 – 5 March 2007 (See pages 33 for full report).

Strategic review of SERI

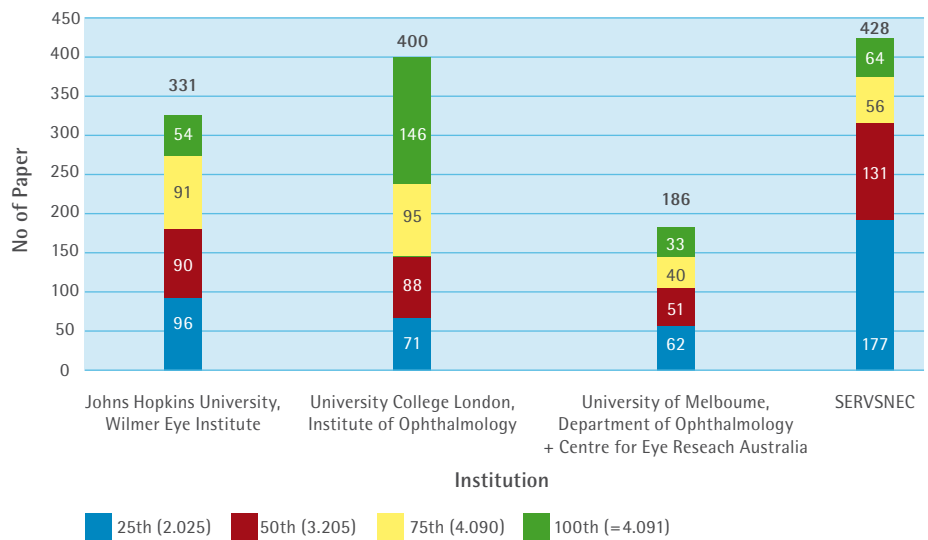
To maintain and further develop its aim of research excellence and to mark the approach of its tenth anniversary in 2007, and upon the recommendation of the SERI BOD, SERI appointed an International Advisory Panel to carry out an in-depth assessment of SERI's progress, research activities and to make recommendations on research priorities and direction.

Three members of the IAP (Professor Alan Bird of the UK, Professor Paul Mitchell of Australia and Professor Robert Nussenblatt of the USA), spent several days in March 2007 fulfilling the remit of the IAP with particular reference to the quality of SERI's research and publications, the competitiveness of its programmes, the adequacy of its funding and the identification of areas that might be improved. Their review involved an appraisal of SERI's staff at all levels, an assessment of the adequacy of SERI's laboratory accommodation and equipment and a comparison of SERI's research output and manpower in comparison with other well established research departments in the USA, UK, Australia, Japan, Taiwan and Hong Kong.

The IAP provided a comprehensive assessment of SERI, with invaluable general and specific advice, with clearly defined suggestions in areas, which were identified to require attention. SERI management has responded proactively to these suggestions.

I am pleased to announce that comparison of quantity and quality of peer-reviewed publications utilizing data from the Science Citation Index reveals that SERI appears to have performed exceptionally well in comparison to these institutions, as seen in Figure below. This validates SERI's current role as a major international research institution.

Quality of Peer-Reviewed Papers (Scirnce Citation Index) FY 2002 - 2006



I am grateful to the members of the IAP for the time and effort made by them in reviewing SERI's facilities and activities and for identifying not only SERI's strengths, including a commendable publication record, but also for making useful recommendations in relation to the organisation of research within SERI, the identification of research priorities and the highlighting of those areas where additional funding and research space is required if SERI is to realise its undoubted potential.

In appreciation

SERI have achieved success in a relatively short space of time. I am very grateful to the people who are responsible for our achievements - our Institutional Review Board members; study patients and their families; our collaborators and mostly our dedicated staff, clinicians, and scientists of Singapore Eye Research Institute and the Singapore National Eye Centre.

I would also like to thank the National Medical Research Council for the continued funding of the institute.

PROFESSOR DONALD TAN
Institute Director

Report on Research Outcomes

In 2006/07, SERI scientists and clinicians again achieved a high publication output with 121 scientific articles in peer reviewed ophthalmology and visual science journals with a total impact factor of 371, average of 3.26 per paper, and 72 papers had an impact factor of more than 2. In comparison to the previous year, although our total number of publications was slightly reduced (Figure 1), it is important to note that our mean impact factor has risen significantly from 2.48 to 3.26 (Figure 3), suggesting the trend towards publishing in higher impact journals with less concentration on absolute numbers of publications.

In addition, 215 scientific abstracts were presented at local and international clinical and research meetings. 50 new research projects were approved and initiated during the year. SERI scientists and affiliated clinicians were awarded a total of \$4,695,275 in individual research grants and industry-funded grants. During the year, SERI scientists and clinicians were presented with a total of 10 awards for research excellence.

Table 1: SERI Scientific Publications 1991-2006/07

| | Clinical Research | Epidemiological Research | Translational Research | Others | TOTAL |
|--------------|-------------------|--------------------------|------------------------|----------|------------|
| 1991 | 19 | 0 | 0 | 0 | 19 |
| 1992 | 13 | 1 | 1 | 0 | 15 |
| 1993 | 30 | 2 | 1 | 0 | 33 |
| 1994 | 14 | 0 | 0 | 0 | 14 |
| 1995 | 23 | 1 | 0 | 0 | 24 |
| 1996 | 33 | 3 | 2 | 0 | 38 |
| 1997 | 35 | 3 | 3 | 0 | 41 |
| 1998 | 21 | 2 | 2 | 0 | 25 |
| 1999 | 17 | 6 | 5 | 0 | 28 |
| 2000 | 25 | 13 | 9 | 0 | 47 |
| 2001* | 31 | 13 | 12 | 0 | 56 |
| 2002/03* | 39 | 38 | 20 | 0 | 97 |
| 2003/04* | 54 | 31 | 18 | 0 | 103 |
| 2004/05* | 82 | 29 | 8 | 1 | 120 |
| 2005/06* | 79 | 35 | 12 | 3 | 129 |
| 2006/07* | 66 | 32 | 20 | 3 | 121 |
| TOTAL | 581 | 209 | 113 | 7 | 910 |

* inclusive of publications from National Healthcare Group Institutions

Table 2: Competitive Research Grant Funding in 2006/2007

| Funding Source | No. of Grants | Total Grant Amount |
|--|---------------|---------------------|
| National Medical Research Council (NMRC) | 4 | \$ 1,215,168 |
| Biomedical Research Council (BMRC) | 3 | \$ 2,732,465 |
| Singapore Health Services (SingHealth) | 1 | \$ 56,500 |
| Industry Sponsored Projects | 5 | \$ 641,142 |
| SERI Pilot Grant | 16 | \$ 121,867 |
| SNEC Discretionary Research Fund | 9 | \$ 115,048 |
| NUS-ARF | 1 | \$ 50,000 |
| TOTAL | 39 | \$ 4,932,190 |

Figure 1: SERI Scientific Publications (1991-2006/07)

- Others
- Basic Research
- Epidemiological Research
- Clinical research

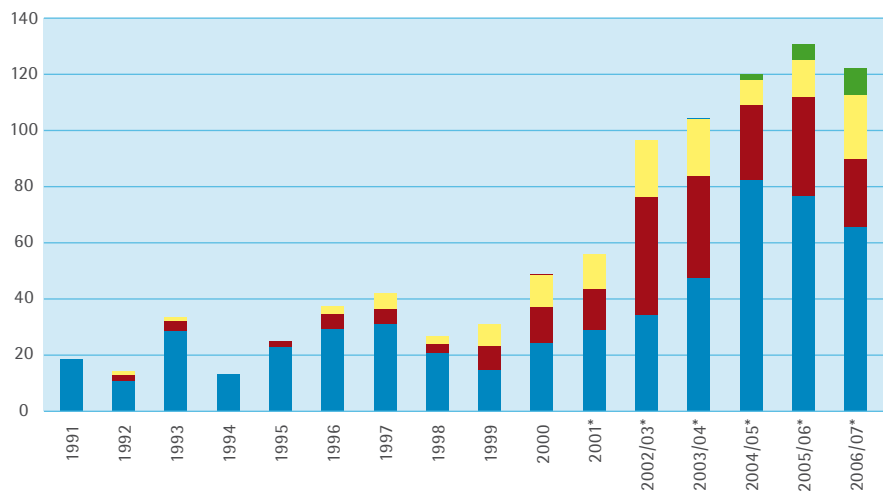


Figure 2: Total Impact Factor (1998-2006/07)

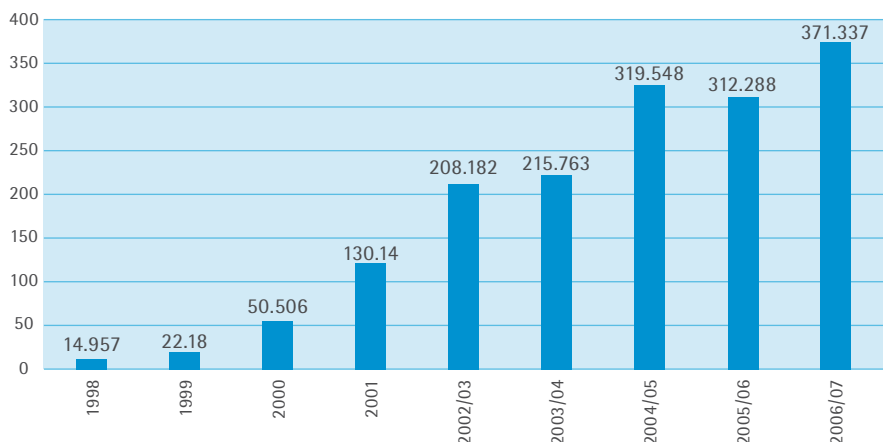
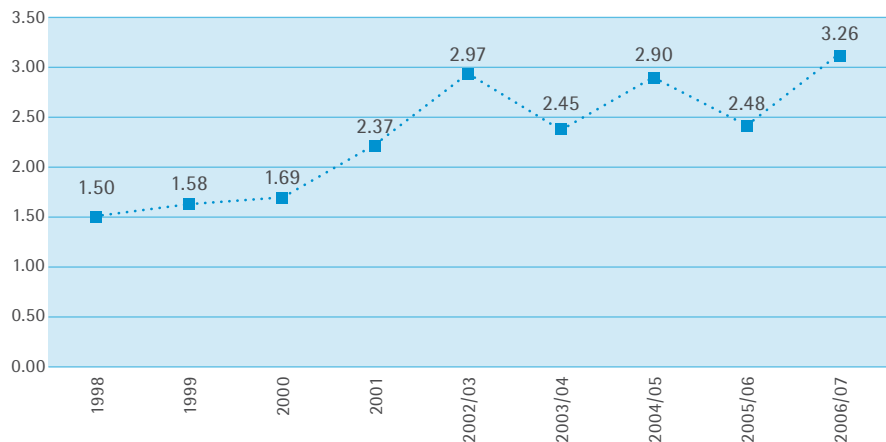


Figure 3: Average Impact Factor (1998-2006/07)



Research initiatives with clinical impact

Glaucoma

The main focus of research in glaucoma remains that of angle closure glaucoma, a major Asian subtype of this blinding disorder. Major studies underway included an evaluation of non-contact screening modalities for angle closure glaucoma, and a multi-centre RCT on the use of prophylactic laser iridotomy in preventing angle closure glaucoma in high risk patients with narrow angles. Another major research project is underway to evaluate new imaging instruments for angle closure such as the anterior segment OCT and the scanning peripheral anterior chamber depth analyzer. Genetic studies relevant to glaucoma, including linkage studies and the identification of candidate genes, are also being conducted.

Ocular Genetics

The Genetics research group is focused on understanding the genetic basis and disease pathophysiology of inherited eye diseases. Particular emphasis is given to conditions more prevalent in Singapore such as angle closure glaucoma and myopia; other conditions currently studied include corneal endothelial dystrophies and retinal dystrophies (Retinitis pigmentosa). Through an NMRC funded grant (NMRC- 0940/2005) received by A/Prof Tin Aung the genetics group at SERI, identified the first gene underlying congenital hereditary endothelial dystrophy (CHED). This work resulted in a paper in Nature Genetics in 2006. In recognition of this work Tin Aung and Eranga Vithana were also awarded the Singhealth Outstanding Publication Award in 2006. Dr. Eranga Vithana also won the best oral paper (Scientist) in the 15th SGH Annual Scientific Meeting, Singapore (2006). A total of 5 papers have been produced by the Genetics group (2 published and 3 in press) this year.

Myopia research

Our second large-scale 3-year clinical trial on the use of atropine eyedrops in school age children to retard myopia progression, and to determine the bioavailability of atropine to optimize atropine usage is well underway, with full recruitment achieved. Additionally, laboratory work continued on the role of cellular pharmacological receptor and pathways for atropine on the scleral fibroblasts, including use of our current pig and mouse models of myopia. Our randomized clinical trials on NeuroVision treatment in low and mid-myopic individuals in the SAF are currently near-completion, and preliminary interim analysis in the low myopia group by an independent 3rd party observer has confirmed significant differences in outcome between treatment groups, which still remain masked at this stage. A pilot study to evaluate NeuroVision technology in progressive myopia in 33 school children at Evergreen Primary School to evaluate the impact of NeuroVision treatment on visual enhancement and retarding myopia progression has been successfully performed, 1 year follow-up is currently underway. Preliminary treatment results have confirmed that NV treatment is highly effective in enhancing visual acuity in these 6-8 year olds, and these children are currently using spectacles which are significantly undercorrected, whilst retaining good visual acuity. Results on the effect on reduction of myopia progression rates, if any, will be known in the last quarter of 2007.

Stem Cell Research

The Stem Cell Research Group continued to investigate the use of novel methods of ocular surface transplantation for treatment of ocular disease. This includes the use of epithelial alternatives, such as the use of oral mucosal equivalents to replace conjunctival or corneal epithelium.

The group has demonstrated the effective use of autologous human serum as an alternative to bovine serum for ex vivo cell expansion. This has potentially important clinical implications as it raises the possibility of using autologous serum in the culture process, thereby eliminating the need for allogeneic tissue, and further minimizing the risks of transmission of infection and allograft rejection.

Femtosecond Laser-Assisted Corneal Transplantation

A new project to develop new forms of lamellar corneal transplantation has been initiated. Corneal transplantation currently requires manual corneal surgical techniques with relative surgical imprecision, or the use of automated microkeratomes to perform lamellar dissection of the cornea, which is also prone to relative inaccuracy and stromal bed quality. The femtosecond laser is a recent development in refractive surgery in which the laser is used to create a LASIK flap. SERI is developing new femtosecond laser algorithms to perform deep anterior and posterior lamellar corneal transplantation to improve safety and visual outcomes. This project has the potential to transform the field of corneal surgery and transplantation.

Retinal Research

During the year, the Institute has expanded research into the cell and molecular mechanisms underlying retinal new vessel formation such as occurs in blinding forms of diabetic eye disease. Collaborative research with the Department of Anatomy at National University of Singapore has been particularly fruitful with three papers published (or in press) in prestigious journals and six presentations at international meetings. The effect of hypoxia on the blood retinal barriers in relation to macular oedema is a current area of study.

Abnormal retinal cell signalling is thought to underlie the development of myopia and several aspects of this are being studied in the chick, rat and pig. The early development of the myopic pig eye has been investigated with particular reference to the role of peripheral retinal function. Preliminary results have been submitted for publication and have been presented at three international meetings.

The clinical management of retinal disorders often requires the administration of therapeutic drugs to the posterior segment of the eye but current methodology often necessitating repeated intra-vitreous injections has many drawbacks. Alternative methods of drug delivery are being studied in an isolated perfused pig eye model. The establishment of sophisticated electrophysiological equipment for animal work including multifocal electroretinography has extended our ability to assess retinal function in experimental animals.

SERI continued to work on retinal vascular disease such as diabetic and hypertensive retinopathy as a predictor for cardiac or cerebrovascular disease, using retinal imaging as a screening modality.

Psychophysics and Visual Neuroscience

Studies of changes in retinal electrophysiological function associated with myopia progression were carried out this year. Two scientific articles related to this field have been published. In addition, we have initiated a new study to investigate retinal neurophysiological changes in various stages of diabetic retinopathy this year.

Several perceptual learning studies evaluating NeuroVision treatment in low and mid-myopia and post-refractive surgery are currently in progress, including two RCTs with the SAF on visual improvement and contrast sensitivity enhancement in military subjects.

Ocular surface diseases

Having proven our concept of cultivating cultured conjunctival equivalents for conjunctival and ocular surface reconstruction, our efforts this year focused on evaluating the ability of our conjunctival constructs in replacing corneal epithelium in limbal stem cell deficiency, and re-evaluated the concept of conjunctival epithelial transdifferentiation in these eyes. Cultured conjunctival transplants as corneal surface replacements in 4 eyes of 3 patients were successfully performed this year. Proteomic tear and ocular surface work will continue to evaluate new ocular defensins and biomarkers for dry eye disease, and early results of our work on antimicrobial peptides are promising and need to be followed up. Four publications in this field of research were published this year. In addition, one of our key stem cell clinician scientists, Dr Leonard Ang, was awarded the 2005 Singapore National Academy of Sciences (SNAS) Young Scientist Award for his contribution to the program.

Proteomics work has proceeded well this year; patents were submitted in the area of defensins analogues and dry eye. A new defensins analogue was designed and synthesized which has been found to have antimicrobial properties like those of antibiotics but with no epithelial cell cytotoxicity. Additional work in the closely related area of innate immunity resulted in three papers published and others in press. SERI lab is developing an international presence in the ocular surface response in wounding and inflammation.

Epidemiological Research

A major ongoing project, which started in August 2004, the Singapore Malay Eye Study (SiMES) is progressing well. This ambitious NMRC funded project is a population-based, cross-sectional epidemiological study of Malay adults aged 40-80 years living in Singapore designed to quantify the prevalence of and risk factors for visual impairment and major eye diseases, including refractive errors, glaucoma, cataract, diabetic retinopathy and age-related maculopathy. The study recruitment closed in July 2006 achieving a response rate of 78.8%. Preliminary analysis of data revealed new findings on the prevalence of and risk factors for different eye diseases in Malay people. These findings were presented at both national and international scientific conferences. The impact of SiMES will be considerable, as there is currently no visual health data in the ethnic Malay subpopulation, and information gleaned from this study will have broad implications for understanding the risk factors and etiology of eye diseases, and for public health planning and resource allocation for millions of people in Asia.

In addition, SiMES will expand into two major programmes in 2007: Singapore Retinal Image Archival and Analysis Network (SIRIAN) and Singapore Indian Chinese Cohort Eye Study (SICC).

» CONTINUED FROM PAGE ONE

Keen eyes here avert blinding infections

But his antenna was up and he got his team to check the number of fungal infections seen recently. They found an unusually high 13 cases over a period of just two months.

Now he was sure there was a problem, but did not know what it was. He informed the health authorities and got his team to contact patients to check if there was anything in common among them. He also checked for similar infections in other countries.

The calls to patients paid off. They all used disposable soft contact lenses and Bausch & Lomb's ReNu with MoistureLoc contact lens solution. Wearing his other hat as director of the Singapore Eye Research Institute, he set all the public hospitals here digging through their old cases.

Meanwhile, he also went to the hospitals' microbiology laboratories to check all eye fungal infections. There are three groups of fungi that cause corneal infections, but all the labs were seeing only one, *Fusarium*.

Prof Tan alerted the Ministry of Health.

Professor K. Satku, the ministry's director of medical services, had epidemiologists looking into the problem right away.

Dr Steven Ooi Peng Lim, the ministry's deputy director (disease control) recalled



PHOTO: LIM SUI HAI
SAVED: Student Joel Cheng got an eye infection from using Bausch & Lomb's ReNu contact lens solution and might have gone blind in his left eye if the infection was not discovered early.

managing corneal transplant problems.

One of the experts he spoke to was Professor Eduardo Alfonso of Florida's Bascom Palmer Eye Institute, known for its data on *Fusarium*. In the US, such infections are more common in Florida's tropical climate.

When Prof Alfonso returned and checked, he found a spike. In the latest report, his centre uncovered more than 50 such infections.

Slightly over a week after Singapore's alert, reports from Hong Kong said that three in four of its patients with fungal eye infections had used ReNu. Then cases started appearing in Malaysia, the US, Europe and Australia.

Finally, on May 15, Bausch & Lomb voluntarily and permanently withdrew the product from all markets worldwide.

Since November 2004, when ReNu with MoistureLoc was introduced, there have been 79 cases of *Fusarium* keratitis here. The real spike came in January this year with 14 cases, followed by another 14 in February.

Despite the publicity and strong warnings by the ministry, some people continued using ReNu and eight new cases surfaced in March and April.

But by then, doctors were all on the alert, and the patients received treatment before suffering loss of sight. — Dr Paul Mitchell, Dr Paul Satku



RIGHT MOVE: The actions taken by SNEC deputy director Prof Tan led to the eventual removal of the ReNu solution worldwide.

Chronology of events

January 2006: Professor Donald Tan raises alert after noticing unusual surge in cases of fungal eye infection keratitis.

February 17: After three people needed corneal transplants to save their eyesight, the Health Ministry issues public warning against using the ReNu contact lens solution, even though tests had found nothing wrong.

February: The public warning was followed up quickly with alerts to health authorities in other countries, triggering findings of similar infections in Hong Kong, the US, Malaysia, Europe and Australia.

May 15: Bausch & Lomb voluntarily and permanently withdraws the product from all markets worldwide.

Today, Monday, 26 March 2007, Pg 6

Eye spy a vision data mine

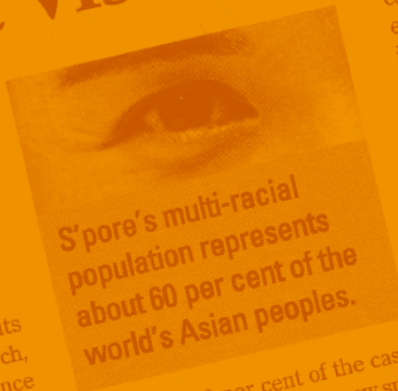
Singapore is ideal for eye research — if the subjects are willing

SHERALYN TAY
sheralyn@mediacorp.com.sg

EVEN as Singapore reiterates its commitment to biomedical research, regional interest in vision science and research is picking up — with sights set on Asian-centric studies on myopia, glaucoma and other eye-related problems.

And the country with one of the world's highest myopia rates could take the critical lead in this. That is, if only the average Singaporean could be convinced.

Singapore's "perfect" multi-ethnic population is representative of about 60 per cent of the world's Asian peoples, said Professor Donald Tan, medical director at the Singapore Eye Research Institute.



S'pore's multi-racial population represents about 60 per cent of the world's Asian peoples.

About 80 per cent of the cases were easily addressed with new spectacles or simple cataract surgery. Women were also found to be twice as likely to have vision problems or be blind.

This "pivotal" study — to be followed up with studies on the Chinese and Indian communities here — will be very important in unearthing genetic differences and links with other populations, said Sydney-based researcher Dr Paul Mitchell.

He was here earlier this month for the Asia-Association for Research in Ophthalmology meeting.

Even the incentives of a free eye check worth \$300, and travel reimbursement or a \$20 voucher, were not enough to convince them — many of whom were contract staff — to go for the one-off, three-hour check-up.

Said Ms Aidah Idris, recruitment manager for the Singapore Epidemiology of Eye Disease at the Singapore Eye Research Institute: "Many of them insisted they were fine. But what they perceived as 'fine' was not really so."

The five recruiters had to visit each household as many as 12 times, explaining the study's importance and benefits, and even convincing employers to give their contract staff time off for the procedures.

What research participants should realise is that they are leaving a legacy for Singapore and beyond, said researchers.

Data collected for SIMES, for example, will not only be analysed to determine the reasons for poor eye health, but also used for future large studies linked to other health problems, said Dr Tai E Shyong, consultant endocrinologist at Singapore General Hospital.



SERI Board Members

The SERI Board comprises representatives from the Singapore Health Services, National Healthcare Group as well as institutions involved in vision research such as the Defence Medical Research Institute and the National University of Singapore.

CI Prof Ang Chong Lye

Chairman, Board of Directors
Director,
Singapore National Eye Centre

Prof Donald Tan

Director,
Singapore Eye Research Institute
Deputy Director,
Singapore National Eye Centre
Head, Dept of Ophthalmology,
National University of Singapore

Prof Patrick John Casey

Professor/ Vice Dean (Research),
Duke-NUS Graduate Medical School
Singapore

Assoc Prof Lee Kim Hock Lionel

Director,
DMERI@DSO

Dr Loh Yik Hin

Deputy Director of Integrated Health
Services Division,
Ministry of Health

Prof Wong Eu Li, John

Dean, Yong Loo Lin School of Medicine
National University of Singapore

Mr Wong Yew Meng

Accountant/Partner,
PriceWaterHouseCoopers

Mr Sia Kheng Hong

Company Secretary

Management Committee

The committee is chaired by the Director of the Institute. The SERI Executive Committee is the major administrative body of the Institute and is responsible for the approval of project fundings, research direction and management.

CHAIRMAN

Prof Donald Tan
Director,
SERI

MEMBERS

CI Prof Ang Chong Lye
Director,
SNEC

Assoc Prof Aung Tin
Associate Director,
Education & Training,
SERI

Prof Roger W Beuerman
Scientific Director,
SERI

Mrs Karen Chee-Hansen
Assistant Director,
International & Corporate Affairs
SERI

Prof Wallace S Foulds
Senior Consultant,
SERI

Dr Khoo Chong Yew
IRB Chairman,
SERI

Ms Charity Wai
Chief Operating Officer,
SNEC

Assoc Prof Wong Tien Yin
Associate Director,
International Activities,
SERI

Institutional Review Board

The Institutional Review Board is an important component of SERI. The IRB reviews, approves and monitors all research projects conducted at SERI and SNEC. The IRB safeguards the rights, safety and well-being of all research subjects in accordance with the guidelines set out in the Singapore Good Clinical Practice Guidelines adapted from the Declaration of Helsinki. The IRB is chaired by a visiting consultant to the SNEC and members include a lawyer, independent consultants who are specialists in ethical and legal aspects and a senior nursing representative.

CHAIRMAN

Dr Khoo Chong Yew
Visiting Consultant,
SNEC

MEMBERS

Dr Ang Beng Chong
Clergy,
Hebron Bible Presbyterian Church

CI Prof Ang Chong Lye
Medical Director,
SNEC

Prof Roger Beuerman
Deputy Director,
SERI,
Scientific Director,
SERI

Dr Chan Tat Keong
Consultant,
Cataract & Comprehensive, SNEC

Prof Wallace S Foulds
Senior Consultant,
SERI

Mdm Ho Shin Hiong
Director of Nursing,
SNEC

Dr Lim Kuang Hui
Ophthalmologist,
Eye Clinic Mount Elizabeth

Dr Dominic Leung
Dental Surgeon,
TP Dental Surgeons

Dr Piyah Phong
Ophthalmologist,
Eye Associates Clinic & Surgery

Mr Suresh Sachi
Legal Director,
A*STAR

Prof Donald Tan
Director,
SERI

SNEC Research Committee

The SNEC Research Committee plays a pivotal role in reviewing of research budget, and evaluating and endorsing on the appropriateness of research projects. This includes reviewing the scientific merits of research projects and giving direction for the development of translational and clinical research.

CHAIRMAN

Prof Donald Tan

Deputy Director,
SNEC

Director,
SERI

Head,
Dept of Ophthalmology, NUS

DEPUTY CHAIRMAN

A/Prof Aung Tin

Senior Consultant,
Glaucoma Service, SNEC

MEMBERS

CI Prof Ang Chong Lye

Medical Director,
SNEC

Assoc Prof Chee Soon Phaik,

Head,
Ocular Inflammation & Immunology Service,
SNEC

Dr Leonard Ang

Consultant,
Cornea Service, SNEC

Dr Chan Wing Kwong,

Head,
Refractive Surgery Service, SNEC

Dr Bobby Cheng

Consultant,
Ocular Inflammation & Immunology Service,
SNEC

Dr Fong Kee Siew

Head,
Oculoplastic Service, SNEC

Dr Lee Shu Yen

Consultant,
Cataract & Comprehensive Ophthalmology
Service, SNEC

Dr Quah Boon Long

Head,
Paediatric Ophthalmology & Strabismus
Service, SNEC

Dr Sharon Tow

Head,
Neuro-Ophthalmology Service, SNEC

Dr Doric Wong

Head,
Vitro-Retinal Service, SNEC

Staff

as at March 2007

Director

Prof Donald Tan

Deputy Director / Scientific Director

Prof Roger W Beuerman

Assoc Director, International Activities

Assoc Prof Wong Tien Yin

Assoc Director, Education & Training

Assoc Prof Aung Tin

Senior Consultants

Prof Wallace S Foulds

Assistant Director, International & Corporate Affairs

Mrs Karen Chee-Hansen

HUMAN RESOURCES

Human Resources & Admin Manager

Ms Cindy Lee

Human Resources & Admin Executive

Ms Margaret Ng

FINANCE

Accountants

Ms Angeline Neo

Mr Victor Tan

Accounts Assistants

Ms Jessie Leong

Ms Samantha Lim

INSTITUTIONAL REVIEW BOARD

SECRETARIAT

IRB Executive

Ms Chia Joo Yi

Protocol Officer

Ms Chia Yi Hui

CLINICAL RESEARCH

Clinic Manager

Sis Peck Chye Fong

Research Optometrists

Mr Andy Ang

Ms Goon Yar Yen

Mr Jackson Kwok

Ms Lee Jia Yi

Ms Debbie Low

Ms Jolene Ong

Ms Marlina Tay

Ms Toh Ai Nee

Clinical Research Fellows

Dr Han Tun Aung

Dr Lisandro Sakata

Dr Rajesh Sasikumar

Clinical Research Associate

Dr Anand Parthasarathy

Clinical Research Officer

Mr Brendon Zhou

Genetic Research Coordinator

Mr Toh Ju Yuan

Research Officer

Ms Regina Loo

Clinical Trial Coordinators

Ms Chan Hoi Yi

Mr Muhd Nazarul Bin Jamil

Ms Kelly Wong

Project Coordinator

Ms Evelin Tan

Patient Relations Assistant

Ms Nelliberty Baha Said

Receptionists

Ms Serena Chew

Ms Mary Koh

LABORATORY RESEARCH

Senior Research Fellows

Dr Eranga N Vilthana

Dr Zhou Lei

Research Fellows

Dr Amutha Barathi

Dr Chi Luu

Dr Kek Wee Kuan

Dr Li Jing

Dr Liu Shou Ping

Research Associates

Dr Do Phuc Tien

Ms Shalin Seebah

Ms Weon Sung Rhan

Dr Wu Hong

Research Officers

Ms Tracy Chai

Ms Jaime Chew

Ms Li Seow Ching

Ms Lim Lih Yin

Ms Rachel Tseng

Ms Divya Venkataraman

Mr Victor Yong

Research Assistants

Ms V Anandalakshmi

Ms Ashley Wu

Dr Zaw Moe Thein

Laboratory Technicians

Ms Rebekah Poh

Ms Zhu Hong Yuan

Lab Secretary

Ms Thia Lei Ling

PROJECT STAFF

Singapore Cohort Study of the Risk
Factors for Myopia (SCORM)

Research Officers

Ms Ang Su-Lin

Ms Wang Ye

Clerical Officer

Ms Sim Siew Eng

Trainee

Mr Zin Lin Htike

Singapore Epidemiology of
Eye Disease (SEED)

SEED Clinical Studies Manager

Dr Mya Sandar

SEED Recruitment Manager

Ms Aidah Bte Idris

SEED IT & Imaging Coordinator

Ms Haslina Hamzah

SEED Data Coordinator

Ms Maisie Ho

SEED Statistical Officer

Ms Wong Wan Ling

Singapore Malay Eye Study (SiMES)

Research Optometrist

Mr Ryan Man

Research Associate

Ms Sangeetha Nagarajan

Teaching and Training

SERI had three postgraduate students pursuing various ophthalmic research degrees in year 2007.

PHD

Victoria Zhu Hong Yuan

Zaw Moe Thein

Dr Louis Tong

SERI participated in the Biotechnology Industrial Attachment Programme for Biotechnology students. The attachment which lasted three to four months each, allowed the students to gain valuable work and learning experience with the scientists at SERI.

- Chen Quin Hui, Ngee Ann Polytechnic
- Shintya Goh No, Ngee Ann Polytechnic
- Khoo Keng Kiat Shaun-James, Ngee Ann Polytechnic
- Lin Ruyi, Ngee Ann Polytechnic
- Ng Shi Hui, Ngee Ann Polytechnic
- Wan Mei Xian Janice, Ngee Ann Polytechnic
- Chan Kian Kai, Temasek Polytechnic
- De Souza Andrew Nigel, Temasek Polytechnic
- Kelvin John Selva, Temasek Polytechnic
- Tan Hwei Ling, Temasek Polytechnic
- Tee Siow Wei, Temasek Polytechnic

Teaching and Training cont'd

Education & Training

SERI continues to conduct weekly educational seminar, which provides the platform for SERI scientists and staff to share their research findings. In addition, local and international researchers in both ophthalmic and non-ophthalmic fields were also invited to speak at the SERI weekly seminar.

3 April 2006

The Association between Serum Citric Acid Levels and Long-Term Incidence of Hypertension. Results from Beaver Dam Eye Study

Dr Anoop Shankar

Assistant Professor
Dept of Community,
Occupational and Family Medicine
Yong Loo Lin School of Medicine
National University of Singapore

10 April 2006

In Silico and Experimental Approaches to Discovering Protein Interactions

Dr Prasanna R. Kolatkar

Group Leader
Dept of Information & Mathematical Sciences
Genome Institute of Singapore

11 April 2006

Interactions of Major Genes for AMD and Modifiable Risk Factors

Dr Debra A Schaumberg

Assistant Professor
Medicine & Ophthalmology
Harvard Medical School

8 May 2006

Current Use of Botox in Ophthalmology

Dr Yip Chee Chew

Consultant
Tan Tock Seng Hospital

15 May 2006

Research at Optometry Centre: A Small Spark at a Time

Dr Wilfred Tang

Head
Singapore Polytechnic Optometry Centre

17 May 2006

Quantitative Proteomics for Biomarker Discovery in Tear Fluid

Dr Zhou Lei

Senior Research Fellow
Singapore Eye Research Institute

22 May 2006

Elevation of S100 Calcium Binding Protein A8 in Tear Fluid of Pterygium Patients

Dr Zhou Lei

Senior Research Fellow
Singapore Eye Research Institute

Gene Expression Profiling of Primary and Recurrent Pterygium Using DNA Microarray

Dr Wong Yong Wee

Research Fellow
Singapore Eye Research Institute

Use of Scanning Peripheral Anterior Chamber Depth Analyzer (SPAC) for Anterior Chamber Depth Assessment in Normal and Angle-closure Subjects

Dr Baskaran Mani

Research Fellow
Singapore Eye Research Institute

Transglutaminase Participates in Cytoplasmic to Nuclear Translocation of p65 in the UVB Induced NF-kappa B Pathway in Human Corneal Epithelial Cells

Dr Louis Tong

Registrar
Singapore National Eye Centre

29 May 2006

Reactive Oxygen Species, Cause or Cure for Apoptosis

A/Prof Marie-Veronique Clement

Associate Professor
National University of Singapore

5 June 2006

Preimplantation Genetic Diagnosis – The Local Perspective

A/Prof Samuel Chong

Paediatrics
National University Hospital

26 June 2006

Trans-Glutaminases in the Ocular Surface – Opportunities for Research and Treatment

Dr Louis Tong

Associate Consultant
Singapore National Eye Centre

3 July 2006

Diabetic Neuropathy: Can Impaired Nerve Regeneration be Improved?

A/Prof Einar Wilder-Smith

Senior Consultant
Director Research Dept Medicine
National University Hospital /
National University of Singapore

17 July 2006

DNA Double Strand Break Repair and Radiation Hypersensitivity

Dr Susan Loong

Senior Consultant
Dept of Radiation Oncology
National Cancer Centre

24 July 2006

Latest Advances in Refractive Surgery

Dr Chan Wing Kwong

Senior Consultant and Head of Refractive Surgery
Singapore National Eye Centre

Teaching and Training cont'd

2 August 2006

Toll-Like Receptors in Ocular Surface Epithelial Cells

Dr Li Jing

Research Fellow
Singapore Eye Research Institute

15 August 2006

Will We Be Able To Stop Myopia?

Prof Josh Wallman

Professor of Biology
City College of the City University of New York

23 August 2006

NADPH Oxidase Mediated-Oxidative Stress in Vascular Smooth Muscle Cells

Dr Moe Kyaw Thu

Senior Research Scientist
National Heart Centre

28 August 2006

Femtosecond Lasers in Ophthalmology-Surgery and Imaging

Prof Dr. Josef Bille

University of Heidelberg
Institute of Applied Physics

30 August 2006

Emerging Antimicrobial Resistance Problems in Singapore

Dr Koh Tse Hsien

Consultant Bacteriologist /
Clinician Scientist
Singapore General Hospital

6 September 2006

Defining the Neurosphere Niche; Identification of Autocrine/Paracrine Survival Factors for Neural Stem Cells

A/Prof Sohail Ahmed

Head
Neural Stem Cell Laboratory Centre for
Molecular Medicine
A*Star

13 September 2006

Generation of Mouse Graves' Ophthalmopathy Model by Genetic Immunization and Cytokine Profile Evaluation Using Real-Time PCR

Ms Goh Sui Sin

MSc Candidate
National University of Singapore

20 September 2006

Research and Development of Membrane Active Cationic Steroid Antibiotics

Dr Liu Shou Ping

Research Fellow
Singapore Eye Research Institute

27 September 2006

Tuberculosis and the Eye

Dr Kristine Bascal

Uveitis Fellow
Singapore National Eye Centre

4 October 2006

Peripapillary Atrophy Changes in a Longitudinal Follow-up of Glaucoma Patients

Dr Jovina See

Consultant & Head
Glaucoma Services
National University of Singapore

11 October 2006

Identification of Beta Microseminoprotein Binding Partners with Yeast Two Hybrid System

Dr Wong Yong Wee

Research Fellow
Singapore Eye Research Institute

18 October 2006

Lessons from the Singapore 5-FU trial

Dr Steve Seah

Senior Consultant (Part Time)
Singapore National Eye Centre

25 October 2006

The Handan Eye Study – A New Epidemiological Study in Rural China

Ms Mya Sandar

Clinical Studies Manager
Singapore Eye Research Institute

1 November 2006

Membrane Array Characterization of 80 Chemokines, Cytokines, and Growth Factors in Open – and Closed-EyeTears: Angiogenin and Other Defense System Constituents.

Ms Lim Lih Yin

Research Officer
Singapore Eye Research Institute

22 November 2006

A Pig Model of Retinal Capillary Closure

Dr Kek Wee Kuan

Research Fellow
Singapore Eye Research Institute

29 November 2006

Screening for Angle Closure in Singapore

Dr Raghavan Lavanya

Research Fellow
Singapore Eye Research Institute

13 December 2006

Ophthalmic and Orbital Atlases

Prof Wieslaw L. Nowinski

Director/ Principal Scientist
Biomedical Imaging Lab
Agency for Science, Technology & Research
A*Star

3 January 2007

Analisis Trial: Prevalence of Plateau Iris in Primary Angle Closure Suspects

Dr Rajesh Sasikumar

Clinical Research Fellow
Singapore Eye Research Institute

10 January 2007

Novel Nanostructured, Bicontinuous Microemulsion-Based Polymer – A Material with Important Ophthalmic Implications

Dr Edwin Chow

Research Scientist
Inst of Bioengineering and Nanotechnology
A*Star

17 January 2007

Three-Dimensional Microscopy and Imaging Through Scattering Media

Prof Colin Sheppard

Head
Division of Bioengineering
National University of Singapore

24 January 2007

Biomedical Devices through Materials Innovation

Prof Freddy YC Boey

Prof & Dean
School of Materials Science & Engineering
Nanyang Technological University

Teaching and Training cont'd

7 February 2007

Novel Nanostructured, Bicontinuous Microemulsion-based Polymer – A Material with Important Ophthalmic Implications

Dr Edwin Chow

Research Scientist
*Inst of Bioengineering and Nanotechnology, A*STAR*

14 February 2007

Transgenic and Knockout Mice – Principle and Application

Dr Winston Whei-Yang Kao

Ben & Louise Tate Professor
Director, Ophthalmic Research
Ophthalmology
University of Cincinnati

28 February 2007

Insights into Corneal Wound Healing Using Knock-Out Mice

Dr Winston Whei-Yang Kao

Ben & Louise Tate Professor
Director, Ophthalmic Research
Ophthalmology
University of Cincinnati

7 March 2007

What the Clinician Scientist/ Surgeon Needs to Understand about Schlemm's Canal Surgery

Prof David L Epstein

Joseph A.C. Wadsworth Clinical Professor and Chairman
Dept of Ophthalmology
Duke University Medical Center (Duke Eye Center)

14 March 2007

Human Tear Metabolomics: Introduction and Preliminary Results

Dr Zhou Lei

Senior Research Fellow
Singapore Eye Research Institute

21 March 2007

Cell Death in the Human Ocular

Dr Louis Tong

Clinician Scientist
*Singapore Eye Research Institute/
Singapore National Eye Centre*

28 March 2007

Pseudoexfoliation Syndrome

Dr Ho Su Ling

Associate Consultant
Uveitis and Comprehensive Ophthalmology
Tan Tock Seng Hospital

SERI also participated actively in Continuing Medical Education programmes at local institutions

12 April 2006

"C-reactive Protein, Other Markers of Inflammation and Risk of AMD"

Debra A.Schaumberg, ScD, OD, MPH

Assistant Professor of Medicine and Ophthalmology
Harvard Medical School

25 May 2006

"Osteo-Odonto Keratoprosthesis – A Tooth for An Eye"

Prof Donald Tan

Director
Singapore Eye Research Institute
Deputy Director
Singapore National Eye Centre

26 July 2006

SERI/SNEC's First Nature Publication: Mutations in SLC4A11 Cause Recessive Congenital Hereditary Endothelial Dystrophy (CHED)

"Identification of the CHED Gene"

A/Prof Aung Tin

Consultant
Glaucoma Service
Singapore National Eye Centre

"Functional Characterization and Other Work"

Dr Eranga Vithana

Senior Research Fellow
Singapore Eye Research Institute

18 October 2006

"Dry Eye: How Bench Work is Changing the Clinical Focus"

Dr Louis Tong

Associate Consultant
Corneal Service
Singapore National Eye Centre

31 January 2007

"Anterior Segment Optical Coherence Tomography Imaging for Corneal / Anterior Segment Surgery"

Dr Jodhbir Mehta

Clinical Research Fellow
Corneal Service
Singapore National Eye Centre

Myopia trial: Online exercises for 40 kids

Move to see if NeuroVision system can help young people aged 10 see better

Projects / Collaborations

BY LEE HUI CHIEH

how the myopic eye receives images, but the American NeuroVision system improves eyesight by training the brain to "sharpen" the blurred images seen by the eye.

After treatment, a person ...

shortsighted younger than children elsewhere. About four in five aged 18 are myopic, double that in the United States. Myopia in Singaporean children worsens ...

The Straits Times, Wednesday, 18 July 2007, Pg H9

» CLEAR VISION FROM A PINHOLE

The presbyopic eye is unable to focus light from a near object, creating a blurred image when performing tasks like reading or making a cellphone call.

The implant material ... a pinhole ... unfocused

Hope for those with near-vision problems

Implant being tried out here does not damage cornea or affect distant vision

BY LEE HUI CHIEH

A TINY doughnut – less than a tenth the thickness of a sheet of paper – is promising new hope to old eyes. With age, adults often develop near-vision problems – or what is known in the medical world as presbyopia. But in a new procedure being tested by doctors here, a tiny, doughnut-shaped

This does not reduce the actual degree of presbyopia. Instead it uses the pinhole principle to increase the eye's depth of field – so that near objects that were previously blurred now appear sharper. Think of it in terms of a camera – by making the aperture smaller, images can be brought into sharper focus.

The Singapore National Eye Centre (SNEC) is trying out the new implants on 50 patients here as part of global clinical trials.

The worldwide trials will involve about 400 patients in total, and the SNEC is the only centre in Asia selected to take part.

Preliminary results of the trial involving some 100 patients in Singapore and Europe

could see an average of three to four lines lower on a 13-line eye chart after getting the implant.

Currently, besides glasses or contact lenses to help them see near objects, patients can also opt for several surgical procedures, mostly offered by specialists in private practice.

There is conductive keratoplasty, where the shape of the cornea is changed with controlled heat waves, generated by radio frequencies.

Alternatively, patients can opt for a type of Lasik surgery where a laser is used

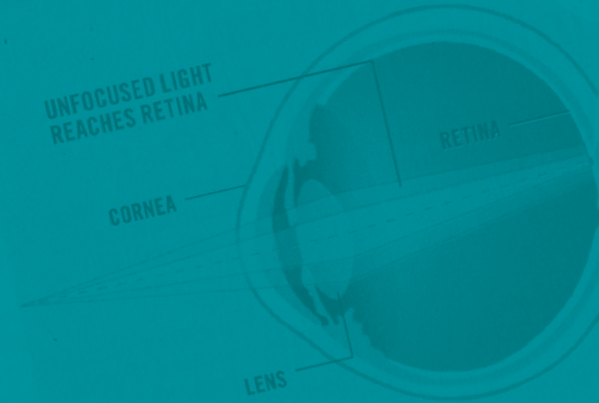
BLURRED IMAGE ON RETINA

UNFOCUSED LIGHT REACHES RETINA

CORNEA

LENS

RETINA



New Projects Approved (April 2006 – March 2007)

- 1. Efficacy and Safety of a Systematic Switch From Latanoprost to Travoprost in Patients with Glaucoma at SNEC (R463/12/2006)**
PI : Aung Tin
Collaborators : Rajesh Kumar
Source of Funding : N.A.
- 2. Retinal Vascular Changes in Children and Its Relationship to Cardiovascular Risk (R464/13/2006)**
PI : Wong Tien Yin
Co-PI : Saw Seang Mei
Collaborators : Anoop Shankar
Source of Funding : SingHealth Foundation
- 3. An Investigation of the Physical Characteristics of In-Focus and Out of Focus Images in Relation to Their Possible Role in the Etiology of Children Myopia (R465/14/2006)**
PI : Wallace Foulds
Collaborators : Chi Luu
Source of Funding : SERI Pilot Grant
- 4. Investigating the Genetic Basis of Glaucoma: Potential Candidate Genes (R466/15/2006)**
PI : Aung Tin
Co-PI : Colin Tan
Collaborators : Eranga Vithana
Source of Funding : SERI Pilot Grant
- 5. A Prospective Clinical Trial to Evaluate the Safety and Effectiveness of the AcuFocus™ ACI 7000 in Presbyopic Subjects (R468/17/2006)**
PI : Donald Tan
Collaborators : Chan Wing Kwong, Wee Tze Lin, Chua Wei Han
Source of Funding : AcuFocus, Inc.
- 6. Development of New Procedures for Corneal Transplantation and Corneal Surgery Using a Femtosecond Laser – Human Eye Bank Corneal Studies (R472/21/2006)**
PI : Donald Tan
Collaborators : Roger Beuerman, Howard Cajucom-Uy
Source of Funding : National Medical Research Council
- 7. Pilot Study to Assess the Efficacy of Short Exposure to Defocus to Slow the Progression of Myopia in Children (R473/22/2006)**
PI : Chua Wei Han
Collaborators : Donald Tan, Ian Morgan, Audrey Chia
Source of Funding : SNEC DRF
- 8. Off Label Use of Avastin (Bevacizumab) Intravitreal Injection for the Adjunctive Treatment of Complications From Retinal Vascular Diseases (R474/23/2006)**
PI : Ang Chong Lye
Collaborators : Ong Sze Guan, Doric Wong, Lee Shu Yen, Lee Mun Wai
Source of Funding : SERI Pilot Grant
- 9. Vision Standard and the Visual Status of Professional Drivers in Singapore (R476/25/2006)**
POI : Ng Chee Bing Christopher
Collaborators : Daniel Kwek, Melissa D/O Jodi, Audrey Sim
Source of Funding : N.A.
- 10. An 8-Week, Multicenter, Masked, Randomized Trial (with an 18-week Masked Extension) to Assess the Safety and Efficacy of 700mg and 350mg Dexamethasone Posterior Segment Drug Delivery System (DEX PS DDS) Applicator System Compared with Sham DEX PS DDS Applicator System in the Treatment of Non-Infectious Ocular Inflammation of the Posterior Segment in Patients with Intermediate Uveitis (R477/26/2006)**
PI : Chee Soon Phaik
Collaborators : Bobby Cheng, Lim Wee Kiak
Source of Funding : Allergan

New Projects Approved cont'd

11. CMV – Associated Anterior Uveitis (R479/28/2006)

PI : Chee Soon Phaik
Collaborators : Aliza Jap, Kristine Bacsal, Bobby Cheng
Source of Funding : N.A.

12. Visual Outcome and Patient Satisfaction Following Implantations of AMO ReZoom Multifocal IOL in the Dominant Eye and the AMO Tecnis Multifocal IOL in the Non-Dominant Eye (The Combination IOL Study) (R481/30/2006)

PI : Chua Wei Han
Co-PI : Zainah Alsagoff
Collaborators : Chng Nai Wee
Source of Funding : N.A.

13. Orbital Inflammatory Disease (R482/31/2006)

PI : Seah Lay Leng
Collaborators : N.A.
Source of Funding : N.A.

14. Gene and Protein Profiling and the Selection of Limbal Stem Cell Markers (R483/32/2006)

PI : Li Jing
Co-PI : Roger Beuerman
Collaborators : Donald Tan, Zhou Lei, Wong Yong Wee, Ti Seng Ei
Source of Funding : National Medical Research Council

15. Sources of Conjunctival Stem Cells (R484/33/2006)

PI : Roger Beuerman
Collaborators : Li Jing, Donald Tan, Chee Soon Phaik, Yann Barrandon
Source of Funding : National Medical Research Council

16. Cellular and Biocompatibility Assessment of Celgene Membrane (R485/34/2006)

PI : Jodhbir Mehta
Collaborators : Roger Beuerman
Source of Funding : Celgene

17. Off Label Use of Avastin (Bevacizumab) Intravitreal Injection for the Treatment of Cystoid Macular Oedema Secondary to Uveitis (R488/37/2006)

PI : Chee Soon Phaik
Collaborators : Lim Wee Kiak, Bobby Cheng, Lee Mun Wai
Source of Funding : N.A.

18. Prospective Evaluation of Limbal Relaxing Incision (LRI) in Conjunction with Phacoemulsification Surgery for Astigmatic Correction in Asian Eyes (R489/38/2006)

PI : Chua Wei Han
Collaborators : Zainah Alsagoff, Jocelyn Chua
Source of Funding : SERI Pilot Grant

19. Comparison of Dynamic Contour Tonometry with Goldmann Applanation Tonometry in Eyes Pre and Post Lasik (R490/39/2006)

PI : Lim Lee Hooi
Co-PI : Chua Wei Han
Collaborators : Lavanya Raghavan, Francis Oen, Chan Wing Kwong, Wee Tze Lin, Aung Tin
Source of Funding : SERI Pilot Grant

20. Nature and Time Course of Retinal Dysfunction in Patients with Diabetes (R491/40/2006)

PI : Wong Tien Yin
Collaborators : Chi Luu, Wallace Foulds
Source of Funding : SERI Pilot Grant

21. Retinal Vessel Imaging and Cardiovascular Risk (R494/43/2006)

PI : Wong Tien Yin
Co-PI : Saw Seang Mei
Collaborators : Wynne Hsu, Lee Mong Li, Chia Kee Seng, Mak Koon Hou, Ronald Klein, Barbara Klein
Source of Funding : BMRC YIA Grant

22. Red Dot Perimetry (R496/45/2006)

PI : Cheng Jin Fong
Collaborators : N.A.
Source of Funding : N.A.

23. Pseudophakic Retinal Detachments Experience at SNEC (R497/46/2006)

PI : Lee Shu Yen
Collaborators : Ang Chong Lye
Source of Funding : N.A.

24. Singapore Eye Disease Study (SEDS) – The Indian/Chinese Cohort (R498/47/2006)

PI : Wong Tien Yin
Collaborators : Saw Seang Mei, Donald Tan, Aung Tin, Tai E Shyong
Source of Funding : SERI Pilot Grant

New Projects Approved cont'd

- 25. Cultivated Ocular Surface Epithelial Transplantation for the Treatment of Severe Cornea and Ocular Surface Disease (COSET) (R499/48/2006)**
PI : Leonard Ang
Collaborators : Donald Tan, Roger Beuerman, Ti Seng Ei, Por Yong Ming, Do Phuc Tien, Maung Zaw Moe Thien
Source of Funding : SNEC HREF
- 26. Orbital Lymphoma – Review of Case Notes (R500/49/2006)**
PI : Seah Lay Leng
Collaborators : Kelvin Lee, Fong Kee Siew, Choo Chai Teck, Chee Soon Phaik
Source of Funding : N.A.
- 27. Contact Lens in Pediatrics (CLIP) in an Asian Population Study (R501/50/2006)**
PI : Lim Li
Co-PI : Donald Tan
Collaborators : Khoo Chong Yew, Quah Boon Long, Por Yong Ming
Source of Funding : Johnsons & Johnsons
- 28. Phospholipase D in the Human Corneal and Conjunctival Tissue (R502/51/2006)**
PI : Louis Tong
Collaborators : Li Jing, Wong Yong Wee, Roger Beuerman, Donald Tan
Source of Funding : SERI Pilot Grant
- 29. A Pilot Study of Changes in Gonioscopic Angle Width and Intraocular Pressure following Diagnostic Mydriasis with Tropicamide 1% on Angle-Closure Following Laser Peripheral Iridotomy (R503/52/2006)**
PI : Aung Tin
Collaborators : N.A.
Source of Funding : N.A.
- 30. Changing Patterns and Emerging Trends in Infectious Keratitis (R504/53/2006)**
PI : Por Yong Ming
Collaborators : Donald Tan, Raymond Loh, Koh Tse Hsien, Tan Ai Ling
Source of Funding : N.A.
- 31. Review of Pediatric Glaucoma Surgeries in Singapore from 1996 – 2006 (R505/54/2006)**
PI : Ho Ching Lin
Collaborators : Nesaretnam Barr Kumarakulasinghe, Raghav Sundar
Source of Funding : N.A.
- 32. Repeatability and Reproducibility of Anterior Chamber Angle Measurements Using Anterior Segment Optical Coherence Tomography (AS-OCT) (R506/55/2006)**
PI : Aung Tin
Collaborators : Lavanya Raghavan
Source of Funding : N.A.
- 33. Does Retinal Hypoxia Play a Role in the Myopia Associated with the Retinopathy? (R508/57/2006)**
PI : Wallace Foulds
Collaborators : Chi Luu, Kek Wee Kuan
Source of Funding : SERI Pilot Grant
- 34. The Effect of Chromaticity on Eye Growth in the Chick (R509/58/2006)**
PI : Wallace Foulds
Collaborators : Chi Luu, Kek Wee Kuan
Source of Funding : SERI Pilot Grant
- 35. Comparison of the Quality of Vision Provided by CanonSTAAR KS3-Ai Aspheric Three-Piece Silicone Posterior Chamber Intraocular Lens with Bausch & Lomb Sofport Advanced Optics Three-Piece Silicone Posterior Chamber Intraocular Lens (R510/59/2006)**
PI : Zainah Alsagoff
Collaborators : Chng Nai Wee, Jon Goh, Cordelia Chan
Source of Funding : N.A.
- 36. An Assessment of Electrophysiological Tests in Evaluating Retinal and Optic Nerve Function in Patients with Ocular Surface Disorders (R511/60/2006)**
PI : Audrey Chia
Collaborators : Chi Luu, Donald Tan, Por Yong Ming, Anand Parthasarathy
Source of Funding : SNEC HREF
- 37. Investigating the Genetic Basis of Fuchs Corneal Endothelial Dystrophy: Screening of Potential Candidate Gene (R512/61/2006)**
PI : Jodhbir Mehta
Collaborators : Aung Tin, Donald Tan, Eranga Vithana
Source of Funding : SERI Pilot Grant
- 38. A Clinical Trial Evaluating Femtosecond Laser-Associated Deep Lamellar Endothelial Keratoplasty (FLEK) (R513/01/2007)**
PI : Donald Tan
Collaborators : Anand Parthasarathy, Por Yong Ming, Jodhbir Mehta, Roger Beuerman
Source of Funding : SNEC HREF

New Projects Approved cont'd

39. Genes, Gene-Environment Interactions and Myopia in Singapore Children (R518/06/2007)

PI : Saw Seang Mei
Collaborators : Eric Yap, Roger Beuerman, Terri Young, Lu Yi-Ju, Chia Kee Seng, Donald Tan, Mark Seielstad, Wong Yong Wee, Eranga Vithana, Daniel Ng
Source of Funding : Biomedical Research Council

40. Generation of a Mouse Model for Recessive Congenital Hereditary Endothelial Dystrophy (CHED2) and Fuchs Endothelial Corneal Dystrophy (FECD) (R519/07/2007)

PI : Eranga Vithana
Collaborators : Aung Tin, Donald Tan, Roger Beuerman
Source of Funding : SERI Pilot Grant

41. Nasolabial Fold Angle Measurements using Anterior Segment Optical Coherence Tomography in Normal Subjects (R520/08/2007)

PI : Marcus Lim
Collaborators : Audrey Looi, Han Tun Aung, Choo Chai Teck, Aung Tin
Source of Funding : N.A.

42. Familial Risk of Primary Angle Closure Glaucoma (R521/09/2007)

PI : Aung Tin
Collaborators : Wong Tien Yin, Eranga Vithana, Saw Seang Mei
Source of Funding : N.A.

43. Repair of Orbital Floor Fracture Using Porous Polycaprolactone (OsteoMesh™) Implants (R522/10/2007)

PI : Seah Lay Leng
Collaborators : Teoh Swee Him, Choo Chai Teck, Fong Kee Siew, Audrey Looi, Chee Soon Phaik, Sunny Shen, Mohamad Rosman
Source of Funding : N.A.

44. Characteristics of Children Presenting with Strabismus in Singapore (R523/11/2007)

PI : Audrey Chia
Collaborators : N.A.
Source of Funding : N.A.

45. Singapore Retinal Image Archival and Analysis Network (SiRIAN) for Disease Population (R524/12/2007)

PI : Wong Tien Yin
Collaborators : Lim Joo Hwee, Tai E Shyong, Wynne Hsu, Mong Li Lee, Saw Seang Mei, Ng See Kiong, Li Huiqi, Wong Meng Cheong, Jeanette Lee
Source of Funding : Singapore Bioimaging Consortium

46. Optical Coherence Tomography of Idiopathic Polypoidal Choroidal Vasculopathy (R525/13/2007)

PI : Loh Boon Kwang
Collaborators : Ang Chong Lye, Doric Wong, Ian Yeo, Lee Shu Yen
Source of Funding : SNEC HREF

47. Evaluate the Utility of Anterior Segment Optical Coherence Tomography (AS-OCT) Compared to Standard Assessment in the Diagnosis, Management and Surgery of Corneal and Anterior Segment Disorders (R526/14/2007)

PI : Jodhbir Mehta
Collaborators : Aung Tin, Donald Tan, Por Yong Ming, Anand Parthasarathy, Han Tun Aung, Laurence Lim
Source of Funding : SNEC HREF

48. The Ubiquitin Proteasomal System in the Ocular Surface and Its Relevance in Pterygium (R527/15/2007)

PI : Louis Tong
Collaborators : Li Jing, Wong Yong Wee, Roger Beuerman, Donald Tan
Source of Funding : SNEC HREF

49. Singapore Consortium of Cohort Studies (SCCS) – Multi-Ethnic Cohort (MEC) (R528/16/2007)

PI : Chia Kee Seng
Co-PI : Wong Tien Yin
Collaborators : NV Ramani, Jeannette Lee, Tai E Shyong
Source of Funding : Biomedical Research Council

50. Brain Magnetic Resonance Changes in Optic Neuritis in Asians (R537/25/2007)

PI : Sharon Tow
Collaborators : Sitoh Yih Yian, Chng Soke Miang, Clement Tan, Lim Su Ann, Goh Kong Yong, Boey Pui Yi
Source of Funding : N.A.

Projects Completed During The Year (April 2006 – March 2007)

- 1. A Multi-Centre, Randomized, Double-Masked Controlled Study to Evaluate the Safety and Efficacy of An Intravitreal Fluocinolone Acetonide (0.5 or 2mg) Implant in Patients with Non-Infectious Uveitis Affecting the Posterior Segment of the Eye (BLP 415-001) (R276/20/2002)**
PI : Chee Soon Phaik
Collaborators : Lim Wee Kiak, Bobby Cheng
Funding Source : Bausch & Lomb
- 2. The Epidemiology of Neuro-Ophthalmic Disorders in Asians (R280/24/2002)**
PI : Lim Su Ann
Collaborators : Sharon Tow, Clement Tan, Wong Tien Yin, Alvin Seah, JF Cullen, Goh Kong Yong, Esther Fu
Funding Source : NHG Research Fund
- 3. The Electrophysiological and Morphological Changes in Myopic Retina (R304/48/2002)**
PI : Chi Luu
Collaborators : Lee Shu Yen, Chua Wei Han
Funding Source : SERI Pilot Grant
- 4. 24-Month Study on the Safety and Efficacy of the HumanOptics 1CU Accommodative Intraocular Lens (R318/11/2003)**
PI : Peter Tseng
Collaborators : Ang Chong Lye, Ong Sze Guan, Jon Goh, Chan Tat Keong, Zainah Alsagoff
Funding Source : SNEC DRF
- 5. Modulation of Conjunctival Epithelial Responses to Cellular Stress – An in-vitro Model (R335/28/2006)**
PI : Louis Tong
Collaborators : Roger Beuerman, Donald Tan, Li Jing
Funding Source : SERI Pilot Grant
- 6. Combined Penetrating Keratoplasty and Pupilloplasty – An Observational Case Series (R344/02/2004)**
PI : Arundhati Anshu
Collaborators : N.A.
Funding Source : N.A.
- 7. Myopic Macular Haemorrhages (R347/05/2004)**
PI : Lee Shu Yen
Collaborators : Wong Tien Yin, Adrian Koh, Doric Wong, Bobby Cheng, Ian Yeo, Edmund Wong, Yeo Kim Teck, Ong Sze Guan
Funding Source : SNEC DRF
- 8. Comparison of HVF, PERG, PVEP and mfVEP for Detection of Optic Nerve Dysfunction and Recovery in Patients with Optic Neuritis (R351/09/2004)**
PI : Chi Luu
Collaborators : Sharon Tow
Funding Source : SERI Pilot Grant
- 9. Retinal Function in Diabetic Macular Edema (R352/10/2004)**
PI : Chi Luu
Co-PI : Adrian Koh
Collaborators : Ian Yeo, Ranjana Mathur
Funding Source : SERI Pilot Grant
- 10. A Singapore Multi Center Randomized, Placebo-Controlled Study to Evaluate the Efficacy of a New Computerized System in the Treatment of Amblyopia in Older Children and Adults (R365/23/2004)**
PI : Donald Tan
Collaborators : Bill Chan, Linley Seenyen, Mohamad Rosman, Yvonne Ling, Quah Boon Long, Sonal Farzavandi
Funding Source : NeuroVision Inc.

Projects Completed During The Year cont'd

11. The Prevalence Rates of Myopia and Other Refractive Errors in Singapore Adults Aged 21 Years and Above: The Singapore Cohort Study (R388/46/2004)

PI : Saw Seang Mei
Collaborators : Wong Tien Yin, Tai E Shyong, Lim Su Chi, Jeanette Lee, Donald Tan
Funding Source : SERI Pilot Grant

12. Assessment of Fibrin Glue (Tisseel) in Pterygium Surgery and Other Forms of Ocular Surface Reconstruction (R389/47/2004)

PI : Donald Tan
Collaborators : Leonard Ang, Por Yong Ming
Funding Source : SNEC DRF

13. Screening for Angle Closure Glaucoma in the Singapore Population (R392/50/2004)

PI : Aung Tin
Co-PI : Steve Seah
Collaborators : Adrian Ee
Funding Source : SingHealth Research Fund

14. Prospective Clinical Trial Comparing HOYA AF-1 (UY) YA-60BBB Intraocular Lens and Alcon Acrysof Natural Intraocular Lens (R396/54/2004)

PI : Chee Soon Phaik
Collaborators : Ti Seng Ei
Funding Source : HOYA

15. Visual Impairment, Age-Related Diseases and Mortality in Chinese Adults (R398/56/2004)

PI : Wong Tien Yin
Collaborators : Saw Seang Mei, Steve Seah, Derrick Heng, Fong Chee Weng
Funding Source : NA

16. Establishment of an Isolated Perfused Porcine Eye Model for Drug Delivery and Electrophysiological Studies (R409/04/2005)

PI : Kek Wee Kuan
Collaborators : Wallace Foulds, Chi Luu
Funding Source : SERI Pilot Grant

17. An Investigation into the Genetic Basis of Partial Penetrance Phenotype, Characteristic of Autosomal Dominant Retinitis Pigmentosa Locus on Chromosome 19q13.4 (RP11) (R411/06/2005)

PI : Eranga Vithana
Collaborators : Ruan Yijun, Liu Jianjun, Aung Tin
Funding Source : SingHealth Research Fund

18. Evaluating the Risk of Raised Intra-Ocular Pressure After Pupil Dilation Among Patients with Diabetic Retinopathy (R413/08/2005)

PI : Chitra Vallei D/O Govindasamy
Co-PI : Wong Ching Yee
Collaborators : Aw Ai Tee, Ian Yeo, Aung Tin
Funding Source : SNEC Nursing Fund

19. Effects of Reading on Accommodative Responses (R421/16/2005)

PI : Anna Yeo
Co-PI : Wilfred Tang
Collaborators : Irene Chew Lay Khim, Chan Mei Ling, Tan Ai Ling
Funding Source : N.A.

20. A Multi-Center, Prospective, Subject-Masked, Bilateral, Randomized, Controlled Trial to Compare the Safety and Effectiveness of Two Versions of the Bausch & Lomb Zyoptix™ Tissue Saving Aspheric Algorithm to the Current Zyoptix™ Tissue Saving Algorithm When Used For Myopia and Myopic Astigmatism Lasik Treatment (Protocol #441) (R435/30/2005)

PI : Chan Wing Kwong
Collaborators : Wee Tze Lin
Funding Source : Bausch & Lomb

21. Screening for Dengue-Related Maculopathy Among Patients with Dengue Fever/ Dengue Haemorrhagic Fever (R437/32/2005)

PI : Daniel Su
Collaborators : Aliza Jap, Chee Soon Phaik, Ang Chong Lye, Donald Tan, Lim Wee Kiak, Bobby Cheng, Kristine Bacsal, Tan Ban Hock, Ashok Kurup, Helen Oh, John Flores
Funding Source : SERI Pilot Grant and SNEC DRF

Projects Completed During The Year cont'd

22. To Audit the Accuracy of SRK/II in Predicting the Target Postoperative Intraocular Lens Refractive in Singapore National Eye Centre (R441/36/2005)

PI : Lim Lee Hooi
Collaborators : Lee Shu Yen, Ang Chong Lye
Funding Source : N.A.

23. Comparison of Safety and Efficacy of Brinzolamide/ Timolol Fixed Combination vs COSOPT in Patients with Open-Angle Glaucoma or Ocular Hypertension (R449/44/2005)

PI : Aung Tin
Collaborators : Francis Oen
Funding Source : Alcon

24. Spectrum of Vogt Koyanagi Harada Disease in Singapore (R458/07/2008)

PI : Chee Soon Phaik
Collaborators : Kristine Bacsal, Aliza Jap
Funding Source : N.A.

25. An Investigation of the Physical Characteristics of In-Focus and Out of Focus Images in Relation to their Possible Role in the Etiology of Childhood Myopia (R465/14/2006)

PI : Wallace Foulds
Collaborators : Chi Luu
Funding Source : SERI Pilot Grant

26. Vision Standard and the Visual Status of Professional Drivers in Singapore (R476/25/2006)

PI : Ng Chee Bing Christopher
Collaborators : Daniel Kwek, Melissa D/O Jodi, Audrey Sim
Source of Funding : N.A.

27. Orbital Inflammatory Disease (R482/31/2006)

PI : Seah Lay Leng
Collaborators : N.A.
Source of Funding : N.A.

28. Red Dot Perimetry (R496/45/2006)

PI : Cheng Jin Fong
Collaborators : N.A.
Source of Funding : N.A.

Collaborations

Local Institutions

- Alexandra Hospital
- Changi General Hospital
 - Dept of Ophthalmology
- Clinical Trials & Epidemiology Research Unit
- Defence Medical & Environmental Research Institute
- Defence Science Organisation National Laboratories
- Genome Institute of Singapore
- Gleneagles Hospital
- Health Promotion Board
- Institute for Infocomm Research
- Institute of Molecular and Cell Biology
- John Hopkins Singapore
- KK Women's and Children's Hospital
 - Dept of Ophthalmology
- Ministry of Health
- National Cancer Centre
- National Dental Centre
- National Heart Centre
- National Neuroscience Institute
- National University of Singapore
 - Dept of Anatomy
 - Dept of Biochemistry
 - Dept of Computer Science
 - Dept of Community, Occupational and Family Medicine
 - Dept of Microbiology
 - Dept of Ophthalmology
 - Dept of Physiology
 - Graduate Programme in Bioengineering
- Nanyang Technological University
- Singapore Armed Forces
- Singapore Bioinformatics Institute
- SingHealth Research
- Singapore Polytechnic
 - Optometry Centre
- Singapore General Hospital
 - Burns Laboratory
 - Dept of Clinical Research
 - Dept of Diagnostic Radiology
 - Dept of Endocrinology
 - Dept of Experimental Research
 - Dept of Experimental Surgery
 - Dept of Obstetrics and Gynaecology
- The Eye Institute, National Healthcare Group
 - Alexandra Hospital
 - National University Hospital
 - Tan Tock Seng Hospital

Collaborations cont'd

Overseas Institutions

- Australian National University Research School of Biological Sciences, Australia
- Bascom Palmer Eye Institute, USA
- Center for Eye Research Australia, University of Melbourne, Australia
- Center National De La Recherche Scientifique, France
- CHUV-Lausanne University Hospital, Lausanne, Switzerland
- Cleveland Eye Clinic, Cleveland, Ohio, USA
- East Valley Ophthalmology, USA
- Eccles Institute of Human Genetics, University of Utah, UT, USA
- Duke University and Duke University Medical Centre, USA
- Johns Hopkins University, USA
- Kyoto Prefectural University of Medicine, Kyoto, Japan
- Lions Eye Institute, Perth, Australia
- Mahidol University, Salaya Campus, Institute of Molecular Biology, Thailand
- Moorfields Eye Hospital, United Kingdom
- National Eye Institute, National Institutes of Health
- Ocular Surface Center, Cullen Eye Institute, Baylor College of Medicine, Houston, Texas USA
- Philipines Academy of Ophthalmology
- Sankara Nethralaya
- Stanford University, USA
- Strathclyde University, Glasgow, UK
- The Feinberg School of Medicine, Northwestern University, Chicago, Illinois, USA
- The University of Glasgow, UK
- Tianjin Medical University, Eye Centre, Tianjin, PR China
- Tongren Hospital, Beijing, PR China
- University of Aberdeen, UK
- University of British Columbia, Canada

- University of Hiroshima, Japan
- University College London, Institute of Ophthalmology, United Kingdom
- University of Pennsylvania, USA
- University of Sydney, Australia, Dept of Ophthalmology
- University of Wisconsin, Madison, USA
- Vancouver General Hospital, Canada
- Xiamen Eye Centre, PR China
- Yamanashi Medical University, Yamanashi, Japan

Industry Collaborations

- Acufocus, USA
- Advanced Medical Optics (AMO)
- Alcon
- Allergan
- Bausch & Lomb, USA
- Carl Zeiss
- Celgene
- Essilor, USA
- HOYA Corporation, Japan
- Johnson & Johnson
- Keravision, USA
- Menicon, Japan
- NeuroVision Inc, USA
- Novartis Pharma AG, Switzerland
- Oculex Pharmaceuticals, USA
- Proneuron
- Pfizer (S) Pte Ltd
- Regenera Ltd, Australia
- SOLA International Holdings Ltd

Events / Achievements

The Straits Times, Tuesday, 23 May 2006, Pg 1

Keen eyes here avert blinding infections



By SALMA KHALIK
Health Correspondent

WHEN Professor Donald Tan did his weekly Wednesday morning hospital ward rounds in early January, alarm bells clanged.

There were too many patients with the fungal eye infection keratitis — a disease so rare that the Singapore National Eye Centre (SNEC) sees only six to 10 cases a year, including people from other countries.

This time, all the patients were young Singaporeans.

Fungal eye infections are difficult to treat, as Joel Cheng, 16, found out. He was among those warded with a serious infection that caused visible white patches on his left cornea.

His treatment, which included applying 10 different medicines to his eyes every hour and cost his parents more than \$30,000, has enabled him to retain the use of his cornea.

But five others here were not so lucky and needed cornea transplants. In the United States, the past three months have seen cases of people going blind.

Back in January, Prof Tan, the SNEC's deputy director, had not heard of any outbreak, but thought it very unusual to see so many cases on the same day.

Such infections are usually caused by physical injury to the eye, such as when a jogger runs into a tree branch, or in a worksite accident. None of the hospitalised cases fit the bill.

What Prof Tan did in the days that followed led to the removal of the ReNu contact lens solution from shop shelves, first in Singapore and eventually, worldwide.

He called other public hospitals here, and only Changi General Hospital had seen a rise in cases.

CONTINUED ON PAGE 2

Weekend Today, 10-11 June 2006, Pg 6

Behind the infections

Three polymers, meant to soothe, stopped eye solution from working

CHEOW XIN YI
xinyi@newstoday.com.sg

EYE care product-maker Bausch & Lomb (B&L) has admitted that the formulation of its ReNu MoistureLoc contact lens solution was likely to blame for the now-global fungal eye infection outbreak.

Its findings were first reported in the United States last month, when a worldwide recall of the now-defunct solution was made following an outbreak similar to the one detected in Singapore earlier this year.

The cause of all the trouble: Three polymers, or compounds, that essentially prevented the disinfectant from doing its work of killing bacteria.

Ironically, the polymers were meant to make the solution more comfortable for users — the MoistureLoc solution is the only product in the market with more than one polymer.

On Monday, more information will be presented at a symposium by the deputy director of Singapore National Eye Centre, Associate Professor Donald Tan, who first blew the whistle in January on the unusually high number of cornea infections here, especially among B&L solution users.

The B&L findings, said Assoc Prof Tan, showed these polymers



TODAY FILE PHOTO
THE WHISTLE-BLOWER: Assoc Prof Tan first drew attention to the unusually high number of cornea infections here, especially among B&L solution users.

could form multiple layers that trap any fungus present.

This is compounded by lazy practices, when users do not clean their contact lens cases or discard the used solution.

"So, when fresh solution is poured in, the fungus is trapped under the polymers and not killed," he said at a press briefing on the 21st Congress of the Asia-Pacific Academy of Ophthalmology on Friday.

He said: "Bausch and Lomb have found that in open bottles, you can get the fungus growing or present on the tip and on the cap because of the trapping of the fungus there. And (it appears) that every time you add the solution to your contact lens case, you're actually adding fungus."

While investigations are ongoing, added Assoc Prof Tan, findings are "the first of their kind with a very strong association".

He estimated that more than 300 cases of fungal eye infections had been reported in Singapore, Malaysia and Singapore. B&L said it was unable to provide a related figure across the region.

In Singapore, more than 100 cases were reported between 2004 and April 2005, according to the Ministry of Health (MOH).

While more lawsuits have been filed, with a reported cost to B&L of US\$1 billion, Assoc Prof Tan said it had no such legal action pending.

Asked if the findings could lead to a nationwide recall of contact lenses, Assoc Prof Tan said it could not be ruled out.

He said: "We are taking the necessary action to prevent further cases."

Meanwhile, various institutions, including the Singapore Ministry of Health, are upping their guard to prevent product recalls or sterilisation of contact lenses, although the practice is not common.

The Institute of Ophthalmology, which has caused several outbreaks of eye infections, has released a statement saying it will continue to monitor the situation.



Events

Asia-ARVO

Asia-ARVO is a biennial meeting held in locations throughout Asia to highlight the important clinical and translational aspects of vision and ophthalmic research. Previously known as SERI-ARVO for meetings held in 2003 and 2005, the name was changed in 2005 to reflect ARVO's commitment to partnering with the many countries in Asia that have expanding eye research programs.

Host Institution: Singapore Eye Research Institute

Singapore Eye Research Institute (SERI) is the national research institute of ophthalmology funded by the National Medical Research Council. SERI is dedicated to performing vision research with local institutions as well as major eye centers and research institutes throughout the world. Since its inception in 1997, SERI has established itself as a leading centre in South Asia for eye and visual science research and educational programming. In 2003, SERI was appointed as a National University of Singapore-affiliated institute. With its close integrations of clinical, basic science and epidemiological research, SERI is a premier eye research center in Southeast Asia.

Supported By: The Association for Research in Vision and Ophthalmology (ARVO)

The Association for Research in Vision and Ophthalmology (ARVO) is the world's largest organization of vision and ophthalmology researchers with more than 11,300 eye and vision researchers from over 70 countries.

ARVO's membership continues to grow, with 14 percent in 11 countries in Asia, 58 percent in the United States, and 28 percent in the remaining 58 countries. The membership is multidisciplinary and consists of both clinical and basic researchers (approximately 44 percent MD/Ophthalmologists, 26 percent PhD's and 30 percent Others including optometrists, osteopaths, and veterinarians). Considered the premier eye research meeting, ARVO's Annual Meeting in

Florida attracts over 9,200 researchers from around the world.

Participating Institutes:

- Alexandra Hospital, Department of Ophthalmology & Visual Science
- Changi General Hospital, Department of Ophthalmology
- National University of Singapore, Department of Community, Occupational and Family Medicine
- National University of Singapore, Department of Ophthalmology
- Department of Endocrinology, Singapore General Hospital
- Singapore National Eye Centre
- Singapore Polytechnic, School of Optometry
- Tan Tock Seng Hospital, Department of Ophthalmology

Over 1000 people attended the 4 day Meeting held at the Suntec Singapore International Convention and Exhibition Centre from 2 – 5 March 2007.

The meeting received an overwhelming response with 708 abstracts submitted by young researchers, clinicians and invited speakers.

A total of 199 symposium presentations, which included no less than 100 invited international speakers, addressed the important clinical and translational aspects of vision and ophthalmic research, which included topics on Stem Cell Biology, Genetics, Immunology, Inflammation and Infection, Epidemiology, as well as subspecialty symposia on Ocular Surface,

Cornea, Dry Eye, Cataract/Lens, Uveitis, Glaucoma, Retina, Myopia and Refractive Surgery. New topics added this year: Paediatrics and Ocular Imaging were well received.

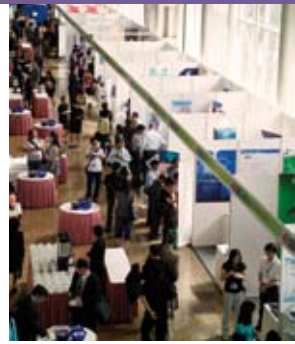
The pre-meeting workshops on Genetics for Non-Geneticists; Basic Statistics for Non-Statisticians; Writing Grants, Scientific Papers and Reviews received favourable feedback from the participants.

Special Interests Groups sponsored by the Alcon, Allergan and Menicon were held on the first day of the Meeting. Topics included: Dry Eye Management; Advancements in IOL Technology; Safety & Care of Contact Lenses; Therapeutic Interventions for Macular Edema and Innovations in Anti-microbial Protection for Contact Lenses. Sponsored lunch-time symposia addressed the Optimizing AMD treatment options.

In the spirit of encouraging young doctors and scientists in research, the Asia-ARVO Meeting again awarded a total of 59 Travel Fellowship Awards with funds generously donated by industry sponsors such as Advanced Medical Optics, ARVO and Novartis.

The meeting also awarded young researchers for outstanding clinical or basic ophthalmic research presented at the meeting.

Once again, the organizing committee thanks all the speakers, delegates and sponsors for the support and contributions which has made the Meeting better and more successful.



Events Asia-ARVO cont'd

Asia ARVO 2007 attendees by Region/Country

Asia-Pacific

| | |
|--------------|------------|
| Australia | 70 |
| China | 38 |
| Hong Kong | 15 |
| India | 112 |
| Indonesia | 44 |
| Japan | 44 |
| Korea | 18 |
| Kyrgyzstan | 1 |
| Malaysia | 29 |
| New Zealand | 7 |
| Pakistan | 3 |
| Philippines | 17 |
| Singapore | 390 |
| Taiwan | 14 |
| Thailand | 56 |
| Vietnam | 9 |
| Total | 647 |

Europe

| | |
|-----------------|------------|
| Austria | 10 |
| Belgium | 2 |
| Denmark | 1 |
| France | 5 |
| Germany | 34 |
| Ireland | 0 |
| Italy | 8 |
| Norway | 2 |
| Poland | 2 |
| Russia | 4 |
| Spain | 1 |
| Sweden | 0 |
| Switzerland | 11 |
| The Netherlands | 7 |
| UK | 39 |
| Total | 126 |

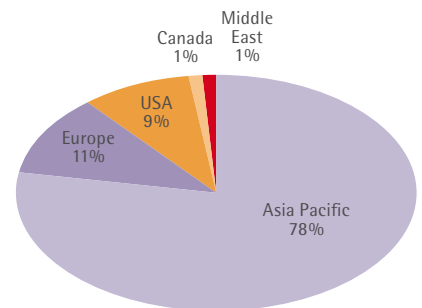
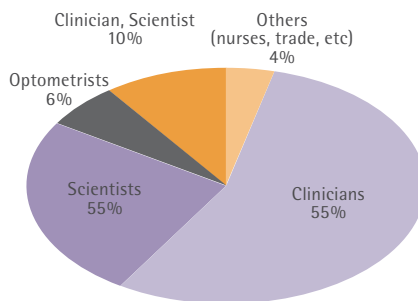
USA 100

Canada 7



Middle East

| | |
|--------------|-----------|
| Egypt | 1 |
| Iran | 4 |
| Israel | 7 |
| Oman | 0 |
| Turkey | 3 |
| U.A.E | 1 |
| Total | 16 |



Events

International Activities

SERI staff and associates participated actively in overseas conferences during the year to establish links with overseas institutes, meet up with overseas collaborators and to promote and enhance SERI's presence in the international scene.

Conferences/Meetings participated includes:

- **Congress of Ophthalmology and Optometry China**
14 – 16 April 2006, Shanghai, China
- **Association for Research in Vision and Ophthalmology**
30 April – 4 May 2006, Fort Lauderdale, USA
- **Austrian Ophthalmological Society**
20 May 2006, Stift Gottweig, Austria
- **Biomedical Engineering of Material and Application Meeting**
31 May – 1 June 2006, Los Angeles, USA
- **21st Congress of the Asia-Pacific Academy of Ophthalmology (APAO)**
10 – 14 June 2006, Singapore
- **4th International Society for Stem Cell Research Annual Meeting (ISSCRS)**
29 June – 1 July 2006, Ontario, Canada
- **The 6th International Symposium of Ophthalmology (ISO)**
13 – 15 August 2006, Hong Kong
- **11th International Myopia Conference (IMC)**
16 – 18 August 2006, Singapore
- **The Tun Hussein Onn National Eye Hospital 20th Anniversary International Scientific Meeting**
30 August – 2 September 2006, Kuala Lumpur, Malaysia
- **24th American Society of Retinal Specialists & 6th Annual Meeting of the European Vitreo-Retinal Society**
6 – 14 September 2006, France
- **The Third Global Chinese Ophthalmic Conference in Conjunction with 11th Congress of Chinese Ophthalmological Society (CCOS)**
31 August – 4 September 2006, Beijing
- **European Association for Vision And Eye Research (EVER)**
4 – 7 October, 2006, Portugal
- **Refractive Surgery and Ocular Surface Disease Meeting**
13 – 15 October 2006, Tianjin Medical Eye Centre
- **Combined Meeting Club Jules Gonin & The Retina Society**
15 – 20 October, 2006, Capetown
- **XVII International Congress of Eye Research (ICER)**
29 October – 4 November 2006, Buenos Aires, Argentina
- **American Academy of Ophthalmology 2006 Annual Meeting**
11 – 14 November 2006, Las Vegas, USA
- **3rd Affymetrix Asia Pacific User Group Meeting**
12 – 13 November 2006, Singapore
- **International Neuro-Ophthalmology Society**
28 November – 2 December 2006, Tokyo, Japan
- **SALAS 2nd Fall Conference**
30 November – 1 December 2006, Singapore
- **12th Annual Meeting of the Kyoto Cornea Club in Tokyo**
1 – 2 December 2006, Japan
- **South East Asia Glaucoma Interest Group (SEAGIG)**
1 – 3 December 2006, Chennai, India
- **Asia – ARVO Meeting**
2 – 5 March 2007, Singapore
- **Annual Joint Meeting on Immunology Teaching and Research**
9 March 2007, Hanoi, Vietnam



SGH 15th Annual Scientific Meeting, Singapore



19th Asia-Pacific Association Of Cataract & Refractive Surgeons Meeting, Singapore



Minister for Health, Singapore

Awards

Dr Eranga Vithana, Senior Research Fellow, SERI
SGH 15th ANNUAL SCIENTIFIC MEETING, SINGAPORE
 22 APRIL 2006

- **Best Oral Paper (Scientist) Award**
 The Identification and Characterization of the Gene Responsible for Autosomal Recessive Congenital Hereditary Endothelial Dystrophy (CHED2).

Assoc Prof Wong Tien Yin, Assoc Director, International Activities, SERI
COMMONWEALTH HEALTH MINISTER'S AWARD
 JUNE 2006

- **The Commonwealth Health Minister's Award for Excellence in Medical Research**
 The annual award, made in recognition of outstanding individual achievement in health and medical research in Australia.

Prof Wallace Foulds, Senior Consultant, SERI
21st CONGRESS OF THE ASIA-PACIFIC ACADEMY OF OPHTHALMOLOGY, SINGAPORE
 10 – 13 JUNE 2006

- **Zhang Xiao-Lou Lecture Award**
 Alterations in the Pattern of Eye Disorders Over Time and Location.

Prof Donald Tan, Director, SERI
19th ASIA-PACIFIC ASSOCIATION OF CATARACT & REFRACTIVE SURGEONS MEETING, SINGAPORE
 10 – 13 JUNE 2006

- **APACRS Medal Award 2006**
 The APACRS Medal has honoured outstanding Asian ophthalmologists by awarding them with the APIIA Medal for their contributions to ophthalmology in Asia for service, teaching or research, and in advancing regional and Asian organizations.

Prof Donald Tan, Director, SERI
MINISTER FOR HEALTH, SINGAPORE
 10 JULY 2006

- **Minister for Health Award, Outstanding Performance in Public Health**
 Outbreak of Fusarium Keratitis, 2006.
 The Award pays tribute to the competence of our healthcare professionals and healthcare system. The findings by our healthcare professionals led the MOH to issue its first public alert to the rising incidence of contact lens related fungal corneal infection.

Assoc Prof Wong Tien Yin, Assoc Director, International Activities, SERI
42nd ANNUAL MEETING OF THE EUROPEAN ASSOCIATION FOR THE STUDY OF DIABETES (EASD), COPENHAGEN
 14 – 17 SEPTEMBER 2006

- **Novartis Young Investigator's Award**
 Novartis Young Investigator's Award is awarded for the significant achievements in researching diabetes risk and management.

Prof Donald Tan, Director, SERI
AMERICAN ACADEMY OF OPHTHALMOLOGY ANNUAL MEETING, LAS VEGAS
 11 – 14 NOVEMBER 2006

- **Distinguished Achievement Award 2006**
 The Distinguished Service Award honors an individual or organization for ongoing notable service to ophthalmology and to the Academy.



Singhealth Outstanding Publication Award

Awards cont'd

**Assoc Prof Aung Tin, Assoc Director, Education & Training,
Dr Eranga Vithana, Senior Research Fellow, SERI**

SINGHEALTH OUTSTANDING PUBLICATION AWARD

22 NOVEMBER 2006

- **Singhealth Outstanding Publication Award 2006**

The award recognises SingHealth investigators who have made outstanding contributions to the global body of scientific literature in the past year.

Assoc Prof Aung Tin, Assoc Director, Education, SERI
**22nd CONGRESS OF THE ASIA-PACIFIC ACADEMY OF
OPHTHALMOLOGY, LAHORE, PAKISTAN**

24 - 28 FEBRUARY 2007

- **Nakajima Award**

Nakajima Award from the Asia Pacific Academy of Ophthalmology for outstanding contribution to research in Ophthalmology.

**Assoc Prof Wong Tien Yin, Assoc Director,
International Activities, SERI**

SINGHEALTH

20 MARCH 2007

- **GCEO Excellence Awards 2007 (Research)**

The GCEO Excellence Awards are SingHealth highest tribute to excellence at the workplace, recognizing exemplary professionals in the Institutions who exhibit excellence in their work and who demonstrate SingHealth core values. The Research award is to recognize excellence in pure "research" and "clinical science".

Publications

April 2006 – March 2007

1. **Amrith S, Goh PS, Wang SC.** Lacrimal sac volume measurement during eyelid closure and opening. *Clin Experiment Ophthalmol* 2007; 35(2):135-139. (Impact Factor: 1.193)
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Financial Statement

The Straits Times, Tuesday, 1 August 2006, Pg H1

By SALMA KHALIK
Health Correspondent

SCIENTISTS here have identified the gene that causes a rare congenital blindness in children, which may well give clues to why the elderly lose their sight.

The team from the Singapore Eye Research Institute (Seri) started its research after director Donald Tan operated on a 12-year-old blind boy in Myanmar two years ago.

The boy had three other blind siblings with the same rare disease, known as congenital hereditary endothelial dystrophy.

By examining blood samples from all four, the team identified the gene responsible for turning off a protein needed to keep the cornea functioning properly.

Blindness results when the cornea, which is the transparent layer at the front of the eye, turns cloudy.

Dr Tan said. "So if we find this gene, we can find out one way the cornea goes cloudy."

"Diseases occur in similar ways, and there are just so many ways the cornea can turn cloudy."

The elderly usually have multiple defective genes, so it is difficult to pinpoint the one responsible for the faulty gene in a child, therefore narrows down the search for it in an elderly person.

Dr Tan, who is also the deputy director of the Singapore National Eye Centre (SNEC), the main benefit of identifying the gene linked to a particular disease is that it makes it possible to identify and treat the disease early.

Scientists here find gene that causes blindness in kids

Discovery of gene may also help treat blindness in elderly

Associate Professor Tin Tin of Seri and SNEC, the study team leader, said that, because the cornea is on the surface of the eye and easily accessible, doctors may be able to tweak the related gene in the elderly to stave off blindness.

Humans have about 25,000 genes. So far, only about 400 human genes have been successfully linked to diseases.

The Singapore find adds to the list.

The team's discovery was published last month in *Nature Genetics*, a prestigious scientific journal.

Dr Ersanga Vithana, a geneticist with Seri and the lead scientist, said the disease affecting the Myanmar family is so rare, doctors had to consult their colleagues in India, Britain and Canada who have seen similar cases. He said he was sure it was the same gene that plays each time.

Eye surgeons here do 40 to 50

corneal transplants a year on elderly people who become blind because a layer of their cornea turns cloudy.

The disease, known as Fuchs' endothelial dystrophy, accounts for one in five corneal transplants here.

Praising the team's work, Professor Edison Liu, who heads the Genome Institute of Singapore, said the discovery is significant regardless how widespread this eye disease is across the population, studies like these shed light on how genes work and how they can fail.

He said of the study: "The major advance is that Singapore scientists have mounted such a sophisticated genetic analysis."

salma@spli.com.sg

Directors' Report

We are pleased to submit this annual report to the member of the Company, together with the audited financial statements for the financial year ended 31 March 2007.

Directors

The directors in office at the date of this report are as follows:

CI Prof Ang Chong Lye
Prof Donald Tan Tiang Hwee
BG A/Prof Lee Kim Hock Lionel
Mr Wong Yew Meng
Prof Wong Eu-Li
Prof Patrick John Casey
Dr Loh Yik Hin

Directors' interests

According to the register kept by the Company for the purposes of Section 164 of the Companies Act, Chapter 50 (the "Act"), no director who held office at the end of the financial year (including those held by their spouses and infant children) had interests in shares or debentures of the Company, or of related corporations, either at the beginning or at end of the financial year.

Neither at the end of, nor at any time during the financial year, was the Company a party to any arrangement whose objects are, or one of whose objects is, to enable the directors to acquire benefits by means of the acquisition of shares in or debentures of the Company or any other body corporate.

Since the end of the last financial year, no director has received or become entitled to receive, a benefit (except for emoluments received by a director of the Company from related corporations), by reason of a contract made by the Company or a related corporation with the director, or with a firm of which he is a member, or with a company in which he has a substantial financial interest.

Share options

During the financial year, there were :

- (i) no options granted by the Company to any person to take up unissued shares in the Company; and
- (ii) no shares issued by virtue of any exercise of option to take up unissued shares of the Company.

As at the end of the financial year, there were no unissued shares of the Company under option.

Auditors

The auditors, Ernst and Young, have indicated their willingness to accept re-appointment.

Signed by the Board of Directors



CI Prof Ang Chong Lye
Director

Singapore



Prof Donald Tan Tiang Hwee
Director

Statement by Directors

In our opinion:

- (a) the financial statements set out on pages 5 to 21 are drawn up so as to give a true and fair view of the state of affairs of the Company as at 31 March 2007 and the financial performance and cash flows of the Company for the year ended on that date in accordance with the provisions of the Singapore Companies Act, Chapter 50 and Singapore Financial Reporting Standards; and
- (b) at the date of this statement, there are reasonable grounds to believe that the Company will be able to pay its debts as and when they fall due.

The Board of Directors has, on the date of this statement, authorised these financial statements for issue.

Signed by the Board of Directors



CI Prof Ang Chong Lye
Director



Prof Donald Tan Tiang Hwee
Director

Singapore

Independent Auditors' Report

To the member of Singapore Eye Research Institute

We have audited the accompanying financial statements of Singapore Eye Research Institute (the "Company"), which comprise the balance sheet of the Company as at 31 March 2007, the income and expenditure account and cash flow statement of the Company for the year then ended, and a summary of significant accounting policies and other explanatory notes, as set out on pages 5 to 21.

Directors' responsibility for the financial statements

The Company's directors are responsible for the preparation and fair presentation of these financial statements in accordance with the provisions of the Singapore Companies Act, Chapter 50 (the "Act") and Singapore Financial Reporting Standards. This responsibility includes: designing, implementing and maintaining internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditors' responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Singapore Standards on Auditing. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free of material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion,

- (i) the financial statements of the Company are properly drawn up in accordance with the provisions of the Act and Singapore Financial Reporting Standards so as to give a true and fair view of the state of affairs of the Company as at 31 March 2007 and the financial performance and cash flows of the Company for the year ended on that date; and
- (ii) the accounting and other records required by the Act to be kept by the Company have been properly kept in accordance with the provisions of the Act.

ERNST & YOUNG
Certified Public Accountants

Singapore

Balance Sheet

as at 31 March 2007

| | Note | 2007 \$ | 2006 \$ |
|---|------|------------|------------|
| Non-current assets | | | |
| Property, plant and equipment | 3 | 3,537,814 | 3,829,235 |
| Intangible assets | 4 | 59,899 | 69,411 |
| | | <hr/> | <hr/> |
| | | 3,597,713 | 3,898,646 |
| Current assets | | | |
| Trade and other receivables | 5 | 973,449 | 744,664 |
| Cash and cash equivalents | 6 | 3,047,407 | 3,019,330 |
| | | <hr/> | <hr/> |
| | | 4,020,856 | 3,763,994 |
| Total assets | | <hr/> | <hr/> |
| | | 7,618,569 | 7,662,640 |
| Accumulated fund | | | |
| | 7 | <hr/> | <hr/> |
| | | 1,783,566 | 2,329,327 |
| Non-current liability | | | |
| Deferred capital expenditure grant | 8 | <hr/> | <hr/> |
| | | 2,807,450 | 2,791,686 |
| Current liabilities | | | |
| Trade and other payables | 9 | 2,174,358 | 1,379,308 |
| Deferred capital expenditure grant | 8 | 766,090 | 1,078,039 |
| Employee benefits | 11 | 87,105 | 84,280 |
| | | <hr/> | <hr/> |
| | | 3,027,553 | 2,541,627 |
| Total liabilities | | <hr/> | <hr/> |
| | | 5,835,003 | 5,333,313 |
| Total accumulated fund and liabilities | | <hr/> | <hr/> |
| | | 7,618,569 | 7,662,640 |

The accompanying notes form an integral part of the financial statements.

Income and Expenditure Account

for the year ended 31 March 2007

| | Note | 2007 \$ | 2006 \$ |
|---|------|-------------|-------------|
| NMRC operating expenditure grant | 12 | 3,471,928 | 3,282,490 |
| Other operating expenditure grant | | 2,393,999 | 1,692,762 |
| NMRC capital expenditure grant | 12 | 392,875 | 386,120 |
| Other capital expenditure grant | | 388,774 | 379,156 |
| Other income | | 1,494,404 | 1,172,420 |
| | | <hr/> | <hr/> |
| | | 8,141,980 | 6,912,948 |
| Staff costs | | (5,194,960) | (3,762,301) |
| Supplies and consumables | | (1,219,064) | (880,463) |
| Depreciation of property, plant and equipment | | (743,608) | (733,094) |
| Amortisation of intangible assets | | (37,282) | (27,473) |
| Rental and utilities | | (153,050) | (180,639) |
| Purchased and contracted services | | (117,963) | (129,699) |
| Repair and maintenance | | (271,916) | (230,830) |
| Other operating expenses | | (953,360) | (373,415) |
| | | <hr/> | <hr/> |
| Results from operating activities | | (549,223) | 595,034 |
| | | <hr/> | <hr/> |
| Finance income | | 31,690 | 9,921 |
| Finance expense | | (28,228) | - |
| | | <hr/> | <hr/> |
| Net finance income | 13 | 3,462 | 9,921 |
| | | <hr/> | <hr/> |
| (Loss)/surplus before income tax | | (545,761) | 604,955 |
| | | <hr/> | <hr/> |
| Income tax | 14 | - | - |
| | | <hr/> | <hr/> |
| (Loss)/surplus for the year | 15 | (545,761) | 604,955 |
| Accumulated surplus brought forward | | 2,329,327 | 1,724,372 |
| | | <hr/> | <hr/> |
| Accumulated surplus carried forward | | 1,783,566 | 2,329,327 |

The Company had no other changes in shareholders' equity except for loss after tax of \$545,761 (2006 : \$604,955) for the financial year ended 31 March 2007.

The accompanying notes form an integral part of the financial statements.

Cash Flow Statement

for the year ended 31 March 2007

| | 2007 | 2006 |
|---|-----------|-----------|
| | \$ | \$ |
| Operating activities | | |
| (Loss)/surplus before income tax | (545,761) | 604,955 |
| Adjustments for: | | |
| Depreciation of property, plant and equipment | 743,608 | 733,094 |
| Amortisation of intangible assets | 37,282 | 27,473 |
| Loss on disposal of property, plant and equipment | 12,751 | 11,674 |
| Amortisation of deferred capital expenditure grant | (768,898) | (753,601) |
| | (521,018) | 623,595 |
| Changes in working capital : | | |
| Trade and other receivables | (228,785) | 1,076,514 |
| Trade and other payables | 797,875 | (251,198) |
| Cash flows from operating activities | 48,072 | 1,448,911 |
| Investing activities | | |
| Purchase of : | | |
| Property, plant and equipment | (464,938) | (859,888) |
| Intangible assets | (27,770) | (56,502) |
| Donations for capital expenditure | 472,713 | 871,394 |
| Cash flows used in investing activities | (19,995) | (44,996) |
| Net increase in cash and cash equivalents | 28,077 | 1,403,915 |
| Cash and cash equivalents at beginning of the year | 3,019,330 | 1,615,415 |
| Cash and cash equivalents at end of the year | 3,047,407 | 3,019,330 |

The accompanying notes form an integral part of the financial statements.

Notes to the Financial Statements

31 March 2007

These notes form an integral part of the financial statements.

The financial statements were authorised for issue by the Board of Directors on 31 March 2007.

1. Domicile and activities

Singapore Eye Research Institute (the "Company") is incorporated in the Republic of Singapore and has its registered office at 31 Third Hospital Avenue, #03-03 Bowyer Block, Singapore 168753. The address of its principal place of business is 11 Third Hospital Avenue, #05/06-00 SNEC Building, Singapore 168751.

The principal activity of the Company is to carry out eye-related medical research projects.

The immediate and ultimate holding companies during the financial year were Singapore National Eye Centre Pte Ltd and MOH Holdings Pte Ltd. Both were incorporated in Singapore. The Company, limited by guarantee has been registered as a Charity, under the Charities Act, Cap. 37 with effect from 27 November 2002.

2. Summary of significant accounting policies

2.1 Basis of preparation

The financial statements are prepared in accordance with Singapore Financial Reporting Standards ("FRS").

The financial statements have been prepared on a historical cost basis except as disclosed in the accounting policies set out below.

The financial statements are presented in Singapore dollars which is the Company's functional currency. All financial information is presented in Singapore dollars.

The preparation of financial statements requires management to make judgements, estimates and assumptions that affect the application of accounting policies and reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised and in any future periods affected.

In particular, information about significant areas of estimation uncertainty and critical judgements in applying accounting policies that have the most significant effect on the amount recognised in the financial statements are described in Note 16.

The accounting policies used by the Company have been applied consistently to all periods presented in these financial statements.

2.2 Foreign currencies

Transactions in foreign currencies are translated to the respective functional currencies of the Company at the exchange rate at the date of the transaction. Monetary assets and liabilities denominated in foreign currencies at the reporting date are retranslated to the functional currency at the exchange rate at the reporting date. Non-monetary assets and liabilities denominated in foreign currencies that are measured at fair value are retranslated to the functional currency at the exchange rate at the date on which the fair value was determined.

Foreign currency differences arising on retranslation are recognised in the income and expenditure account.

Notes to the Financial Statements cont'd

2. Summary of significant accounting policies (cont'd)

2.3 Property, plant and equipment

Property, plant and equipment are stated at cost less accumulated depreciation and impairment losses.

Low value assets costing less than \$1,000 individually are written off in the period of outlay.

Donated property, plant and equipment received costing less than \$1,000 are written off in the period of receipt. The corresponding donation income is recognised in the income and expenditure account in the period of receipt. Donated property, plant and equipment received costing more than \$1,000 are capitalised and depreciated over their useful lives so as to match the related amortisation of the deferred income (see note 2.9).

Depreciation is recognised in the income and expenditure account on a straight-line basis over their estimated useful lives (or lease term, if shorter) of each part of an item of property, plant and equipment.

The estimated useful lives are as follows:

| | |
|----------------------------------|----------|
| Building improvements | 10 years |
| Medical and laboratory equipment | 8 years |
| Computer equipment | 3 years |
| Office equipment | 5 years |
| Furniture and fittings | 8 years |

Depreciation methods, useful lives and residual values are reviewed, and adjusted as appropriate, at each reporting date.

2.4 Intangible assets

Computer software, which is not an integral part of the related hardware, is accounted for as an intangible asset and is stated at cost less accumulated amortisation and impairment losses.

No amortisation is provided on software development-in-progress.

Amortisation of computer software is charged to the income and expenditure account on a straight-line basis over its estimated useful life of 3 to 5 years.

2.5 Financial instruments

Non-derivative financial instruments

Non-derivative financial instruments comprise trade and other receivables, cash and cash equivalents, financial liabilities, and trade and other payables.

Non-derivative financial instruments are recognised initially at fair value plus, for instruments not at fair value through profit or loss, any directly attributable transaction costs, except as described below. Subsequent to initial recognition, non-derivative financial instruments are measured as described below.

A financial instrument is recognised if the Company becomes a party to the contractual provisions of the instrument. Financial assets are derecognised if the Company's contractual rights to the cash flows from the financial assets expire or if the Company transfers the financial asset to another party without retaining control or transfers substantially all the risks and rewards of the asset. Regular way purchases and sales of financial assets are accounted for at trade date, i.e., the date that the Company commits itself to purchase or sell the asset. Financial liabilities are derecognised if the Company's obligations specified in the contract expire or are discharged or cancelled.

Cash and cash equivalents comprise cash balances and bank deposits.

Notes to the Financial Statements cont'd

2. Summary of significant accounting policies (cont'd)

2.5 Financial instruments (cont'd)

Other

Other non-derivative financial instruments are measured at amortised cost using the effective interest method, less any impairment losses.

Impairment of financial assets

A financial asset is considered to be impaired if objective evidence indicates that one or more events have had a negative effect on the estimated future cash flows of that asset.

An impairment loss in respect of a financial asset measured at amortised cost is calculated as the difference between its carrying amount, and the present value of the estimated future cash flows discounted at the original effective interest rate.

Individually significant financial assets are tested for impairment on an individual basis. The remaining financial assets are assessed collectively in groups that share similar credit risk characteristics.

All impairment losses are recognised in the income and expenditure account.

An impairment loss is reversed if the reversal can be related objectively to an event occurring after the impairment loss was recognised. For financial assets measured at amortised cost, the reversal is recognised in the income and expenditure account.

2.6 Leases

When the Company is a lessee of an operating lease

Where the Company has the use of assets under operating leases, payments made under the leases are recognised in the income and expenditure account on a straight-line basis over the term of the lease. Lease incentives received are recognised in the income and expenditure account as an integral part of the total lease payments made. Contingent rentals are charged to the income and expenditure account in the accounting period in which they are incurred.

2.7 Impairment – non-financial assets

The carrying amounts of the Company's non-financial assets, are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, the assets' recoverable amounts are estimated.

An impairment loss is recognised if the carrying amount of an asset or its cash-generating unit exceeds its recoverable amount. A cash-generating unit is the smallest identifiable asset group that generates cash flows that largely are independent from other assets and groups. Impairment losses are recognised in the income and expenditure account unless it reverses a previous revaluation, credited to equity, in which case it is charged to equity.

The recoverable amount of an asset or cash-generating unit is the greater of its value in use and its fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset or cash-generating unit.

Impairment losses recognised in prior periods are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been recognised.

Notes to the Financial Statements cont'd

2. Summary of significant accounting policies (cont'd)

2.8 Employee benefits

Defined contribution plans

Obligations for contributions to defined contribution pension plans are recognised as an expense in the income and expenditure account as incurred.

Short-term benefits

Short-term employee benefit obligations are measured on an undiscounted basis and are expensed as the related service is provided.

A provision is recognised for the amount expected to be paid under short-term cash bonus or profit-sharing plans if the Company has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be estimated reliably.

2.9 Income recognition

Donation income

Donations, other than those specified below, are recognised in the income and expenditure account in the period of receipt.

Property, plant and equipment and cash donation received, which is designated for property, plant and equipment purchases whose individual value is more than \$1,000 is taken to deferred income in the period of receipt. The deferred income is amortised over the useful life of the property, plant and equipment by crediting to the income and expenditure account an amount so as to match the related depreciation expense. Cash donation which is designated for specific use other than for property, plant and equipment purchases is taken to donation fund account in the period of receipt. The donation income is recognised in the income and expenditure account when the relevant expenditure is incurred.

Grant income

Grant income designated for research purposes is recognised in the income and expenditure account when the relevant qualifying costs are incurred.

Sponsorships

Sponsorships which are designated for specific events are taken to a sponsorship fund account. Sponsorship income is recognised in the income and expenditure account when relevant expenditures have been incurred. Net surplus or deficit is only taken to income and expenditure account when the relevant event is completed.

2.10 Research and development

Expenditure on research activities, undertaken with the prospect of gaining new scientific or technical knowledge and understanding, is recognised in the income and expenditure account as an expense when it is incurred.

2.11 Finance income and expense

Finance income comprises interest income on funds invested and foreign currency gains that are recognised in the income and expenditure account. Interest income is recognised as it accrues, using the effective interest method.

Finance expenses comprise foreign currency losses and impairment losses recognised on financial assets that are recognised in the income and expenditure account.

Notes to the Financial Statements cont'd

2. Summary of significant accounting policies (cont'd)

2.12 Income tax expense

Income tax expense comprises current and deferred tax. Income tax expense is recognised in the income and expenditure account except to the extent that it relates to items recognised directly in equity, in which case it is recognised in equity.

Current tax is the expected tax payable on the taxable income for the year, using tax rates enacted or substantively enacted at the reporting date, and any adjustment to tax payable in respect of previous years.

Deferred tax is recognised using the balance sheet method, providing for temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognised for the temporary differences arising from the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit. Deferred tax is measured at the tax rates that are expected to be applied to the temporary differences when they reverse, based on the laws that have been enacted or substantively enacted by the reporting date.

A deferred tax asset is recognised to the extent that it is probable that future taxable profits will be available against which temporary differences can be utilised. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realised.

The Company has been registered as a Charity, under Charities Act, Cap. 37 with effect from 27 November 2002. The tax liability on the Company's income is regulated by Section 13M of the Singapore Income Tax Act.

3. Property, plant and equipment

| | Computers \$ | Medical and laboratory equipment \$ | Office equipment \$ | Furniture and fittings \$ | Building improvements \$ | Total \$ |
|----------------------------------|-----------------|--|---------------------------|---------------------------------|--------------------------------|-------------|
| Cost | | | | | | |
| As at 1 April 2005 | 212,649 | 5,288,675 | 90,234 | 527,551 | 1,019,090 | 7,138,199 |
| Additions | 165,990 | 669,758 | - | 24,140 | - | 859,888 |
| Disposals | (20,283) | - | (4,057) | - | - | (24,340) |
| As at 31 March 2006 | 358,356 | 5,958,433 | 86,177 | 551,691 | 1,019,090 | 7,973,747 |
| Additions | 21,083 | 443,855 | - | - | - | 464,938 |
| Disposals | (18,310) | (28,600) | (1,487) | - | - | (48,397) |
| As at 31 March 2007 | 361,129 | 6,373,688 | 84,690 | 551,691 | 1,019,090 | 8,390,288 |
| Accumulated depreciation | | | | | | |
| As at 1 April 2005 | 161,483 | 2,475,540 | 70,057 | 417,613 | 299,391 | 3,424,084 |
| Depreciation charge for the year | 41,330 | 522,618 | 5,967 | 61,270 | 101,909 | 733,094 |
| Disposals | (11,180) | - | (1,486) | - | - | (12,666) |
| As at 31 March 2006 | 191,633 | 2,998,158 | 74,538 | 478,883 | 401,300 | 4,144,512 |
| Depreciation charge for the year | 71,705 | 547,680 | 4,349 | 17,965 | 101,909 | 743,608 |
| Disposals | (18,310) | (15,914) | (1,422) | - | - | (35,646) |
| As at 31 March 2007 | 245,028 | 3,529,924 | 77,465 | 496,848 | 503,209 | 4,852,474 |

Notes to the Financial Statements cont'd

3. Property, plant and equipment (cont'd)

| | Computers \$ | Medical and laboratory equipment \$ | Office equipment \$ | Furniture and fittings \$ | Building improvements \$ | Total \$ |
|------------------------|-----------------|--|---------------------------|---------------------------------|--------------------------------|-------------|
| Carrying amount | | | | | | |
| At 1 April 2005 | 51,166 | 2,813,135 | 20,177 | 109,938 | 719,699 | 3,714,115 |
| At 31 March 2006 | 166,723 | 2,960,275 | 11,639 | 72,808 | 617,790 | 3,829,235 |
| At 31 March 2007 | 116,101 | 2,843,764 | 7,225 | 54,843 | 515,881 | 3,537,814 |

4. Intangible assets

| | \$ |
|----------------------------------|---------|
| Cost | |
| At 1 April 2005 | 87,714 |
| Additions | 56,502 |
| At 31 March 2006 | 144,216 |
| At 1 April 2006 | 144,216 |
| Additions | 27,770 |
| At 31 March 2007 | 171,986 |
| Accumulated amortisation | |
| At 1 April 2005 | 47,332 |
| Amortisation charge for the year | 27,473 |
| At 31 March 2006 | 74,805 |
| At 1 April 2006 | 74,805 |
| Amortisation charge for the year | 37,282 |
| At 31 March 2007 | 112,087 |
| Carrying amount | |
| At 1 April 2005 | 40,382 |
| At 31 March 2006 | 69,411 |
| At 31 March 2007 | 59,899 |

Notes to the Financial Statements cont'd

5. Trade and other receivables

| | 2007 \$ | 2006 \$ |
|---------------------------------------|------------|------------|
| Deposits, prepayments and receivables | 696,252 | 671,010 |
| Amounts due from : | | |
| Immediate holding company | | |
| - trade | 169,303 | - |
| - non-trade | 21,889 | - |
| Pen-ultimate holding company | | |
| - trade | 82,551 | 73,654 |
| Related corporation | | |
| - trade | 3,454 | - |
| | 973,449 | 744,664 |

The non-trade amount due from immediate holding company is unsecured, interest-free and repayable on demand. Transactions are concluded on terms agreed between the Company and its immediate holding company. There is no allowance for doubtful receivables arising from outstanding balances.

6. Cash and cash equivalents

Cash at bank balances earn interest at floating rates based on daily bank deposit rates ranging from 0.69% to 1.20% (2005: 1% to 1.5%) per annum.

7. Accumulated fund

The Company is limited by guarantee and has no share capital. The accumulated fund represents the cumulative surplus of the Company.

8. Deferred capital expenditure grant

| | 2007 \$ | 2006 \$ |
|---------------------------|------------|------------|
| At cost | 8,518,808 | 8,081,741 |
| Less : | | |
| Accumulated amortisation | | |
| At 1 April | 4,212,016 | 3,471,081 |
| Amortisation for the year | 768,898 | 753,601 |
| Disposal | (35,646) | (12,666) |
| At 31 March | 4,945,268 | 4,212,016 |
| | 3,573,540 | 3,869,725 |
| Non-current | 2,807,450 | 2,791,686 |
| Current | 766,090 | 1,078,039 |
| | 3,573,540 | 3,869,725 |

Notes to the Financial Statements cont'd

9. Trade and other payables

| | 2007 | 2006 |
|----------------------------|------------------|------------------|
| | \$ | \$ |
| Trade payables | 493,437 | 538,429 |
| Accrued operating expenses | 1,074,428 | 233,961 |
| Amounts due to : | | |
| Immediate holding company | | |
| - trade | - | 16,572 |
| Related corporations | | |
| - trade | 102,406 | 9,873 |
| Other payables | 11 504,087 | 580,473 |
| | <u>2,174,358</u> | <u>1,379,308</u> |

10. Other payables

| | 2007 | 2006 |
|--------------------------------------|----------------|----------------|
| | \$ | \$ |
| Amount held on behalf of researchers | - | 49,110 |
| Donation funds | - | 110,254 |
| Research funds | - | 347,920 |
| Advances from sponsors | 312,096 | - |
| Others | 191,991 | 73,189 |
| | <u>504,087</u> | <u>580,473</u> |

11. Employee benefits

| | 2007 | 2006 |
|--|--------|--------|
| | \$ | \$ |
| Liability for short term accumulating compensated absences | 87,105 | 84,280 |

12. NMRC operating/capital expenditure grants

The Company's operation is funded primarily from grants from National Medical Research Council ("NMRC").

Notes to the Financial Statements cont'd

13. Finance income and expense

| | 2007 \$ | 2006 \$ |
|---|------------|------------|
| Interest income from financial institutions | (31,690) | (9,862) |
| Exchange gain | - | (59) |
| Finance income | (31,690) | (9,921) |
| Bad debts written off | 16,614 | - |
| Exchange loss | 11,614 | - |
| Finance expense | 28,228 | - |
| Net finance income | (3,462) | (9,921) |

14. Income tax

The Company is a non-profit organisation registered with the Commissioner of Charities under the Charities Act. The tax liability on the Company's income is regulated by Section 13M of the Singapore Income Tax Act. No provision for taxation has been made in the financial statements as the directors are of the opinion that the Company will be able to comply with the conditions of Section 13M2(b) of the Singapore Income Tax Act.

15. (Loss)/surplus for the year

The following items have been included in arriving at (loss)/surplus for the year :

| | 2007 \$ | 2006 \$ |
|---|------------|------------|
| Amortisation of deferred capital expenditure grant | (768,898) | (753,601) |
| Operating lease expense | 12,102 | 10,559 |
| Contribution to defined contribution plan included in staff costs | 350,903 | 249,194 |
| Loss on disposal of property, plant and equipment | 12,751 | 11,674 |

16. Accounting estimates and judgements

Estimates and judgements are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances.

The selection of critical accounting policies, the judgements and other uncertainties affecting application of those policies and the sensitivity of reported results to changes in condition and assumptions are factors to be considered when reviewing the financial statements. The Company believes the following critical accounting policies involve the most significant judgements and estimates used in the preparation of the financial statements.

Notes to the Financial Statements cont'd

16. Accounting estimates and judgements (cont'd)

Useful lives of property, plant and equipment and intangible assets

Property, plant and equipment and intangible assets, are stated at cost and are amortised on a straight-line basis over their estimated useful lives. The estimated useful lives represent our estimate of the periods that management expects to derive economic benefits from these assets. In estimating these useful lives and in determining whether subsequent revisions to useful lives are necessary, the management considers the likelihood of technical obsolescence arising from changes in technology and intended use.

Valuation of receivables

The Company evaluates whether there is any objective evidence that receivables are impaired, and determines the amount of impairment loss as a result of the inability of the debtors to make required payments. The Company determines the estimates based on the financial health of the debtors, ageing of the receivables balance, credit-worthiness, and the historical write-off experience. If the financial conditions of the debtors were to deteriorate, actual write-offs would be higher than estimated.

17. Financial instruments

Risk management is integral to the whole business of the Company. The Company has a system of controls in place to create an acceptable balance between the cost of risks occurring and the cost of managing the risks. The management continually monitors the Company's risk management process to ensure that an appropriate balance between risk and control is achieved.

Credit risk

Credit risk is the potential financial loss resulting from the failure of a customer or a counterparty to settle its financial and contractual obligations to the Company, as and when they fall due.

Cash and fixed deposits are placed with financial institutions which are regulated.

At the balance sheet date, there is no significant concentration of credit risk. The maximum exposure to credit risk is represented by the carrying amount of each financial asset in the balance sheet.

Liquidity risk

The Company's operation is funded primarily from grants from National Medical Research Council. As such, the Company's exposure to liquidity risk is minimised.

Interest rate risk

The Company's exposure to market risk for changes in interest rates relates primarily to the Company's fixed deposits with financial institutions. The Company manages its interest rate risks by placing such balances on varying maturities and interest rate terms.

Foreign currency risk

The financial assets and liabilities of the Company are primarily denominated in Singapore dollars. The Company has no significant exposure to foreign currency risk.

Estimation of fair values

The notional amounts of financial assets and liabilities with a maturity of less than one year (including trade and other receivables, cash and cash equivalents, and trade and other payables) are assumed to approximate their fair values because of the short period to maturity.

Notes to the Financial Statements cont'd

18. Commitments

As at 31 March 2007, the Company had commitments for future minimum lease payments under non-cancelled leases as follows :

| | 2007 | 2006 |
|-----------------------------------|--------|--------|
| | \$ | \$ |
| - Within 1 year | 8,606 | 8,606 |
| - After 1 year but within 5 years | 16,268 | 24,873 |
| | 24,874 | 33,479 |

19. Related parties

Other than disclosed elsewhere in the financial statements, the transactions with related parties are as follows:

| | 2007 | 2006 |
|-------------------------------|---------|---------|
| | \$ | \$ |
| Sale of services | | |
| - Penultimate holding company | 25,596 | 63,908 |
| - Immediate holding company | 570,152 | 317,811 |
| - Related corporation | 31,281 | - |
| Purchase of services | | |
| - Penultimate holding company | 9,185 | 8,436 |
| - Immediate holding company | 333,977 | 439,358 |
| - Related corporation | 152,494 | 81,226 |

The Company occupies space at the premises of its holding company. The rental rate of \$350,495 per annum is waived by the holding company.

20. Comparative information

Change in classification

During the current year, the Company modified the income and expenditure account classification of reversal of allowance for doubtful receivables and exchange gain from other operating expenses to finance income; impairment made for doubtful receivables, and bad debts written off from other operating expenses to finance expense; and interest income from other operating income to finance income. Comparative amounts were reclassified for consistency.

Notes to the Financial Statements cont'd

21. New accounting standards and interpretations not yet adopted

The Company has not applied the following accounting standards and interpretations that have been issued as of the balance sheet date but are not yet effective:

- FRS 40 *Investment Property*
- FRS 107 *Financial Instruments: Disclosures and Amendment to FRS 1 Presentation of Financial Statements: Capital Disclosures*
- FRS 108 *Operating Segments*
- INT FRS 107 *Applying the Restatement Approach under FRS 29 Financial Reporting in Hyperinflationary Economies*
- INT FRS 108 *Scope of FRS 102 Share-based Payment*
- INT FRS 109 *Reassessment of Embedded Derivatives*
- INT FRS 110 *Interim Financial Reporting and Impairment*
- INT FRS 111 *FRS 102 Group and Treasury Share Transactions*
- INT FRS 112 *Service Concession Arrangements*
- Amendments to FRS 2 *Inventories*
- Amendments to FRS 7 *Cash Flow Statements*
- Amendments to FRS 19 *Employee Benefits*
- Amendments to FRS 27 *Consolidated and Separate Financial Statements*
- Amendments to FRS 33 *Earnings Per Share*
- Amendments to FRS 34 *Interim Financial Reporting*
- Amendments to FRS 36 *Impairment of Assets*
- Amendments to FRS 101 *First-Time Adoption of Financial Reporting Standards*
- Amendments to FRS 105 *Non-current Assets Held for Sale and Discontinued Operations*
- Amendments to FRS 106 *Exploration for and Evaluation of Mineral Resources*
- Amendments to INT FRS 29 *Service Concession Arrangements : Disclosures*
- Amendments to INT FRS 104 *Determining Whether an Arrangement Contains a Lease*

FRS 107 and amended FRS 1, which become mandatory for the Company's 2008 financial statements, will require extensive additional disclosures with respect to the Company's financial instruments and share capital. This standard does not have any impact on the recognition and measurement of the Company's financial statements.

The Company has not considered the impact of the initial application of the standards and interpretations which have been issued but are not yet effective, on the financial statements of the Company.

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