

# **Conference Report: “Crossing the Boundaries” at the Second Scientific Meeting of the Australasian Wound and Tissue Repair Society**

22<sup>nd</sup> to the 24<sup>th</sup> of March, 2010, Perth Convention Centre, Perth, Western Australia, Australia

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## **Abstract**

The first scientific meeting of the Australasian Wound and Tissue Repair Society (AWTRS) was held on the sixth day of May, 2008 and emerged from the perceived need to recognise the current developments and innovative research outcomes that were being generated in the field of wound repair and tissue regeneration within the Australasian region. Two years on, in 2010, the second meeting has provided the same common forum for researchers based in the Australasian region and, in addition, has provided access to a strong representation of delegates from international research institutes. The second meeting was intended instead as not only an opportunity to distinguish forefront research but also as an avenue to explore research going beyond the boundaries into novel, innovative and even aesthetic directions. Furthermore, the inaugural AWTRS Master Class was the forerunner of this year’s conference, successfully bringing together internationally recognised experts into a dynamic and intimate environment consisting of higher degree research students, early- and mid-career researchers and successful laboratory heads alike, all with a passion to discuss topics from latest directives in wound research and career development strategies to the marriage of science and art and the cultural, ethical and moral impact of this BioArt. The conference also included the inaugural AWTRS Annual General Meeting. With a strong contingent of 48 presenters, 24 poster presentations and 3 plenary sessions this conference eclipsed other previous wound and tissue repair meetings with the high level of quality research presented. The AWTRS conference is an advantageous and beneficial, if not crucial, event in the biennial calendar for the wound and tissue repair research community.

## **2010 AWTRS Meeting Master Class**

The inaugural AWTRS Master Class was held on Monday the 22<sup>nd</sup> of March as the forerunner of the 2<sup>nd</sup> Meeting of the AWTRS. It was facilitated by Prof Zee Upton (Queensland University of Technology (QUT)) and featured both Paul Martin (Bristol University) and Robert Short (University of South Australia) as the invited speakers and leaders of the group’s discussions. The AWTRS Master Class consisted of ten speakers and was broken into four distinct Master Class sessions that focused on (1) tissue engineering, (2) chronic wounds, (3) burn injuries and (4) molecular biochemistry, and was each followed by a stimulating, intensely interesting and dynamic discussion period. There was also a special presentation from scientist/artist Oron Catts (SymbioticA). The whole four hour event was neatly wrapped up with an informal discussion with both Martin and Short about their own career highlights, research experiences and comments on the future directions of the field. The group was able to ask many questions to the senior researchers, including: what are the essential elements for building a strong career in research; how to write a quality manuscript and get it published in a top-tier journal; and what makes a grant application stand out from others. The AWTRS Master Class was highly beneficial for all those who attended, especially the higher degree research students and early- and mid-career researchers, and ultimately proved to be a successful discussion forum.

## **Oron Catts on the Science of BioArt**

During the Master Class participants were introduced to the revolutionary and relatively novel art practice known as BioArt in the special presentation by Oron Catts. BioArt is a study of aesthetics which employs living matter as its medium and biotechnology as its brush and palette in order to provoke the senses and emotions and, in the majority of instances, generate controversy on account of the relativist nature of the artworks. As

the Director of SymbioticA at the University of Western Australia, Catts presented some of the previous interactive pieces he has created. These included: the aseptic culturing of frog muscle cells to provide a “steak” for consumption by those involved in the project; growing leather clothing from immortalised cell lines on polymer scaffolds; and, possibly suggesting revision of the age-old expression “when pig’s fly” by growing “pig wings”. Each of these pieces had a literal aspect that engaged the participant (because to engage in BioArt is to not only experience it but become a part of it) to discover the meaning that nothing is impossible or sacred. What can scientists gain from the BioArt experience? Could it be an appreciation for culture within the laboratory or possibly a movement towards a greater understanding of the scope of scientific research? In any case, it is truly subjective and thrives on the impact it creates within the community and the emotions that it evokes in those that experience it. BioArt truly lives up to the ideals of this scientific meeting by not only “crossing the boundaries” but going beyond all conservative expectations. To see some of these artworks please visit *The Tissue Culture and Art Project* website (<http://www.tca.uwa.edu.au/>).

### **Master Class I: Tissue Engineering – The natural way**

Following on from Australia’s leading BioArtist may be daunting, but the concept of an ultimate cure for deafness equally captured the AWTRS Master Class audience’s imagination. Perforated ear drum is a common condition in the community as was exemplified by the session chair, Zee Upton’s, own experience. Robert Morano and the Molecular and Cellular Otolaryngology Group are out to improve current practice in tympanic membrane replacement using silk fibroin scaffolds. Following optimisation, these silk protein matrices have been shown to support the growth of tympanic membrane keratinocytes and show promise for future clinical use.

### **Master Class II: Chronic Wounds - Learning from humans**

The second session of the AWTRS Master Class, entitled “Chronic Wounds – Learning from humans”, commenced with two presenters from QUT in Brisbane. James Broadbent, who incidentally was awarded the Bio-Rad Best Oral Presentation prize, opened the session with a presentation of his work, entitled “Revealing the chronic wound fluid proteome”. The method development for generating an inventory of proteins and peptides that reflected the chronic wound micro-environment was discussed in detail. The use of stringent methods to properly prepare samples prior to identification and use of robust spectrum analysis tools had a crucial bearing on the quality and reliability of downstream data, especially for investigating the low abundant and less-investigated region of the proteome. Melissa Fernandez finished the session with her presentation “Heterocyclic catabolites in chronic wound fluid: Indicators of hypoxia and oxidative stress”. Here, the seminal discovery of hypoxia induced purine catabolism as a potential cause of non-healing wounds was described and the implications of the purine catabolites, from non-healing venous leg ulcers, were discussed as potential diagnostic or prognostic indicators of wound chronicity.

### **Master Class III: Burn Injury – A therapeutic challenge**

Different methods of first aid for burn injury were summarised by Leila Cuttle in her talk entitled “Investigation of the Vasculature and cells in the zone of stasis after burn injury – is there a window of opportunity for therapeutics?”. The porcine model of deep dermal injury and laser Doppler imaging was used to examine levels of tissue perfusion in the burn area and the zone of stasis. It was reported that increased perfusion within the zone of stasis was found 24-48 hours following injury, which correlated with improved wound healing. However, perfusion in the actual burn area decreased within 1 hour post-burn, suggesting that first aid should be administered within the first hour after insult in order to salvage burn tissue vasculature. Of note was that saliva is not an effective burn relief salve, however, Leila was tight-lipped as to the origin of the laboratory samples used. The second talk in this Master Class was presented by Natalie Morellini, entitled “Single administration of metallothionein-IIA enhances wound healing following burn injury”. It was reported here that a single application of exogenous MT-IIA enhanced cell viability, proliferation and reduced apoptosis *in vitro* and enhanced wound healing and re-epithelialisation *in vivo*.

### **MasterClass IV: The Scheme of Things – Where does my molecule fit?**

First to speak in this session was Borut Klopčič who reported on “Impaired Colonic collagen assembly and reduced intestinal fibrosis in the absence of SPARC”. It was reported here that colonic inflammation and fibrosis in SPARC knock-out (KO) mice was reduced when compared to the wildtype (WT) mice, but collagen A1 expression was increased. Treatment with indomethacin, a cyclooxygenase (COX) inhibitor, to the mice increased expression of collagen A1 and COX-2 as well as levels of inflammation and fibrosis in WT mice but not KO mice. The second report of this session was presented by James Waters who was awarded the Bio-Rad Runner-up Oral Presentation for his work entitled “Involvement of Flightless I (Flii) during hair follicle regeneration”. Macroscopic and histological assessment of the hair follicle regeneration process in mice, a remarkably scar-free process, was compared between mice expressing different levels of Flii. Different patterns of Flii expression were reported, which has led to a greater understanding of Flii in the wound healing process, particularly the mechanism of scar-free regeneration.

### **Panel Discussion**

Profs Martin and Short took the stage at the end of the AWTRS Master Class for the informal discussion session, which provided a platform for audience members to ask questions directly to the two senior research scientists. A dynamic range of questions caused a lively discussion which at times involved the whole Master Class with differing points of view that led to great debates. Martin and Short also gave insight into how they reached their professional positions and maintained their research output, which included: the recommendation to experience other laboratories around the world to develop oneself as a skilled researcher; generate novel ideas through discussion with colleagues and developing collaborative endeavours with other researchers; and to publish high quality data, within top-ranking journals of one's field, as much as possible. Publishing within the top-tier was also viewed as an advantage, though not essential, for obtaining funding and accelerating one's career development.

### **2010 AWTRS Scientific Meeting**

The Second Meeting of the AWTRS was over-shadowed on the night of Monday the 22<sup>nd</sup> of March, 2010 as the worst storm in over 20 years descended upon the region. Although there was great disruption to the conference dinner the conference proceeded without delay the following morning and was testament to the capability of the organisers and resilience of the local people and city alike. Over the two day period there were 8 presentation sessions (comprised of 38 speakers), 3 plenary talks, 2 poster exhibitions (with 24 presenters), 1 special presentation by Prof Zee Upton and the AWTRS inaugural Annual General Meeting.

### **Plenary Presentations**

AWTRS 2010 was spearheaded by three exceptional plenary presentations. Following the official conference welcome and opening, Bristol University's Paul Martin delved into a world of genetically tractable animal models with his presentation “Studies of Wound Repair and Inflammation in Flies and Fish and Mice”. Videos of leukocytes and macrophages migrating around *Drosophila* embryos like carefully guided machinery offered an image of biology-at-work which is rarely observed in such clarity. Further insight into the genetics behind the wound response and signalling rounded off the presentation with osteopontin taking centre stage as a moderator of repair and fibrosis in mutant mice and fly strains. The second plenary presentation was from Switzerland-based Jeffery Hubbell. The use of functional hydrogels for wound healing was explored here with specific emphasis on the incorporation of recombinant fibronectin fragments and their ability to regulate the differentiation of mesenchymal stem cells along the osteogenic pathway as well as their application to the sequestration and release of many heparin-binding growth factors. The later segment of the presentation revealed how these matrices are being used to deliver genetic material to mice for targeting of specific wound healing responses. Cees Oomens delivered the final plenary presentation of the conference with a talk entitled

“A Multi-scale Approach to Study the Aetiology of Pressure Ulcers”. An innovative use of MRI in combination with *in vivo* use of the cell viability dye, propidium iodide, was key to A/Prof Oomen’s investigation of mechanical indentation effects. Predictive models using a Finite Element method were also presented and the aetiology of pressure wounds squarely placed on tissue deformation and disruption rather than ischemia with the exception of prolonged ischemia. Each of the plenary speakers delivered outstanding presentations and really captured a diverse and inspiring cross-section of the wound healing research happening globally.

## Themes – Day 1

### Inflammation and Immunity in Wound Healing

The first session of the 2010 scientific program opened with a presentation from Prue Hart entitled “Vitamin D in the Skin: Role in Homeostasis, inflammation and immunity”. Here, Prof Hart discussed the *in vivo* role of topical 1, 25 (OH)<sub>2</sub> vitamin D<sub>3</sub> in the functional regulation of dendritic cells and regulatory T cells obtained from local draining lymph nodes. Treated cells were found to have increased regulatory ability of Th-1 and Th-2 immune responses which were mapped to a probable IL-2 stimulation using gene arrays. The role of vitamin D in immune homeostasis was then discussed in terms of inflammation and immunity regulation. The second report, “Macrophage Migration into Wounds”, was presented by Rachael Murray. Mechanisms of macrophage migration and migration signaling were the focus of this talk, with the SNARE protein family taking centre stage in these processes. “Enzymatic Processing of Extracellular Matrix Heparin Sulphate Proteoglycans in Wound Healing: A Role for Mast Cells?” was the next presentation delivered by John Whitelock of the University of New South Wales. The complicated world of glycans and proteins was clearly presented here with the interaction of growth factors and glycans from mast cells presented as a possible means of angiogenesis regulation in wound healing. MMP-9 was placed at the centre of impaired diabetic wound healing in Susan McLennan’s presentation “Inflammatory Pathways Prolong Matrix Metalloproteinase Levels in Diabetic wounds”. Studies in both animal models and human diabetic wounds showed clear abnormalities in MMP-9 and TIMP-1 expression levels with bacterial load directly proportional to MMP-9 levels at wound presentation. Both bacterial load and MMP-9 levels were suggested for use as predictors of wound healing outcome.

### Fibrosis, Scarring and Wounds

The second session of the day commenced with Steve Mutsaers’ presentation “IL-6 family proteins in the regulation of pulmonary fibrosis”. Here, an investigation into the involvement of gp130, an interleukin-6 cytokine family co-receptor, in belomycin-induced lung fibrosis in mice revealed that gp130-mediated activation of STAT3 signaling promotes development of fibrosis via a Smad3 independent mechanism. Following this, Allison Cowin presented her research on the “Function of secreted and cytoplasmic forms of Flightless in wound healing”, demonstrating that Flii is secreted in response to injury from keratinocytes, fibroblasts and macrophages *in vitro*, and is present in both acute and chronic wound fluid samples. Furthermore, A/Prof Cowin found that Flii doesn’t possess a secretory signal, ruling out trafficking via the Golgi and recycling endosomes, however it was hypothesised to travel to the cell surface via late endosomes/lysosomes. The session then moved on to “MicroRNAs regulating fibroblast activation and epithelial-mesenchymal transition in fibrosis” presented by Yeeseim Khew-Goodall, who used transforming growth factor-beta (TGF-β) treated primary fibroblasts as a model of the fibrotic disease, Scleroderma. This research found that TGF-β represses miR200s/205, preservers of the epithelial phenotype, which allows EMT progression. David O’Gorman spoke on “POSTN mRNA expression and periostin localisation in hypertrophic and keloid scarring”, focusing on Dupuytren’s Disease which causes fibrosis similar to pathological scarring. Dr O’Gorman found the gene POSTN and its protein, periostin, expressed in Keratin 14-positive basal epithelium keratinocytes of keloid and hypertrophic scar tissue. Its presence was notably absent in normal scar tissue, leading to the hypothesis that periostin induces the differentiation of apoptosis-resistant myofibroblasts in abnormal cutaneous repair. The presentation “Ovariectomy has a profound effect on collagen structure and

matrix gene expression in healthy and OA-affected ovine anterior cruciate ligament” by Martin Cake investigated oestrogen decline during menopause and its link to impaired wound healing. The focus was on the oestrogen-responsive anterior cruciate ligament (ACL) in sheep with ovariectomy (OVX) which exhibited reduced collagen fibril diameter and density, in addition to gene expression of key matrix genes compared to un-operated controls. The session was wrapped up by James Musyoka and his talk on “The effect of Siah2 on fibroblast function”. Mr Musyoka used Siah2 knock-down studies in human dermal fibroblasts and Siah2 knockout mice. These models exhibited less hypoxia inducible factor (HIF-1) production and were less responsive to pro-fibrotic factors, leading to the suggestion that HIF-1 and Siah2 may be potential targets for anti-fibrotic therapy.

### **Regeneration**

Fiona Wood opened the third session of the day with her presentation, “The systemic response to skin injury”. The presentation focused on burn injuries and how the systemic responses to burn injury affect the function of multiple organs and additionally induce long and lasting significant changes in the peripheral and central nervous systems. Prof Wood emphasised the importance of translational research focusing on the holistic function of the patient at both a physical and psychosocial level. “Brain training to promote repair after traumatic wound to the CNS and PNS” was the following presentation by Sarah Dunlop, who began with a discussion on the poor outcomes following CNS/PNS injury. Prof Dunlop highlighted that despite nerve cell survival and axon re-growth, there is usually absence of useful function because axons fail to find correct paths for synaptic transmission. However, mimicking natural movements can restore appropriate re-innervation and normal function which has important implications for translation into rehabilitation medicine after CNS/PNS injury. While the techniques of mouse whisker brushing and lizard “temping” brought a smile to most delegates’ faces the results presented by Prof Dunlop proved truly inspirational. Pritinder Kaur then gave her presentation on “Cycling committed progenitors of the skin’s epithelium are the first to respond to tissue injury”. Dr Kaur investigated devitalised rat tracheas and found that although early differentiating keratinocytes were the first to re-populate the area, it was the quiescent stem cell-like population that sustained tissue renewal. Jing-Ning Huan discussed how the “Specific Inhibition of AQP1 water channels in human umbilical vein endothelial cells by small interfering RNAs”. This research implemented siRNA to knock down a water transport molecule, aquaporin (AQP)-1. Interestingly, Prof Huan found this also decreased sodium channel variants and sodium potassium ATPase, in conjunction with a decrease in cell-cell junctions and tube forming integrity, highlighting the importance of AQPs in the endothelium. The session was wrapped up by Jemma Evans with “There she grows! Perfect endometrial repair month after month” in which she discussed that post-menstrual endometrial repair was a notable exception to the inevitable scarring in adult tissues. Dr Evans work focused on characterising changes to the extracellular matrix protein expression profile during endometrial repair in an *in vivo* mouse model of menstruation. It is anticipated that this will enhance the greater knowledge towards scar-free repair in general.

### **Novel Mechanisms of Repair**

The final session of the day entitled “Novel Mechanisms of Repair” commenced with Chris Jackson’s presentation “Activated protein C acts on the Tie2 axis in human skin keratinocytes and endothelial cells to increase barrier integrity”. This presentation outlined the downstream impact that activated protein C (APC) has on the cellular localisation of Tie2 and the subsequent increase in endothelial and keratinocyte cell integrity. Kiarash Khosrotehrani then followed with his group’s transgenic mouse study on the prominent role of calpains in delayed healing outcomes, which was entitled “Calpain inhibition affects granulation tissue formation and results in delayed wound healing”. The third speaker of the session was Stephen Jane who, in his presentation “Epidermal wound repair is regulated by the planar cell polarity signalling pathway”, introduced Grhl3 as an effector of defective wound healing through the planar cell polarity signalling pathway, implicating the pathway in epidermal wound repair. APC appeared again in Sohel Julovi’s talk entitled “Protease activated receptor-2 is required for activated protein C’s wound healing promoting activity”. This

study found that the accelerated wound healing action of APC is achieved by the PAR-2 molecule through the PI3-Src-AKT axis and complemented the work presented earlier by Jackson. The final presentation of the session, "Clinical observations and physiological data supporting a vascular response as a mechanism of the novel wound-healing agent, Opal A" by Geoffrey Mitchell, was an interesting pilot study on the possible effect of the commercial paw paw extract product, Opal A, to increase tissue perfusion.

A special presentation, by Prof Zee Upton, promptly began after this session and introduced the imminent Wound Management Innovation Cooperative Research Centre, to be headquartered at the Queensland University of Technology, funded partly by the Australian Government and supported by numerous universities, institutes, hospitals, clinics and industry partners. Without a doubt this will be the largest investment in the battle against wounds and the authors look forward to the many wonderful and fruitful research outcomes in the future.

### **Posters and Social**

Twenty-four posters were exhibited during the conference with a fascinating array of information from investigations into wounds on crocodile skin to the effect of hyperbaric oxygen treatment on epidermal thickness of a human-skin model. Of note, Zlatko Kopecki earned the Bio-Rad Best Poster award for his research into the effects of Flii in epidermolysis bullosa blister healing. However, without going into detail on the content of each poster, the overall exhibition was successful in disseminating research data, engaging scientists from various institutes to discuss the work and providing a platform for networking between scientists at various stages of their careers. The poster exhibition ran throughout the entirety of the conference but was not the only chance to congregate as a group and share in healthy discourse. The main social event of the meeting was the conference dinner, postponed one day due to bad weather, but nonetheless enjoyed by all. Many new memories were created, not to mention the research collaborations and novel ideas generated, during these social networking periods, which by the end of the conference were considered to be a great success for all.

### **Themes - Day 2**

#### **Frontier Therapies: Biotherapeutics and Biomaterials I**

The first Biotherapeutics and Biomaterials theme began with an inspired presentation from Mawson Institute's Robert Short. The niche area of plasma polymerisation was explored and bench-to-bedside science on display with the application of Myskin™ - a plasma polymerisation-enabled medical device - to diabetic ulcer treatment covered in a snippet of a BBC documentary. Further discussion of the future of plasma-polymerised thin films for wound healing rounded out the presentation. CSIRO's Jerome Werkmeister then shared his work involving the photochemical cross linking of protein material and its application to tissue sealing and tissue engineering. Advantages over traditional tissue sealants were discussed and applications for growth factor-loading using intramolecular dityrosine bonds highlighted as a future potential in tissue engineering and cell therapy applications. The session's third speaker Paul Dalton then delved into the complex arena of tissue engineering and inflammation, ischemia and excitotoxic processes following spinal chord injury. The rapid infiltration of macrophages and neutrophils into the site of injury was demonstrated followed by insight into the innate immune reaction associated with implantation of biomaterials into the spinal chord. The scaffold's own ability to modulate the inflammatory and wound healing response rounded out the presentation. Session 1 of the Biotherapeutics and Biomaterials theme was completed by Emily Lynam, who incidentally was awarded the UWA School of Surgery Student Prize for best oral presentation. While silicone gel sheets have been used in the treatment of hypertrophic and keloid scars for some time, Mrs Lynam's data has shown that not all silicones are created equal. Chromatographic separation and *in vitro*

biological assays have revealed a subset of silicones which impart substantial biological effects - consistent with desired scar remediation outcomes. A homologous synthetic silicone is now under investigation and has shown promise as a potential treatment and an alternative to invasive chemical treatment options.

### **Frontier Therapies: Biotherapeutics and Biomaterials II**

The second Biotherapies and Biomaterials session began with “RNA Interferences for Modulation of Inflammatory responses to Implantable Biomaterials” from University of New South Wales’ Laura Poole-Warren. The application of gene silencing to wound repair seems one step closer with data presented showing the down-regulation of Flii (a wound healing antagonist) in *in vitro* and *in vivo* studies when treated with biomaterial:siRNA constructs. Ming Hao Zheng then moved the focus to orthopaedic research and the application of tissue engineering to the regeneration of cartilage. Images of chisels, hammers and knee joints ever seem to divide audiences and this presentation was no exception. A review of current cellular therapies for orthopaedic application highlighted several gaps in practice and knowledge before video of controlled cartilage regeneration approaches (including bone grinding instruments that could make the toughest of us cringe) illustrated positive outcomes from Ming Hao’s laboratory. University of South Australia’s Hans Griesser then combined knowledge of bush medicine and biomaterials in his talk “Strategies for Combating Infection at Biomedical Device Surfaces”. The utilisation of aboriginal knowledge led Griesser to the characterisation of novel anti-microbial molecules from the genus *Eremophila* and the subsequent incorporation of these molecules into implantable devices. Both secretory and tethered constructs were evaluated for short and permanent microbial protection, respectively. Leigh Parkinson took time from cleaning his Perth home (post-devastating storm) to deliver his talk “The Effect of Nano-porous architecture on Skin Cell Behaviour and Wound Healing following Burn Injury”. The examination of cell behavior in response to pore size in an aluminium oxide scaffold was presented here with *in vivo* data indicating the potential utility of designed nano-structures in wound healing therapies. Deede Murrell finished up the session with a report of her double-blinded placebo-control randomised controlled trial of intradermal injections of cultured allogeneic fibroblasts for the treatment of recessive dystrophic epidermolysis bullosa (RDEB). Positive results wrapped up the presentation before a lengthy audience discussion surrounding the placebo effect in medicine.

### **Pre-clinical Models of Wounds and Healing**

The seventh session of the AWTRS 2010 meeting commenced with a review of the current animal models available for wound research in the presentation, “Animal Models of Burns and Scarring: From Mice to Pigs” by James McMillan. The use of small animal models such as rabbit, guinea pig and mouse were identified as least representative because of their physiological differences to human skin and their different processes of wound healing. The pig was regarded as the best current pre-clinical model for human wound healing due to high similarities, in many aspects, with human tissue. Xue-Qing Wang then presented a comprehensive wound healing assessment protocol and data from a number of porcine burn trials in her presentation “Burn Wound Healing and Scar Formation in Pre-clinical and Clinical Contexts”. The third speaker for the session, Yan Xie, presented data on her work investigating the human skin equivalent model (HSE), in a presentation entitled “Development of a 3D human skin equivalent wound model for investigating novel wound healing therapies”, Dr Xie’s presentation illustrated the development of reproducible partial- and full-thickness wound models using the HSE. The final presentation of the session was delivered by Chris Anderson and was entitled “Just a Little Prick with a Needle”. Data were presented on the use of microdialysis, for application within the clinic, in the study of wound fluid within acutely wounded skin. Taken together, the presentations in this session indicated there is currently a desire to more rapidly translate basic research into the clinical setting and provided the ultimate exploration of the tools available to this end.

### **Chronic Wounds – Mechanisms and Diagnostics**

The final session of the AWTRS 2010 meeting commenced with a tour de force of proteomics and systems biology with Laura Edsberg’s presentation “Proteins and Pressure Ulcer Outcomes”. The take home message

to “*avoid two-dimensional gels for wound healing investigation*” was rapidly forthcoming before a presentation of large scale chemical labelling and antibody array quantitation of chronic wound fluid proteins. Dr Edsberg then shared compelling data indicating the prognostic value of the S100 family of proteins in the monitoring of pressure ulcers. Flightless 1 then made a final appearance in Nadira Ruzehaji’s presentation “Extracellular Function of the Actin-remodelling Protein Flightless 1 may be Important in Acute and Chronic Wound Responses”. Here, Flii was measured in wound-related tissues and localised to monocytes and neutrophils in peripheral blood plasma suggesting a novel extracellular function for this key wound healing protein. Pressure ulcers were again explored in Sandra Loerakker’s presentation “Role of Ischemia/Reperfusion in the Aetiology of Pressure-related Deep Tissue Injury”. MRI monitoring of rat leg tissue during ischemia and reperfusion revealed the incomplete restoration of perfusion following removal of blood vessel occlusion leading to the clinical implication that removal of mechanical load does not necessarily mean complete restoration of perfusion. The final presentation of the AWTRS 2010 Meeting was delivered by University of Sydney’s Frances Henshaw entitled “Wound Closure in a Diabetic Animal Model is accelerated by Topical Connective Tissue Growth Factor (CTGF)”. The elevated presentation of CTGF in healing diabetic wounds initiated this intriguing investigation where control or diabetic rats were wounded and treated with topical CTGF. Significant wound healing responses were observed in diabetic rats, while non-diabetic controls showed no change, providing a novel target of interest for future research into the treatment of chronic diabetic wounds.

## **Conclusion**

The Second Meeting of the Australasian Wound and Tissue Repair Society was a highly dynamic, informative and inspiring conference without any hesitation to the contrary. The scientific program was well conceived and supported by many internationally reputable researchers. There were numerous opportunities throughout the conference to engage other scientists and discuss current research, project development and even begin seeding collaborative research endeavours. Each session offered an interesting theme and thus provided a wide scope of the current global research occurring within the field. The inaugural AWTRS Master Class was indeed a highlight of the meeting, albeit it was the predecessor to the main conference but it successfully facilitated large group discussions and the in-depth dissemination of current tissue repair research data. In addition, the generous support of all the conference sponsors should be acknowledged, especially Smith&Nephew and phoenix eagle, for without sponsorship many conferences would fail to operate. And, last but certainly not least, the authors would like to acknowledge the tremendous efforts of the conference co-convenors, Hilary Wallace and Mark Fear, and the organising committee, Allison Cowin, Rachael Murray, Ian Darby, Geoff Sussman and Zee Upton. On a final note, the authors would encourage the scientific community with an interest in tissue repair research to attend and participate in the future AWTRS meeting scheduled for 2012.