BIOGRAPHICAL SKETCH

NAME	CURRENT POSITION TITLE
Cheng, Bill billcheng0104@gmail.com	POSTDOCTORAL RESEARCH FELLOW

INSTITUTION AND LOCATION	DEGREE	YEAR	FIELD OF STUDY
University of New South Wales, Sydney, Australia	B.S. (Honor 1st Class)	2003 Mar - 2006 Nov	Biotechnology
University of New South Wales, Sydney, Australia	Ph.D.	2008 Mar - 2012 Mar	Biomedical Engineering
Institute of Biology and Chemistry of Proteins, CNRS, Lyon, France	PDF	2012 May - 2013 Oct	Cell-Matrix Interactions
Institute of Biomedical Science, Academia Sinica, Taiwan	PDF	2013 Nov - 2017 Feb	Cardiovascular Science
Department of Materials Science and Engineering, National Chiao Tung University, Taiwan	PDF	2017 Apr - Present	Materials Science

A. Positions and Honors

Professional Memberships

2008 - 2012 Member, Matrix Biology Society for Australia and New Zealand
2010 - Present Member, International Society for Matrix Biology
2015 - Present Member, Biomedical Engineering Society

Awards

2008 Australia Postgraduate Award (Industry) Scholarship, with additional top-up: awarded based on Academic Merit
2008 State of NSW Finalist for AusBiotech Student Excellence Award
2010 International Society for Matrix Biology (ISMB) Student Travel Award: awarded based on best written abstract
2015 Winner of IBMS, Academia Sinica Travel Award Competition
2016 1st Place in Postdoc & Young Investigator Oral Presentation Award in Tissue Engineering and Regenerative Medicine International Society- Asia Pacific Meeting (TERMIS-AP)
2016 Best Poster Award at The 2nd International Symposium on Biointerface Science and Engineering, in conjunction with the 4th Hoffman Family Symposium.
2016 Selected to represent Academia Sinica and Taiwan at 2017 Global Young Scientist Summit at Singapore, and selected by the summit organizing committee as one of the Top

5 Winners: https://www.gvm.com.tw/article.html?id=37187

2016 105 年度科技部博士後研究人員學術著作獎 **“模擬血小板及單核球的生理性作用以作為新型心臟標靶治療的策略”**

B. Contribution to Science

1. My early publications are based the work that I did during my PhD training, which was investigating the role of perlecan in wound healing, in which perlecan itself is abundantly present in vascular walls. This project was sponsored by a US company called Hemcon, which specialize in making chitosan bandages for US military. Although chitosan bandages are effective in treating the vascular wounds that US soldiers suffered on battlefield, the application was limited due to the poor understanding in how chitosan promoted wound healing. After applying the bandage to a vascular wound, perlecan are found to rapidly deposit onto the chitosan surface. Platelets are demonstrated to have have high affinity for the protein core of the chitosan-bound perlecan, and that the glycosaminoglycan (GAG) components of the protein created a growth factor gradient to recruit platelets to the material. The findings were further verified by large animal studies, showing perlecan-coated chitosan bandage promoted faster wound healing compared to normal chitosan bandage.
    a. Lord M.S., Yu W., **Cheng B.**, Simmons A., Poole-Warren L., Whitelock J.M. (2009). The modulation of platelet and endothelial cell adhesion to vascular graft materials by perlecan. *Biomaterials* **30**: 4898-4906
    b. Lord MS., **Cheng B.**, McCarthy S.J., Jung M., Whitelock J.M. (2011). The modulation of platelet adhesion and activation by chitosan through plasma and extracellular matrix proteins *Biomaterials* **32**: 6655 – 6662

2. I continued to work on cell-matrix interactions in my first postdoctoral training, in which the project was looking at the roles of cytoplasmic proteins in regulating the interactions of membrane proteins at tight junction, as well as the interactions with matrix proteins. From the study, I was able demonstrate novel interactions between syndecan-4 (membrane protein) and Par-3 (cytoplasmic protein). The interaction was found to be critical for cell polarization. During this postdoc training, I also did some work with my PhD supervisors, in which I characterized gene expression pattern of perlecan in human mast cells, and the bioactivity of different perlecan isoforms.
    a. Jung M, Lord MS, **Cheng B**, Lyons JG, Alkhouri H, Hughes JM, McCarthy SJ, Iozzo RV, Whitelock JM. (2013). Mast cells produce novel shorter forms of perlecan that contain functional endorepellin: a role in angiogenesis and wound healing. *Journal of Biological Chemistry* **288**: 3289-3304
    b. Lord MS, Jung M, **Cheng B**, Whitelock JM. (2014). Transcriptional complexity of the HSPG2 gene in the human mast cell line, HMC-1. *Matrix Biology* **35**:123-131
    c. **Cheng B**, Montmasson M, Terradot L, Rousselle P. (2016). Syndecans as Cell Surface

Receptors in Cancer Biology. A Focus on their Interaction with PDZ Domain Proteins. *Frontiers in Pharmacology* **2**:7:10

d. Lord MS, **Cheng B**, Tang F, Lyons JG, Rnjak-Kovacina J, Whitelock JM. (2016). Bioengineered human heparin with anticoagulant activity. *Metabolic Engineering* **38**:105-114

3. My 2nd postdoctoral training, which was focusing on developing novel drug delivery system for heart targeting. To date, although significant progress has been made in identifying novel drug targets for treating patients with myocardial infarction, there is still no specific treatment that targets myocardial injury because of poor drug delivery. I was fortunate to able to work with some of the best cardiologists and animal surgeon in Taiwan, in which we had published papers on the therapeutic outcomes after applying different combination of cells and materials to porcine model of myocardial infarction. Furthermore, I had led a team to develop a novel drug delivery system that does not rely on the enhanced permeability and retention (EPR) effect for heart targeting. Instead the delivery system hitchhikes on the recruited monocytes, using the cells as 'bus shuttles' carrying the delivery system directly to the heart. It is believe this novel delivery strategy opens up a new paradigm in drug delivery, as there are many well-known cardioprotective drugs have poor therapeutic outcome due to low presence in the heart.

   a. Lin YD, Chang MY, **Cheng B**, Liu YW, Lin LC, Chen JH, Hsieh PCH. (2015). Injection of Peptide nanogels preserves postinfarct diastolic function and prolongs efficacy of cell therapy in pigs. *Tissue Engineering Part A* **21**:1662-1671

   b. Chang MY, Chang CH, Chen CH, **Cheng B**, Lin YD, Luo CY, Wu HL, Yang YJ, Chen JH, Hsieh PCH. (2015). The time window for therapy with peptide nanofibers combined with autologous bone marrow cells in pigs after acute myocardial infarction. *PLoS One* **10**:e0115430

   c. Chang MY, Huang TT, Chen CH, **Cheng B**, Hwang SM, Hsieh PCH. (2016). Injection of Human Cord Blood Cells with Hyaluronan Improves Postinfarction Cardiac Repair in Pigs. *Stem Cells Translational Medicine* **5**:56-66.

   d. **Cheng B**, Toh EK, Chen K, Chang Y, Hu JC, Wu H, Chau LY, Chen P, Hsieh PC (2016). Biomimicking platelet-monocyte interactions as a novel targeting strategy for heart healing. *Advance Healthcare Materials* **5**: 2686-2697.

   e. Wu JPJ, **Cheng B**, Roffler SR, Lundy DJ, Yen CYT, Chen P, Lai JJ, Pun SH, Stayton PS, Hsieh PCH (2016) Reloadable multidrug capturing delivery system for targeted ischemic disease treatment. *Science Translational Medicine* **8**: 365ra160

4. Currently, I'm working as Postdoctoral Research fellow at Dr. Hsin-Chieh Lin's lab, where I am learning latest knowledge and skills in making self-assembling peptides and self-healing materials for different biomedical applications. To date, I am an author on multiple manuscripts from Dr. Lin's lab, and one first-author paper. I am also currently working on three first-authors

papers, which all expected to be submitted soon.

a. **Cheng B**, Xing YM, Shih NC, Weng JP, Lin HC (2018) Formulation and characterization of 3D printed grafts as vascular access for potential use in hemodialysis. *RSC Advanced* **8**: 15471-15479

b. Talloj SK, **Cheng B**, Weng JP, Lin HC (2018) Glucosamine-Capped Supramolecular Nanotubes for Human Mesenchymal Cell Therapy. *ACS Applied Materials & Interfaces* **10**: 15079–15087

c. Zhan FK, Liu JC, **Cheng B**, Lai TS, YC Liu, Lin HC, Yeh MY (2018) Tumor Targeting with DGEA Peptide Ligands: A New Aromatic Pep-tide Amphiphile for Imaging Cancers. *Chemical Communications.* Accepted

5. Other Publications

a. Lord MS, **Cheng B**, Farrugia BL, McCarthy S, Whitelock JM (2017) Platelet factor 4 binds to vascular proteoglycans and controls both growth factor activities and platelet activation. *Journal of Biological Chemistry* **292**: 4054-4063

b. **Cheng B**, Chen HC, Chou IW, Tang TW, Hsieh PCH (2017) Harnessing the early post-injury inflammatory responses for cardiac regeneration. *Journal Biomedical Science* **24** :7

c. Tsang TJ, Hsueh YC, Wei EI, Lundy DJ, **Cheng B**, Chen YT, Wang SS, Hsieh PCH (2017) Subcellular Localization of Survivin Determines Its Function in Cardiomyocytes. *Theranostics.* **7**: 4577-4590

C. International Conference (Oral Presentation)

1. **Cheng B**, Toh EK, Chen KH, Chang Y, Chau L, Chen P, Hsieh P. Platelet-like Proteoliposomes Enable Macrophage Targeting Therapy. 2015 Annual Meeting of Biomedical Engineering Society, Tampa, FL, USA
2. **Cheng B**, Toh EK, Chen KH, Chang Y, Chau L, Chen P, Hsieh P. Platelet-like Proteoliposomes Enable Active Drug Delivery to Infarcted Heart Tissue. 2016 World Biomaterials Congress, Montreal, Canada
3. **Cheng B**, Toh EKW, Chen KH, Chang YC, Hu CMJ, Wu HC, Chau LY, Chen P, Hsieh PCH. Biomimicking Platelet-Monocyte Interactions as a Novel Targeting Strategy for Acute Myocardial Infarction. 2016 Tissue Engineering and Regenerative Medicine International Society- Asia Pacific Meeting, Tamsui, New Taipei City, Taiwan

D. Patents

1. Hsieh PC, Wu PJ, Roffler S, **Cheng B**. “A reloadable delivery system for systemically administered therapeutics” pending (US, PCT). (Assignee: Academia Sinica)
2. Hsieh PC, **Cheng B**. “Platelet-like proteoliposomes and methods of use”, US provisional. (Assignee: Academia Sinica)