



ASB NEWS

Nov 2006

Welcome

This second ASB NEWS of 2006 has a guest article from Professor Traian Chirila as well as society news items including an update on the travel awardees and general news items. Hope you will enjoy reading it.

Biomaterials Research at Queensland Eye Institute (QEI)

Guest article by Professor Traian Chirila

QEI is a new clinical and research facility dedicated to the investigation and treatment of eye pathological conditions, which was established and is supported by Prevent Blindness Foundation of Queensland. It started in 2005 as a clinical faculty with two ophthalmologists, Professor Lawrence Hirst and Dr Anthony Pane. The same year, Professor Traian Chirila, upon leaving the Lions Eye Institute and UWA (in Perth), accepted a position of Senior Scientist at QEI with the task of developing a research faculty to be mainly dedicated to ophthalmic biomaterials. Presently, his team at QEI consists of two other scientists (Drs Zainuddin and Zeke Barnard) who are joined by Dr Damien Harkin (visiting from QUT) and Dr Imelda Keen (visiting Research Fellow). Traian, who also holds honorary professorships with UQ (AIBN and School of Medicine) and QUT (School of Physical & Chemical Sciences), is actively involved in collaborative research on polymers and biomaterials with various groups at both universities, being recently a co-recipient of both an ARC-Discovery grant and funding through the Smart State Innovation Projects scheme. He is the Vision Program manager within the International Biomaterials Research Alliance.

The relatively small research team has planned a rather large number of biomaterials projects at QEI, and work is currently carried out on most of the projects. The main project is dedicated to polymers with improved cell attachment characteristics. The aim of this project is to provide substrata for corneal or conjunctival cell growth, an essential step in the creation of bioengineered constructs for ocular surface repair. One direction is the surface modification of synthetic hydrogels by chemical reaction or by high-energy laser irradiation. In another development, silk fibroin was isolated from raw silkworm (*Bombyx mori*) cocoons and made into films that proved to support the growth of corneal limbal stem cells. The films produced at QEI are currently used by Professor Schwab at University of California at Davis for the creation of bioengineered epithelial grafts to be used in the reconstruction of the eye surface, and by scientists at the Ear Science Institute in Perth for the development of bioengineered tympanic membranes. In parallel with cell adhesion experiments, the group is currently investigating the stability in time of the silk films, a collaborative work with QUT. Another project is the development of biodegradable scaffolds for tissue engineering that can be made in a one-pot/one-stage procedure. This research, which is supported by ARC, involves the synthesis and use of functionalized peptides as crosslinking agents, and the synthesis of linear polymers through controlled/living radical polymerization techniques (RAFT, ATRP) associated with a phase-separation process. It is a collaborative project involving Professors Andrew Whittaker (UQ), Murray Baker (UWA) and Heinz-Bernhard Kraatz (University of Saskatchewan). The group also plans to start soon work on new hydrogels as substitutes for the vitreous body in the eye.

The study of spontaneous calcification of synthetic hydrogels is another of Traian's and Zainuddin's ongoing research interests, which was supported in the past by an ARC grant and

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Call for Papers Closes: 31 January 2007

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included UQ's Professors Dave Hill and Andrew Whittaker. The investigation in detail of this process resulted in over 15 published papers so far. Methods to prevent the phenomenon in the hydrogels intended for ocular use are currently investigated, including manipulation of free volume in the polymer network, a project which also involves Drs Anita Hill (CSIRO in Melbourne) and David Richens (University of St Andrews, Scotland).

Beside biomaterials topics, work is carried out on ophthalmologic projects that do not necessarily require the use of polymers. Such topics include the study of selective enzymatic digestion of corneal collagens and the photoinduced crosslinking of corneal stromal collagen. The outcomes of these projects will have significant impact on the development of new surgical techniques for the anterior segment of the eye.

Reports from recipients of the ASB Travel Award 2006

This year three travel awards for students and early career researchers were awarded. Two of the awardees are currently overseas and have provided an update on their experiences so far. The third award recipient, Megan Lord, has delayed her trip and will give a report in the next newsletter.

1st prize was given to Mr Dave Nisbet of Monash University who is currently in the laboratory of Prof. Molly Shoichet at Toronto University:

“During my research at the University of Toronto (Canada), I have been investigating growth factor gradients within thermoreversible hydrogels and the interaction of neural stem cell with electrospun nanofibres. I have prepared a manuscript entitled “Characterization of neural stem cells on electrospun poly(ϵ -caprolactone) submicron scaffolds: evaluating their potential in neural tissue engineering” that will hopefully be submitted before the conclusion of my time over here

I would like to thank the ASB for this wonderful opportunity to not only fast track my research by providing me with an opportunity to work with one of the leaders in my field, but also for the chance to build international collaborations for the future.”



Dave Nisbet at Toronto University

3rd prize was given to Mr Kim Siow Univ South Australia to visit the Laboratory for Surface Science and Technology, Swiss Federal Institute of Technology (ETHZ):

“I arrived in Zurich 29 September 2006, and after two days of rest over the weekend, I started learning the operation of the optical waveguide lightmode spectroscopy (OWLS) and quartz crystal microbalance (Q-sense) instruments at the Biointerfaces Group of the Laboratory of Surface Science and Technology (LSSIT), Federal Institute of Technology. The aim of my research work here is to study the adsorption of proteins onto sulphated and phosphated surfaces prepared by plasma-based methods back in Adelaide. The people in the laboratory as well as those whom I meet in the streets are friendly and helpful, though a little bit of German language would have made my stay in Zurich easier.



Kim Siow at ETHZ

For the second week of my current visit, I travelled to Stuttgart, Germany to present my poster entitled "Functional coatings by plasma co-polymerisation" at the combined Second International Congress on Bio-Nano-Interface and Second International Congress on Regenerative Biology. The regenerative biology session of the conference was especially enlightening for someone like me who has a background in materials science and new to the field. The bio-nano-interface session was equally interesting with the latest innovations being presented by various research institutes and companies. The majority of the speakers were invited and hence the quality of the presentations was par excellence. After the conference, I came back to Zurich to continue my experimental work in the laboratory."

Member news item: Dr Michael Doran and Mr Andrew Rowlands report on the 2006 TERMIS-EU conference

The 2006 TERMIS-EU conference was recently held in Rotterdam, The Netherlands. A large amount of interesting work was presented by various groups from around the world, with the bulk of the presentations coming from European institutions. There was a great deal of work presented that focused on bone and 3D scaffolds derived from natural materials, especially collagens. However, perhaps the most interesting presentation was given by TS Shimizu who demonstrated his group's novel work on building 3D tissues via a layer-by-layer cellular deposition technique. This method permits the incorporation of various different cell types into a functional tissue and while the current approach is perhaps limited in terms of scale up, their results using cardiomyocytes to form a synchronized beating tissue are especially encouraging for the tissue engineering community as a whole. Deservedly, it was this talk that won the best presentation award at the meeting.

International representatives included an Australian contingent formed by Veronica Glattauer (CSIRO Victoria), Jos Malda (QUT

Queensland), Andrew Rowlands (UQ Queensland) and Michael Doran (UQ Queensland) whom together made six oral presentations. The progressive Australian work was well received and attracted the interest of the European crowd. This meeting offered the Australian crew both international exposure as well as the opportunity to assess our relative standing in the world forum.

The 2007 TERMIS-EU meeting will be held September 4-7th in London, England, we encourage all ASB members to present and/or attend this next TERMIS meeting should they have the opportunity to do so.

Student member news: Henry Ko selected to participate in The World Life Science Forum BioVision

Mr Henry Ko from the Graduate School of Biomedical Engineering, University of New South Wales, is one of 100 fellows selected to participate in The World Life Sciences Forum BioVision and Biovision.Nxt Forum in Lyon, France from March 4-14, 2007.

Biovision and Biovision.Nxt's objectives are to create a worldwide network of Tomorrow's Bioleaders and build a network of the most promising talent in life sciences worldwide. BioVision and Biovision.Nxt is attended by key scientists, Nobel Laureates, world experts in healthcare, agriculture-nutrition and the environment, NGOs, opinion leaders from society-at-large, and decision-makers from large corporations.

Following their special programme, the Biovision.Nxt "Class of 2007" Fellows will actively participate in The World Life Sciences Forum BioVision, which was created in 1999 by Mr. Raymond Barre, former French Prime Minister and first Vice President of the European Commission, with the contribution of the European Commission, the European Parliament, and major international institutions such as WHO, FAO, UNESCO, TWAS (Third World Academy of Sciences) and the World Bank.

Interested in becoming a member of ASB? Membership Rates: Full Member (Calendar Year) \$45; Student Member (Calendar Year) \$20. A membership form is available at www.biomaterials.org.au

ASB NEWS is a biannual newsletter that covers news from The Australasian Society for Biomaterials. If you have a news item that you wish to be included please contact the editor: Lisbeth Grøndahl (lgrondahl@uq.edu.au)