

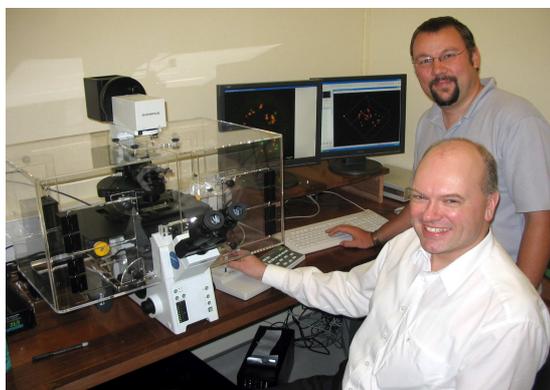
Newsletter of the Physiology Society of Southern Africa (PSSA)

Highlights:

- Microscope..a first

New microscope a first for Africa and Stellenbosch University

Researchers, led by Dr Rob Smith, in the Department of Physiological Sciences at the University of Stellenbosch, have just received a new live cell imaging system from Olympus, the first of its kind in Africa.



Dr Matthais Rommeswinkel of Olympus Biosystems assists Dr Rob Smith (right) of the Department of Physiological Sciences with the new Olympus IX-81 microscope system.

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The R 1,000,000 system, an Olympus IX 81 microscope and Solent Scientific incubator chamber, coupled to an MT-20 illumination system, F-view II camera and Cell-R software will allow researchers to acquire and analyse multi-dimensional images of living cells, from the usual 2D up to 6D, without damaging the cell itself.

“Due to advances in microscope technology researchers are able to see more detail at the cell level than was possible with older imaging systems. We are now able to achieve a resolution of 250nm – about 150 times thinner than a human hair.” says Dr Smith.

During the training workshop, researchers from Stellenbosch University were able to visualize the translocation into the nucleus of a glucocorticoid receptor activated by a ligand!

Interest has been received from researchers from the universities of Cape Town, the Western Cape and Witwatersrand to use the instrument, as well as researchers at the National Laser Centre at the CSIR.

Anyone interested in using the facility should contact Dr Rob Smith on 021 808 3154 or by email at rsmith@sun.ac.za.

Conference Feedback: report from PSSA 2005

In the previous issue of the the PSSA newsletter we featured some feedback from some of the triumphant students that participated in the Wyndham and Johnny van Der Walt competitions. Juliane Weber from Wits was awarded the second prize in the Wyndham competition. She aired her views on how it felt to be in the competition; unfortunately she missed the deadline for the last issue. For the students battling it out this year, some words of inspiration from Juliane:

“I had never been to PSSA before, so I had no idea what to expect. All I knew was that I had been entered into a competition where I would present data from my project and be judged on my presentation skills. Thus began the process of preparing my presentation, practicing my speech (repeatedly!!) and rehearsing it in front of students and members of staff. When I finally gave my speech at the conference the presentation was almost unrecognisable from my first miserable attempt. Although standing at the podium in front of so many renowned scientists made me quite nervous I managed to pull it off without any major disasters. Shaking in my seat afterwards, I could only be glad that I had not made a complete fool of myself by forgetting what I was talking about. So I was quite surprised when I received second prize for the Wyndham competition and even more astounded at the absolute delight of the members of staff when Wits students achieved the top three places in the competition. The conference was an enjoyable experience and I am looking forward to attending it again next year. I hope that, with the help of my supervisors Dr PR Kamerman and Prof D Mitchell, I will be able to give another good presentation in next year’s competition”.

Report on The Cell Signalling World Conference, Luxembourg, 2006

Dr Anna-Mart Engelbrecht and a student, Ms Joe-Lin du Toit (one of the 2005 top-10 of the Wyndham Competition) of the Department of Physiological Sciences, University of Stellenbosch attended the Cell Signaling World Conference in Luxembourg from 25th -28th January 2006. The main theme of the conference was to discuss therapeutic applications in the field of signal transduction, transcription and translation. Some very interesting keynote sessions included: Hypoxia Signal Transduction in Health and Disease (Gregg Semenza – Johns Hopkins School of Medicine, Baltimore, USA); Signal transduction by stress-activated MAPK (Roger Davis – UMASS Medical School, Worcester, USA); Ubiquitin ligase Smurf1 controls osteoblastic activity and bone homeostasis by targeting MEKK2-JNK pathway (Ying Zhang (NIH, Bethesda, Maryland, USA); Mechanisms of caspase-independent cell death (Guido Kroemer – CNRS, Villejuif, France); Oxidative Bax activation as the trigger of the stress-induced intrinsic apoptotic pathway (Lina Ghibelli – University Tor Vergata, Rome, Italy); Regulation of NFκβ-dependent transcription (Sankar Ghosh – Yale, CT, USA).

The molecule of the conference was definitely NFκβ. Most of the keynote speakers highlighted the role of inflammation in disease and therefore mentioned the NFκβ pathway as an integral signaling mechanism. Another interesting observation was that many researchers focused on natural substances e.g. resveratrol, curcumin, ginger and melatonin. Joydeb Kundu’s (National Research Laboratory of Molecular Carcinogenesis and Chemoprevention, College of Pharmacy, Seoul, South Korea) talk on “Resveratrol inhibits phorbol ester-induced expression of COX-2 through inactivation of NFκβ and AP-1 in mouse skin: role of Iκβ kinase and MAPKs” was one of many about the protective mechanisms of natural substances.

This meeting allowed new insights into the rapidly evolving field of signal transduction where novel antibodies against receptors, protein kinase inhibitors, antisense oligonucleotides and gene expression will certainly enhance therapeutic approaches for the next century.

[More conference reports on page 5](#)

News from around South Africa

North-West University (Potchefstroom Campus)

New staff:

Deleted:

Since January 2006 a postdoctoral fellow, *Dr. Manja Reimann*, from Potsdam in Germany has joined forces with the Cardiovascular Physiology Research Group. She did her PhD at the German Institute of Human Nutrition Potsdam-Rehbruecke. She has experience in various techniques regarding the non-invasive assessment of the vasculature obtained in Melbourne, Australia. Her major activities at NWU will include the organisation, recruitment and implementation of two newly funded studies - designed by Alta Schutte and Hugo Huisman.

Awards

Dr Alta Schutte recently received the good news that she is now a Y1 NRF-rated researcher.

Conferences

During September 2005 five occupational hygienists (Fritz Eloff, PJ Laubscher, Nico van Aarde, Johan du Plessis, Riaan Booysen) attended the 6th International Conference of the IOHA (International Occupational Hygiene Association) at Pilanesberg. They delivered four presentations which were also submitted for publication. Various members of the group attended the IOHA conferences in previous years - held in Australia and Norway - but everyone agrees that the SA conference was the most successful.

Scientific writing

Dr. Alta Schutte was invited by the International Hypertension Society (ISH) to write a paper entitled: "A young investigator's research on hypertension in South Africa", for the ISH Newsletter named Hypertension News. This paper will appear in their next newsletter.

Stellenbosch University

New appointments

Prof Willie Daniels (wd@sun.ac.za) is now the Head of Medical Physiology at Tygerberg.

Dr David Fisher (dfisher@uwc.ac.za) is the new Head of Medical Biosciences (which includes Physiology) at UWC.

University of the Witwatersrand

New Appointments

Mr Siyanda Makaula, previously of the Hatter Heart Research Institute at the University of Cape Town, was recently appointed as a lecturer in the School of Physiology. In Siyanda's own words "I hail from the bundus 'Transkei', I've always been interested in how the body functions, all those tiny molecules, cells and chemical reactions were taught at school. I graduated my first degree with the then University of Transkei and then pursued an MSc(med) (cardiac physiology) supervised by Prof Lionel Opie and ultimately read for a PhD (med) (molecular physiology) by Dr M.F. Essop with UCT. My research interest: the effect of metabolic disorders (diabetes/obesity) on the development of cardiac diseases".

Miss Sibongile Makweya was appointed to the School of Physiology as an associate lecturer. Her research interest is in the field of pain in HIV and the treatment thereof. She is currently registered for an MSc Med with Wits where she is looking at the treatment of antiretroviral drug-induced pain.

Walter Sisulu University

Unitra merged with Border Technikon and the Eastern Cape Technikon to form the Walter Sisulu Technikon.

New course

The Department of Physiology at WSU has started offering a BSc course in Human Physiology. The current enrollment is 10 students per year (due to limited staff).

Conference Feedback:**FASEB Summer Research Conferences: Stem- and satellite cells**

I had the opportunity to attend one of the FASEB Summer Research Conferences held from 11-16 June 2005 in Tuscon, Arizona. This well organised event, specifically on the topic of stem- and satellite cells, is held every two years. Several very well-known speakers in the area of satellite cells attended this international conference, such as Michael Rudnicki, Terence Partridge and Peter Zammit. The conference included presentations, poster sessions, as well as a clinical workshop during which more practical and clinical applications of the work currently done in the stem- and satellite cell fields, were discussed. The number of delegates attending the conference was restricted (in fact, I was selected to attend and Prof Myburgh was considered too senior!), allowing for more opportunities to meet other researchers and discussing where current research is heading. A few of the main issues discussed included:

- ⊙ Are stem cells isolated from skeletal muscle and put through differentiation similar or different depending on the original fiber type pre-harvest?
 - ⊙ How do stem cells isolated from skeletal muscle differ from satellite cells and stem cells from other tissues?
 - ⊙ What are the limitations and hurdles to clinical applications of stem- and satellite cells?
 - ⊙ Can stem cell transfer strategies be used as an alternative to cardiac transplantations? Thus far, cell transplant therapy has shown controversial results, with the main problems being immunological barriers, and the difficulty of integrating cellular therapy into a complex tissue organization. In this regard, successful cell transfer would require:
 - increased cell viability,
 - a functional syncytium,
 - limited/no side effects,
 - cell population with stem cell characteristics, and
 - no rejection of transferred cells
- Potential sources could include:
- haematopoietic stem cells,
 - skeletal myoblasts,
 - bone marrow, and
 - mesenchymal stem cells

Contrary to what was first believed, satellite cells are not the only skeletal muscle precursor cell. Other sources include somatic stem cells or self-renewing satellite cells

Continued on next page

FASEB Summer Research Conferences: Stem- and satellite cells...continued from page 5

(SSC), side population stem cells (SP), muscle derived stem cells (MDSC) which can differentiate towards various lineages), bone marrow derived cells (BMDC) and multipotent adult progenitor cells (MAPC).

The final lecture was given by Prof. Terrance Partridge, where he highlighted important issues, including:

- ⊙ do satellite cells perform equally well in different fibers?
- ⊙ do the various fiber types have different satellite cell numbers?
- ⊙ is satellite cell behavior altered when the cells are removed from the muscle fiber, e.g. do they renew in culture or differentiate into the same fiber-type?
- ⊙ the problem of using good satellite cell markers, since most are not 100% reliable.

After the conference, I visited the Department of Animal Sciences' Muscle Biology group at the University of Arizona. Their focal research goals include growth and repair of skeletal muscle (through satellite cells) in domestic animals and humans and identifying hormones and growth factors responsible for satellite cell activation from the quiescent state, division and fiber formation. They perform experiments at cellular, tissue and animal level and have successfully developed techniques to isolate and culture primary satellite cells from animal skeletal muscle.

Elske Schabort
PhD Student in Dept Physiological Sciences
Stellenbosch University

MSc student attends 2006 Cell Signaling World Congress

For a personal account of the congress described earlier by Anna-Mart, Joe Lin gives us a student perspective of events:

“My research supervisor, Dr Anna-Mart Engebrecht, and I were the only delegates from Africa at this meeting. More than 850 researchers from all over the world attended the conference. From the poster as well as the oral presentations, it was clear that certain signal transduction pathways are currently the most prominent players in the field. These include the mitogen-activated protein (MAP) kinases and the Jak/Stat-pathway. The involvement of signalling pathways in a variety of cancers was the most popular topic at the meeting. Such pathways are currently the prime pharmacological targets for the development of new cancer treatments. The well-known transcription factors NF- κ B and p53, which is mutated in 50% of all human cancers, received the most attention. However, acquiring scientific evidence to back up the use of natural remedies was also very popular. The molecular action of curcumin, the active ingredient of turmeric, is currently a red-hot research topic, especially in Korea! This world-class conference certainly let everyone who was a part of it once again realise the importance of such research in the treatment and quest for cures of many diseases”.

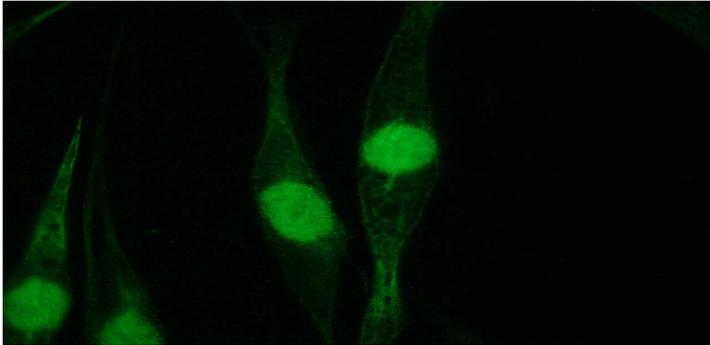
Joe-Lin du Toit
MSc student, Dept Physiological Sciences, Stellenbosch University
Stellenbosch University

Vacancies

Walter Sisulu University

Two senior lecturership positions in Physiology are available. For further details, contact Prof Jehu Iputo email: iputo@getafix.utr.ac.za

Workshop on advanced light microscopy



In December 2005 I had the pleasure, together with my supervisor Dr Engelbrecht and colleague Ms du Toit, of being part of an exciting workshop held at the Pietermaritzburg campus in Kwazulu-Natal. Aim of the three day course was to get a step closer to the capacities of advanced light microscopy techniques for imaging of dynamic cellular processes.

Focus was a theoretical background introduction to the major “F” techniques in fluorescent microscopy, combined with practical sessions in immunocytochemistry and image analysis.

FRAP (Fluorescence Recovery After Photobleaching) and FRET (Fluorescence Resonance Energy Transfer) were thereby the “stars” of the excursion. Via the transfection of for example GFP, linked with the protein of interest, cellular dynamic processes and signalling pathways can so be studied in a great detail and a high degree of precision. Furthermore, I learnt how experiments can be set up, where cells can not only be observed in 3 dimensions x, y with optical sectioning in the z dimension, but also over time, with different defined cellular positions and in a controlled environment. Together with multiple labelling techniques, the amount of information being generated in a short time is phenomenal and inspiring.

We worked with a ZEISS LSM confocal microscope, the course was brilliantly presented by Dr Timmerman from EMBL in Heidelberg, Germany together with Dr Elliot from the Biochemistry department at the Pietermaritzburg campus.

I am looking forward to make use of some of these techniques, since they add such a valuable dimension into the study of cell signalling processes and I am thankful to the department of physiological sciences at Stellenbosch University for creating such opportunities.

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34th MEETING OF THE PHYSIOLOGY SOCIETY OF SOUTH AFRICA

The 34th Meeting of the Physiology Society of South Africa will
be hosted by the University of KwaZulu-Natal at Howard
College.

Dates: 26th – 29th September 2006

Who said marking was not a joke?

*Students can bring some humour into the mundane task of marking assignments, tests
and exams, as Elmarie Terblanche found out recently:*

“athletes have lactic acid macrophages that eat up lactate from the blood”.
(2nd year exercise physiology)

Are you a PSSA member and do not receive the newsletter or any
communication from the PSSA? Then you are not on our mailing list. Please
send your email address to Kennedy Erlwanger so that you can be included
on the PSSA mailing list.

NOTICE

**Please be informed that due to career developments Dr
Jacques van Rooyen will be relinquishing the post of PSSA
treasurer at the end of February 2006. You will be informed
in due course what contingency measures will be made. The
editors (and we are sure most of you) would like to take this
opportunity to thank Jacques for his sterling service to the
PSSA and wish him well in his future plans.**

*Dear reader of this newsletter, the editorial team looks forward to
your submissions of items of news for the news letter.*

PHYSIOLOGY SOCIETY OF SOUTHERN AFRICA