

ACCTERM Newsletter



Director's Message

Welcome to the ninth issue of the Australia-China Centre for Tissue Engineering and Regenerative Medicine's newsletter and the first for 2017. I hope you can find some time in between grant writing and teaching planning to read our latest newsletter and catch up on the centre's most recent activities.

I would like to take this opportunity to wish Dr Yinghong Zhou all the best as she embarks on an Endeavour Research Fellowship next month. Yinghong will travel to Texas A&M University where she will work under the supervision of Professor Jerry Feng. Yinghong has been pivotal in the success of ACCTERM and has been the co-ordinator for the centre since its inception in 2013. Her hard work and enthusiasm is very much appreciated and she will be missed by all ACCTERM members. A new co-ordinator for the centre will be appointed in due course.

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ARTHRITIS — Real Health Matters, Public Lecture

Experts from IHBI— including ACCTERMs Prof Yin Xiao and Prof Ross Crawford recently presented at QUT Real Health Matters, Public Seminar to explain what we know about arthritis. Arthritis is the major cause of disability and chronic pain, with 3.85 million Australians affected and up to 7 million expected to have some form of the disease by 2050. Audience members participated in a question and answers session after the presentations were complete.

Prof Yin Xiao, Prof Ross Crawford and A/Prof Travis Klein did an excellent job in answering audience members queries. Attendees then enjoyed a morning tea at The Cube, Gardens Point, where students presented their current research digitally. The next Real Health Matters is currently being organised. More details to follow.

Publishing Success for ACCTERM

ACCTERM researchers have introduced the concept of “Materiobiology”.

Professor Yin Xiao, the centre’s director, along with partners Dr Yulin Li and Professor Changsheng Liu from the East China University of Science and Technology have jointly published a review paper in the prestigious ‘Chemical Reviews’ journal.

The review summarises the process in which biomaterials with controllable properties can regulate cell behaviours and tissue/organ functions.

In a world first, the ACCTERM researchers have coined the term “Materiobiology” which can be described as a scientific discipline that studies the biological effects of the properties of biomaterials on biological functions at cell, tissue, organ, and the whole organism levels. Serious injuries, diseases, and changes with aging may damage the self-regenerative capacity of tissues and organs, necessitating their replacement or regeneration with the help of medical devices. Among these devices are biomaterials that can be used to treat, augment, repair, or replace a tissue and its functions, or for diagnostics. The new concept of Materiobiology will provide new strategies for the future design of biomaterials with controllable properties to mediate specific biological responses.

The review titled “The Horizon of Materiobiology: A Perspective on Material-Guided Cell Behaviours and Tissue Engineering” has been published in the Chemical Reviews, which has an impact factor of 37.369.

Journal available here: <http://pubs.acs.org/doi/pdf/10.1021/acs.chemrev.6b00654>

Researchers Conduct Large Animal Study

Collaboration on a large animal study between Nanjing University, QUT and Griffith University has begun. The project titled “The effects of zirconium dioxide implant surface characteristics on the early inflammation and osseous healing in diabetes — an experimental study in pigs” received \$270,000 from the International Team for Implantology.

Dr Zhibin Du (QUT) and Dr Ryan Lee (Griffith University) have just finished the pig surgery and have delivered a lecture at Nanjing University.

3D-printed Scaffolds Potential Use in Cancer Treatment

ACCTERM partners in China have made a series of important discoveries in relation to bioceramic scaffolds.

Repairing bones damaged by cancer surgery requires scaffold materials that are able to support tissue regeneration while suppressing tumour regrowth.

The team led by Professor Chengtie Wu and Professor Jiang Chang at the Shanghai Institute of Ceramics, Chinese Academy of Sciences has created a 3D printed bioceramic scaffold that combines the dual function of tumour treatment and tissue regeneration. The exciting finding has recently been accepted by NPG Asia Materials (published by Nature Publishing Group). The work on multifunctional 3D printed scaffolds has also been published in Biomaterials (2016; 111:138-148), Advanced Functional Materials (2017; DOI: 10.1002/adfm.201606218) and Chemical Science (2016;7:2748-2752), and highlighted in Materials Today <http://www.materialstoday.com/biomaterials/news/mussel-inspired-scaffolds-help-treat-bone-cancer>.

The researchers created a nanostructured surface that helps bone cells stick onto the scaffold and proliferate. The stent implanted in the tumour site, combined with near infrared light irradiation for treatment, effectively inhibited the growth of the tumour.

In the coming months ACCTERM will work closely with industrial and clinical partners to develop the product further.

5th ACCTERM Research Forum Update

The Forum this year will take place at Nanjing University, Nanjing, China. Professor Fuhua Yan has kindly agreed to convene the Forum which will be held in November. The organising committee are currently deciding on an exact date. Once this has been agreed further details will be announced.

Website Development

The ACCTERM team is working closely with the QUT IT team to develop a new website for the centre. The new look website will be easier to navigate and will allow researchers to contribute content more readily. The launch date is anticipated to be at the end of the month.

ACCTERM Collaborations to Develop New Therapies for Osteoarthritis

Dr Prasadam (pictured below) is an active member of ACCTERM and her research is directed towards understanding the molecular pathophysiology of osteoarthritis (OA) and identifying new therapeutic strategies to counteract the destruction of the articular cartilage during OA. In particular her research interests include, identifying risk factors of osteoarthritis, evaluating new ways of imaging osteoarthritis, and working towards designing and testing new treatments that help to repair osteoarthritis joints. Dr Prasadam and Prof Yin Xiao strategically partner with leading orthopedic clinicians and biomedical industries to facilitate the translation of discoveries into new therapies for patients suffering with osteoarthritis. In particular, a strong research partnership is established with Prof Xinzhan Mao (Central South University) and the team together recently identified high cholesterol levels as a major risk factor for osteoarthritis. This research has been recently published in the FASEB journal and received 173 commentaries in various media outlets world-wide. Dr Prasadam is also collaborating with industries such as Asia Biomaterials and SALIAI to develop a cost-effective and bio-active gel for the cartilage regeneration. This collaboration enable researchers and clinicians in QUT and China to fast-track discoveries in basic scientific research and translate these into improved care for patients around the world.



Recent Grants Submitted

Scheme: Queensland-Chinese Academy of Sciences Collaborative Science Fund (Q-CAS)
Researcher: Prof Yin Xiao, Prof Xing-Jie Liang, Prof Kenneth Beagley, Dr Yinghong Zhou, Dr Leila Cuttle, Dr Tony Parker, A/Prof Jing Xu
Title: Honey-based nanoparticle wound dressing
Amount: \$400,000

Scheme: ARC Discovery Grant
Researcher: Prof Zhiyong Li, Prof Yin Xiao, Prof Prasad Yarlagadda, Prof Jiang Chang, Dr Yinghong Zhou
Title: Integrated modelling of vascularised bone regeneration
Amount: \$613,357

Scheme: National Health and Medical Research Council (Project)
Researcher: Prof Yin Xiao, Prof Ross Crawford, Prof Chengtie Wu
Title: Understanding and modulation of bone hematoma to heal segmental bone defects
Amount: \$517,214

Scheme: National Health and Medical Research Council (Project)
Researcher: Prof Saso Ivanovski, Prof Yin Xiao, Prof Dietmar Hutmacher, Prof Mark Bartold, Adjunct Prof Lisa Heitz
Title: Regenerative treatment of peri-implantitis using bone constructs with osteogenic, immunomodulatory and antimicrobial properties
Amount: \$640,531

Scheme: ARC Discovery Grant
Researcher: Prof Yin Xiao, Prof Kenneth Beagley, Prof Chengtie Wu
Title: Effect of nanoparticles on immune cells and their function
Amount: \$639,900

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