2012 Chang Gung Memorial Hospital Neuro-Oncology Conference —Translational Research in Brain Tumor

2012年長庚紀念醫院神經腫瘤國際研討會 —腦瘤之轉譯醫學

Date: Saturday, October 20, 2012
Venue: First Congress Hall, Lin-Kou Medical Center, Chang Gung Memorial Hospital

Organized & Hosted by
Department of Neurosurgery, Chang Gung Memorial Hospital Linkuo Branch
Taiwan Neurosurgical Society
Taiwan Society for Neuro-Oncology
Chang Gung Memorial Hospital Cancer Center
Neural Medical Science Research Foundation

- 機器人手術在神經外科的運用
- 奈米科技於分子生物學及腫瘤學上的運用
- 前臨床動物實驗模式之建立
- 腦瘤之免疫治療及藥物傳輸新觀念
- 腦瘤之系統生物學分析

長庚紀念醫院
Chang Gung Memorial Hospital

各位醫界及學界先進：

腦部腫瘤向來都是醫學上的重要課題，長久以來，世界各地的專家不斷的致力於相關研究，或以臨床角度進行新穎治療方法的開發，或運用生物科學觀點進行疾病機制之探討，均卓然有成。為了提供國內外專家更多之學術交流及討論的機會，長庚醫院今年特別籌辦一場國際性研討會，廣邀致力於惡性腦瘤研究的學者來台參加。期待各位先進能夠踴躍參與並不吝分享您的珍貴經驗。

在本研討會中，我們邀請了許多傑出的講員和各位分享治療及研究的創新突破及珍貴經驗。於創新治療方面，來自加拿大 Univ. of Calgary 的 Dr. Garnett R. Sutherland 為運用 robotic surgery 於神經外科手術的先驅；長庚醫院吳杰才主任則將闡述李石增行政長在運用電腦輔助腦部及脊椎手術方面所獲得的突破性成就。於腦瘤生物學探討方面，我們邀請到了來自加州理工學院，獲得三個美國院士榮譽的知名學者 Dr. James R. Heath 介紹運用奈米科技於惡性腦瘤單細胞分析的研究成果。在結合惡性腦瘤的基礎及臨床研究方面，於加州大學舊金山分校腦研究中心擔任 associate director 的 Prof. C. David James 在腦瘤之轉譯醫學研究成果輝煌，將分享他以腦瘤動物模式運用於臨床試驗上的豐富經驗。而加州大學舊金山分校的 Dr. Krystof Bankeiwicz 於運用 convection-enhanced delivery 輸送化療藥物進入腦部之經驗，在學界佔有領先的地位。目前服務於中國醫藥大學的楊文光教授則為台灣在腦瘤免疫治療領域的先驅。而來自美國西雅圖系統生物學研究所的 Dr. Cory Cannon Funk 及 Dr. Leslie Chen 將分享利用高通量分析平台如蛋白質體學及基因體學進行惡性腦瘤系統生物學研究的心得。

本次的內容從臨床療法到基礎研究進而延伸到腦瘤的轉譯醫學，具體而微的包含了腦瘤研究的多重角度。同時主持各個講題的座長均為國內學者的一時之選，相信必然可為討論內容發揮加成效果。我們非常榮幸可以邀請到這些傑出的研究學者來台共聚一堂，期待這些前瞻性之研究能激起更多智慧火花，引領台灣在腦部腫瘤之轉譯研究再大步向前。

10 月 20 日誠摯盼望您的參與及分享，共襄盛舉。

李石增

Lee, Shih Tseng, MD
Chief of Administrative Officer,
Chang Gung Memorial Hospitals

Wei, Kuo-Chen, MD
Chairman,
Neurological Surgery

Wu, Chieh-Tsai, MD
Vice Chairman,
Neurological Surgery

民國 101 年 10 月

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08:10 ~ 08:40	**Administration**	
Opening Ceremony		
08: 40 ~ 08:45	**Welcome**	Dr. Wen-Neng Ueng Superintendent, Chang Gung Momorial Hospital
08:45 ~ 08:50	**Introduction**	Dr. Shih-Tseng Lee Chief of Administrative Office, Chang Gung Momorial Hospital
08:50 ~ 09:00	**Opening Remarks**	Prof. David Fairholm Assistant Dean, Faculty Development and Educational Support Faculty of Medicine, The University of British Columbia
Session 1 Chairs: Prof. Jui-Chang Tsai, Chief, Department of Neurosurgery, National Taiwan University Hospital Prof. Chung-Ching Chio, Superintendent, Chi Mei Hospital		
09:00 ~ 09:50	**MR-Guided Robotic Surgery**	**Prof. Garnette R. Sutherland**
09:50 ~ 10:40	**Advance Computer Aided Neurosurgery**	**Dr. Chieh-Tsai Wu**
10:40 ~ 11:00	**Coffee Break**	
Session 2 Chairs: Prof. Lu-Hai Wang, Distinguished Investigator and Director, Department of Molecular and Genetic Medicine, National Health Insititute Prof. Pin Ouyang, Chief, Department of Anatomy, Chang-Gung University		
11:00 ~ 11:50	**Highly Multiplexed, Quantitative Single Cell Proteomics for Clinical and Fundamental Applications in Oncology**	**Prof. James R. Heath**
11:50 ~ 12:40	**Preclinical Testing of Experimental Therapeutics for Treating Brain Tumors: Raising the Bar for Clinical Trial Evaluation**	**Prof. David James**
12:40 ~14:00	**Lunch**	
Session 3 Chairs: Prof. Shinn-Zong Lin, Superintendent, China Medical University Beigang Hospital Dr. Chen-Nen Chang, Professor, Department of Neurosurgery, Chang-Gung Memorial Hospital		
14:00 ~ 14:50	**Direct MR-guided Intratumoral Delivery of Therapeutics for GBM**	**Prof. Krystof Bankiewicz**

14:50 ~ 15:40	**Autologous Dendritic Cell/Tumor Antigen Adjuvant Immunotherapy of Glioblastomas: Learning from Two Clinical Trials in Taiwan**	**Prof. Wen-Kuang Yang**
15:40 ~ 16:00	**Coffee Break**	
Session 4 Chairs: Dr. Yu-Sun Chang, Professor, Graduate Institute of Biomedical Science, Chang-Gung Memorial Hospital Dr. Yu-Shan Jou, Research Fellow, Institute of Biomedical Sciences, Academia Sinica		
16:00 ~ 16:50	**RNA editing of miRNA binding sites in the U87MG glioblastoma cell line**	**Dr. Cory Cannon Funk**
16:50 ~ 17:40	**Personalized cancer therapy by whole cancer genome sequencing**	**Dr. Leslie Chen**
17:40 ~ 18:00	**Closing**	**Dr. Shih-Tseng Lee** **Chief of Administrative Office, Chang-Gung Memorial Hospital**

Lectures

MR-Guided Robotic Surgery

Garnette Sutherland, MD

University of Calgary, Calgary, Alberta

MR-Guided Robotic Surgery

Garnette Sutherland, M.D.

University of Calgary, Calgary, Alberta

To improve upon interoperative lesion localization and resection control, several investigators translated MR-imaging technology into the operating room. The systems were initially of an open configuration and contained relatively low field magnets. Signal to noise and contrast to noise were improved with the evolution of iMRI systems with higher field magnets, which are closed systems. These closed systems interrupted surgery for imaging, and therefore the systems are generally used to evaluate the extent of surgery rather than to guide surgery. In order to fully utilize the rich array of images, surgery must occur inside the magnet while images are being produced. A robotic surgical system provides the ability to perform surgery inside the magnet so that surgery and imaging can occur simultaneously.

Serendipitously, the remote workstation from which the surgeon teleoperates the robotic manipulators centralizes and fuses imaging data, enabling the surgeon immediate access to current patient information as well as digitized knowledge from the global community. Contemporary MR compatible robots take advantage of the many ongoing advances in material science, audio-visual systems, and haptics. Miniaturization of components enables the process towards creation of dexterous manipulators similar to the human hand. Furthermore technology offers the possibility of accessing visual, tactile, and audio information outside the range of human senses. When current advances in molecular imaging technology combine with these advances in robotic surgery, this paradigm has the potential to convert the scope of surgery from the present level of the organ to the cellular dimension.

CURRICULUM VITAE

Garnette Roy Sutherland

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UNDERGRADUATE STUDIES

1971–1974	Faculty of Science, University of Manitoba
	Degree: B.Sc.
1974–1978	Faculty of Medicine, University of Manitoba
	Degree: M.D.

GRADUATE STUDIES

July 1978– June 1979	General Surgery, University of Western Ontario
	Internship
July 1979 -June 1984	Neurosurgery, University of Western Ontario
	Directors: Drs. C.G. Drake and S.J. Peerless
	Degree: FRCS

POSTGRADUATE APPOINTMENTS

Sept 1984 - July 1989	Assistant Professor
	Departments of Surgery (Neurosurgery) and Pharmacology,
	University of Manitoba
July 1989 - April 1993	Associate Professor, Departments of Surgery (Neurosurgery)
	and Pharmacology, University of Manitoba
April 1993 – Oct 2003	Professor and Chief, Division of Neurosurgery,
	Department of Clinical Neurosciences, University of
	Calgary
July 1997 – Dec 2006	Director, Seaman Family MR Research Centre
	Calgary, Alberta

October 1995 -	Visiting Scientist, National Research Council Canada Institute for Biodiagnostics, Winnipeg, Manitoba
October 2003 -	Professor, Division of Neurosurgery, Department of Clinical Neurosciences, University of Calgary

ACADEMIC AWARDS AND DISTINCTION

Dean's Honour List – University of Manitoba (1971–74)
American Trauma Society Award: Best original paper (1980)
Surgical Residents' Day Award – University of Western Ontario (1980-1982)
American College of Surgeons Award for the Best Paper Presented by a Surgical Resident: Dr. Howard Lesiuk (as supervisor; 1986)
Manitoba Medical Association Scholastic Award (1992)
Canadian Stroke Society Award for Best Paper: Randy Tyson (as supervisor; 1992)
Canadian Stroke Society Award for Best Paper: Deon Louw (as supervisor; 1995)
Finalist, Outstanding Leadership in Alberta Technology, Alberta Science and Technology Leadership Awards Foundation (1998)
Alberta Neurosurgical Society Award for Best Paper by a Resident: Dr. Clare Gallagher (as supervisor; 2003)
Ernest C. Manning Awards Foundation, Award of Distinction (2004)
Canadian Healthcare Manager's Who's Who in Healthcare, Award for Medical Research (2005)
Federal Partners in Technology Transfer, Excellence in Technology Transfer Award (2007)
Alberta Science and Technology Leadership Awards Foundation, Outstanding Leadership in Alberta Technology (2007)
City of Calgary, Signature Award (2008)
The Society for the Advancement of Games and Simulations in Education and Training Best paper presented at the 2008 Conference, May Choi (as supervisor; 2008)
Hotchkiss Brain Institute Summer Student Research Symposium, Award for Best Paper: Shawna Pandya and Jason Motkoski (as supervisor; 2008)
Life Science Alley Luminary Award (2011)
Order of Canada (2012)
Diamond Jubilee Medal (2012)

NATIONAL & INTERNATIONAL COMMITTEE MEMBERSHIPS

University of Manitoba Research Advisory Committee (1989-92)
Cardiovascular Neuroregulation, Neurophysiology and Stroke Committee,

Canadian Heart and Stroke Foundation (Deputy Chairman, 1989-92)
Cardiovascular Neuroregulation, Neurophysiology and Stroke Committee, Canadian Heart and Stroke Foundation (Chairman, 1992-95)
Scientific Review Committee, Canadian Heart and Stroke Foundation (Vice-Chairman, 1995-96)
Scientific Review Committee, Canadian Heart and Stroke Foundation (Chair, 1996 - 98)
Hypertension/Stroke Working Group, Canadian Task Force for Cardiovascular Science (Co-Chairman, 1992)
Canadian Journal of Neurological Sciences (Editorial Board, 1993–99)
Alberta Stroke Program (Director, 1993-96)
Sanofi-Winthrop (Scientific Advisor, 1993-2000)
Bayer Inc. (Scientific Advisor, 1995-2001)
Group Grant Evaluation Committee, Heart & Stroke Foundation of Saskatchewan (1998)
National Hemostasis Management Consultants Group (2001-)
Novo Nordisk (Chair, ICH Canadian Advisory Board, 2003-)
Novo Nordisk (Member, ICH International Advisory Board, 2004-)

RESEARCH INITIATIVES / COLLABORATIONS

Canadian Stroke Research Group (1993 - 1998)
Intraoperative Magnetic Resonance Research Program (IMRIS; BrainLAB; Marconi Medical Systems; Magnex Scientific UK; Surrey Medical Imaging Systems UK; National Research Council Canada; Foothills Medical Centre; University of Calgary, 1995-2008)
NeuroArm: An MR compatible robot for neurosurgery (MD Robotics, University of Calgary, Foothills Medical Centre, National Research Council Canada, IMRIS, 2001-)
Advancing iMRI (IMRIS, University of Calgary, Foothill Medical Centre, National Research Council Canada, MD Robotics, 2008-)

COMPANY CREATION

IMRIS Incorporated, 1999 (*Co-Founder*)
NeuroArm Surgical Ltd., 2008 (*Co-Founder, Director, Vice President*)
iRapidConsult Ltd., 2011 (*Co-Founder, Chairman of the Board*)

SELECTED PUBLICATIONS

Paper (within 5 years)

1. Sutherland GR, Newhook P, Feil G, Fielding T, Greer AD, Latour I. An image-guided MR compatible surgical robot. Neurosurgery 62: 286-293, 2008.

2. Sutherland GR, Latour I, Greer AD. Integrating an image guided robot with intaroperative MRI: A review of design and construction. IEEE Engineering in Medicine and Biology 27:59-65, 2008.
3. Sutherland GR, Kelly JJP, Boehm DW, Klassen JB. Ceramic aneurysm clips for improved MR visualization. Neurosurg 62 [ONS Suppl 2]: 400-406, 2008.
4. Sutherland GR, Tyson RL, Auer RN. Truncation of the Krebs Cycle During Hypoglycemic Coma. Medicinal Chemistry 4:379-385, 2008.
5. Greer AD, Newhook P, Sutherland GR. Human-machine interface for Robotic Surgery and Stereotaxy. IEEE/ ASME Transactions on MRI Compatible Mechatronic Systems 13: 355-361, 2008.
6. Sutherland CS, Hill MD, Kaufmann AM, Silvaggio J, Demchuck AM, Sutherland GR. Recombinant Factor VIIa plus Surgery for Intracerebral Hemorrhage. Can J Neurol Sci 35:567-572, 2008.
7. Lu J-Q, Khalil M, Hu W, Sutherland GR, Clark AW. Tumor to tumor metastasis: esophageal carcinoma metastatic to an intracranial paraganglioma. J Neurosurg 110:744-748, 2009.
8. Gallagher CN, Tyson RL, Sutherland GR. Differential Neuronal and Glial Metabolic Response During Hypothermia. Neurosurgery 64: 555-561, 2009.
9. Eesa M, Sharma P, Mitha A, Sutherland GR, Goyal M. Angiographic CT with selective microcatheterization in delineating surgical anatomy in a dural AV fistula. J Neurosurg 111: 916-918, 2009.
10. Gallagher CN, Carpenter KLH, Grice P, Howe DJ, Mason A, Timofeev I, Menon DK, Kirkpatrick PJ, Pickard JD, Sutherland GR, Hutchinson PJ. The human brain utilizes lactate via the TCA cycle: a 13C-labelled microdialysis and high-resolution NMR study. Brain 132:2839-2849, 2009.
11. Pandya S, Motkoski JW, Serrano-Almeida C, Greer AD, Latour I, Sutherland GR. Advancing Neurosurgery with Image-Guided Robotics. J Neurosurg 111:1141-1149, 2009.
12. Choi MY, Sutherland GR. Surgical Performance in a Virtual Environment. On the Horizon. 17:345-355, 2009.
13. Zhang Z, Clime L, Tomanek B, Sutherland GR, Veres T. Low-Temperature First-Order Reversal Curves and Interaction Effects on Assemblies of Iron-Oxide Nanoparticles. Physica B 404: 3666-3670, 2009.
14. Levy R, Cox RG, Hader WJ, Myles T, Sutherland GR, Hamilton MG. Application of High-Field Magnetic Resonance Imaging in Pediatric Neurosurgery. J Neurosurg: Pediatrics 4: 467-474, 2009.
15. Blasiak B, Tomanek B, Abulrob A, Iqbal U, Stanimirovic D, Albaghdadi H, Foniok T, Lun X, Forsyth P, Sutherland GR. Detection of T2 changes in an early

mouse brain tumor. Mag Res Imag 28: 784-789, 2010.
16. Iqbal U, Trojahn U, Albaghdadi H, Zhang J, OConnor-McCourt M, Stanimirovic D, Tomanek B, Sutherland G, Abulrob A. Kinetic Analysis of Novel Mono- and Multivalent VHH-Fragments and their Application for Molecular Imaging of Brain Tumors. Br J Pharm 160: 1016-1028, 2010.
17. Sutherland CS, Kelly JJP, Morrish W, Sutherland GR. Identification of Disappearing Brain Lesions with intraoperative MRI Prevents Surgery. Neurosurgery 67: 1061-1065, 2010.
18. Samad MD, Hu Y, Sutherland GR. Effect of force feedback from each DOF on the motion accuracy of a surgical tool in performing a robot-assisted tracing task. IEEE Eng Med Biol Soc 1: 2093-2096, 2010.
19. Lang MJ, Sutherland GR. Informatic Surgery: The Union of Surgeon and Machine. World Neurosurg 74:118-120, 2010.
20. Lang MJ, Greer AD, Sutherland GR. Intra-operative MRI at 3.0 Tesla: A Moveable Magnet. Acta Neurosurgica Supplement 109:151-156, 2011.
21. Lang MJ, Greer AD, Sutherland GR. Intra-operative Robotics: neuroArm. Acta Neurosurgica Supplement 109:231-236, 2011.
22. Lang MJ, Kelly JJP, Sutherland GR. A Moveable 3-Tesla Intra-operative MRI System. Neurosurgery 68[ONS Suppl 1]:ons168-ons179, 2011.
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24. Blasiak B, Zhang Z, Zhang X, Foniok T, Sutherland GR, Veres T, Tomanek B. The Effect of Coating Fe3O4/silica core/shell Nanoparticles on T2 Relaxation Time at 9.4T. European Physical Journal-Applied Physics 55:10401-10404, 2011.
25. Scozzafava J, Sutherland GR. Giant Intracranial Aneurysm. CMAJ PMID: 21482656, 2011.
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27. Tomanek B, Iqbal U, Blasiak B, Abulrob A, Albghdadi H, Matyas J, Ponjevic D, Sutherland GR. Evaluation of Brain Tumor Vessels Specific Contrast Agents for Glioblastoma Imaging.Neuro Oncol 14:53-63, 2012.
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29. Lama S, Sutherland GR. Intracerebral Hemorrhage: The Pot Continues to be Stirred. World Neurosurgery 77: 57-58, 2012.
30. Sutherland GR. Surgeon at a Workstation: Information Age Surgery. Cureus Online Journal, www.cureus.com . April 10, 2012.
31. Dhaliwal P, Hurlbert RJ, Sutherland GR. Image Guided Surgery of the Craniovertebral Junction.World Neurosurgery (In Press, 2011).
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33. Cossetto T, du Plessis S, Sutherland GR. The effect of cage subsidence after discectomy on clinical outcome: A review. (Submitted CJNS, 2012).
34. Mert A, Buehler K, Sutherland GR, Tomanek B, Widhalm G, Kasprian G, Knosp E, Wolfsberger S. Advancing Brain Tumor Surgery with 3D Surface Visualization. (Submitted Neurosurgery, 2012).
35. Sutherland GR, Lama S, Gan LS, Wolfsberger S, Zereinia K. Merging Machines with Microsurgery: Clinical Experience with neuroArm. (Submitted J Neurosurg, 2012).
36. Lama S, Dolati P, Sutherland GR. Controversy in the Management of Lenticulostriate Artery Dissecting Aneurysm: A case report and review of literature. (Submitted World Neurosurgery, 2012).
37. Lacey C, Sutherland GR. Advancing Neurosurgery Through Translational Research.Neurosurgery (In Press, 2012).
38. Motkoski JW, Yang FW, Sutherland GR. Toward Robot-Assisted Neurosurgical Lasers. (Submitted IEEE Transactions on Biomedical Engineering, 2012).
39. Sutherland GR, Wolfsberger S, Lama S, Zarei-nia K. The Evolution of neuroArm. Neurosurgery (In Press, 2012)

Monographs and Book Chapters (within 5 years)

1. Auer RN, Dunn JF, Sutherland GR. Hypoxia and related conditions. In: S Love, DN Louis and DW Ellison (eds), Greenfield's Neuropathology Eighth Edition. Edward Arnold (Publishers) Limited, London, 1:64-119, 2008.
2. Sutherland GR, Motkoski JW, Sutherland CO, Greer AD. A new view of robotic surgery. In B Goode (ed), BioOptics World. Pennwell Corp. (Publisher) NH, 2: 18-22, 2009.
3. Lwu S, Sutherland GR. The Development of Robotics for Interventional MRI. In: C Truitt (ed), Neurosurgery Clinics of North America 20:193-206, 2009.
4. Lwu S, Sutherland GR. Neurosurgical Robots- A Review. In: W Hall, Nimsky C and Truwit CL (eds), Intraoperative MRI-Guided Neurosurgery. Thieme Medical (Publishers) Inc, New York, 23:222-232, 2010.

5. Kaibara T, Spetzler RF, Sutherland GR. Intra-operative MR Imaging and Cerebrovascular Surgery. In: W Hall, Nimsky C and Truwit CL (eds), Intraoperative MRI-Guided Neurosurgery. Thieme Medical (Publishers) Inc, New York, 23:170-177, 2010.
6. Lang MJ, Sutherland GR. Technological Convergence in the Neurosurgical Operating Room. Commentary, World Neurosurg 74:107-108, 2010.
7. Singh AD, Sutherland GR. Intraoperative MRI-guided Resection of Meningioma. In: Al-Mefty O,de Monte F, McDermott MW (eds), Meningiomas 2nd Edn Thieme Medical Publishers, New York, 347-355, 2011.
8. Lang MJ and Sutherland GR. The Vision of Robotic Neurosurgery. CNSQ 12:16-17, 2011.
9. Sutherland GR. The Multiple Dimensions of Translational Research. Translational Medicine Research, 2 (1): 1-10, 2012.
10. Motkoski JW and Sutherland GR. Progress in Neurosurgical Robots. In: Jolesz F(ed) Intraoperative Imaging and Image Guided Therapy. (In Press, 2012)
11. Cossetto TY, Zareinia K and Sutherland GR. Neurosurgery. In: Surgical Robotics, Woodhead Publishing Ltd, Cambridge. (In Press, 2012)
12. Lama S, Wolfsberger S, Sutherland GR. Optimal Resection of Insular Glioma with Image-Guided Technologies. In: Al-Mefty O (ed) Controversies in Neurosurgery. (In Press, 2012)

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1. Hoult D, Saunders JK, Sutherland GR, and Roberts FA. Surgical Procedure with Magnetic Resonance Imaging. U.S. Patent No. 5735278. April 7, 1998. Expiry date April 7, 2018.
2. Hoult D, Saunders JK, Sutherland GR, and Roberts FA. Surgical Procedure with Magnetic Resonance Imaging. European Patent No. 0886786. March 14, 1999. Expiry date March 14, 2017.
3. Hoult D, Saunders JK, Sutherland GR, and Roberts FA. Surgical Procedure with Magnetic Resonance Imaging. Japan Patent No. 532996. June 12, 2000. Expiry date June 12 2020.
4. Hoult D, Saunders JK, Sutherland GR, and Roberts FA. Surgical Procedure with Magnetic Resonance Imaging. Canada Patent No. 2246369. June 12, 2003. Expiry date June 12, 2023.
5. Sutherland GR, Louw D, McBeth P, Fielding T, Gregoris D. MRI Compatible Neurosurgical Robot System. U.S. Patent No. 7155316 B2. December 26, 2006. Expiry date December 26, 2026.
6. Sutherland GR, Louw D, McBeth P, Fielding T, Gregoris D. MRI Compatible

Neurosurgical Robot System. Canada Patent No. 2437286. August 13, 2003. Patent Pending.

7. Greer AD, Sutherland GR, Fielding T, Newhook P. Methods, devices and systems for automated movements involving medical robots. Canada Patent No. 2684472. April 9, 2009. Expiry date April 9, 2029.
8. Greer AD, Sutherland GR, Fielding T, Newhook P. Methods. Devices and systems for non-mechanically restricting and/or programming movement of a tool of a manipulator along a single axis. April 16, 2008. Canada Patent No. 2684459. March 26, 2009. Expiry date March 26, 2029.
9. Greer AD, Sutherland GR, Fielding T, Newhook P, Yu S. Methods, devices and systems relating to cameras configured to be positioned within the bore of a magnet and MR bore space illumination. Canada Patent No. 2684326. April 23, 2009. Expiry date April 23, 2029.
10. Greer AD, Sutherland GR, Fielding T, Newhook P, King S, Bewsky C, Matwiv J, Tomanek B, Smith M. Methods, devices and systems useful in registration. Canada Patent No.2684474. April 2, 2009. Expiry date April 2, 2029.
11. Greer AD, Sutherland GR, Fielding T. Devices for interfacing between manipulators and surgical tools. Canada Patent No. 2684459. March 5, 2009. Expiry date March 5, 2029.
12. Sutherland GR, Klassen J. Surgical tool for use in MR imaging. September 12, 2011. Patent Pending.
13. Rizun PR, Sutherland GR. Tactile Feedback Laser System. September 21, 2006. Patent Pending.

TRADEMARK

1. Sutherland GR. NeuroArm: An Ambidextrous, MR-compatible Neurosurgical Robot. SN78-155-649.

Advance Computer Aided Neurosurgery

Chien-Tsai Wu

Vice Chairman, Neurological Surgery; Director of Trauma Team, Chang Gung Memorial Hospital, Taoyuan, Taiwan R.O.C

Advance Computer Aided Neurosurgery

Chien-Tsai Wu

Chang Gung Memorial Hospital, Kweishan Taoyuan, Taiwan, R.O.C.

In recent years, the technique of computer aided image-guidednavigation has gained widespread acceptance in neurosurgery and changed theface of neurosurgical operating theaters. The advances of pre-operative and intra-operative medical imaging are able to provide unprecedented visualization of the normal and lesion structures of brain and spine, and together with 3D image registration and spatial tracking, they help greatly to guide pre-surgical planning and intra-operative decision making. Medical augmented reality is a specialized form of image- guided therapy.

With funding from the Ministry of Economic Affair R.O.C. (TDPA program), theNeurosurgery Department at the Chang-Gung Memorial Hospital andChang-Gung University in Taoyuanhas operated as a Medical Image Guided Therapy Center (The Medical Augmented Reality Center). We work todevelop a Medical Augmented Reality System, which help integrating the patient-specific medical images into the operation theatre facilities. Augmented reality (AR) system is augmenting the real world scene by "a computer generated, interactive, three-dimensional environment" and it provides the observer a sense of presence in themixed world of the virtual images merging with the real view. AR systems have been proposed as solutions in many domains, including entertainment, military training, engineer design, and medicine. Medical augmented reality (MAR) is viewed as one of the most important domains for AR systems, because imaging technology is much pervasive throughout the medical field. MAR can be applied so that the surgeons can see the image of 3D model correctly registered on the patient in the operating theater.

We will present our work using the MAR System for image guided therapy in the clinical situations, including neurosurgical procedures involving brain and spine, and procedures in other clinical fields.

CURRICULUM VITAE

Chieh-Tsai Wu 吳杰才

Office Address: Department of Neurosurgery
Chang Gung Memorial Hospital
5, Fu-Shing Street, Kweishan Taoyuan, Taiwan, ROC

Education: Taipei Medical College Sept. 1982 - June 1989

Employment Records:

1. July 1, 1991 - July 31, 1993
   Resident R1-R2
   Department of Surgery
   Taipei Municipal Chung Hsaio Hospital, Taipei, Taiwan
2. August 1, 1993 –July 1998
   Resident R3 - Fellow
   Department of Neurosurgery
   Chang Gung Memorial Hospital, Taoyuan, Taiwan
3. August 1, 1998- June 2003
   Full time Neurosurgery Attending
   Chang Gung Memorial Hospital, Taoyuan, Taiwan
4. July 2003- Present
   Chief of Pediatric Neurosurgery
   Chang Gung Child Hospital, Taoyuan, Taiwan
5. July 1,2008 – June 30,2012
   Chief of Division of Neuro-Trauma & Neuro-Critical Care Neurosurgery
   Chang Gung Memorial Hospital, Taoyuan, Taiwan
6. January 1,2012 - Present
   Associate Director of Department of Neurosurgery
   Chang Gung Memorial Hospital, Taoyuan, Taiwan

Selected Publication (within 5 years)

1. Tang-Her Jaing , Chieh-Tsai Wu , Shih-Hsiang Chen , Po-Cheng Hung , Kuang-Lin Lin, Shih-Ming Jung, Chen-Kan Tseng: Intracranial tumors in infants: a single institution experience of 22 patients . Childs Nerv Syst. 27(3):415-9, 2011.

2. Yuan-Lin Liao, Chia-Feng Lu, Yung-Nien Sun, Chieh-Tsai Wu , Jiann-Der Lee, Shih-Tseng Lee, Yu-Te Wu: Three-dimensional reconstruction of cranial defect using activecontour model and image registration. Med Biol Eng Comput. 49(2):203-11, 2011
3. Jiann-Der Lee, Chung-Hsien Huang, Tzu-yen Lan, shih-Tseng Lee, Chieh-Tsai Wu: A medical augmented-reality system for image-guided surgery using maker-added ICP. Int J Innov Comput. 7(11): 6523-6539, 2011 (IF 2.93)
4. Ching-Yi Lee, Chieh-Tsai Wu, Kuang-Lin Lin, Hsun-Hui Hsu: Occult cerebrospinal Fluid Fistula between ventricle and extra position o fthe ventriculo-peritoneal shunt tip Acta Neurologica Taiwanica 20(3): 197-201, 2011
5. Zhuo-Hao Liu, Nan-Yu Chen, Po-Hsun Tu, Shih-Tseng Lee , Chieh Tsai Wu*: The management and outcome of post-meningitic subdural empyema in infants. J Neurosurg Pediatrics 6:38-42,2010 (*: correspondence author)
6. Chih-teng Yu, Chun-Liang Chou, Fu-Tsai Chung, Chieh-Tsai Wu, Yuan-Chang Liu, Yun-Hen Liu, Ting-Yu Lin, Shu-Min Lin, Horng-Chuang Lin, Chun-Hua Wang, Han-Pin Kuo, Hao-Cheng Chen, Chien-Ying Liu: Tracheal torsion assessed by a computer-generated 3D image analysis predicts tracheal self-expandable metallic stent fracture. The Journal of Thoracic and Cardiovascular Surgery 140:769-776,2010
7. Jyi-Feng Chen, Shih-Tseng Lee, Chieh-Tsai Wu : A hollow cylindrical PMMA strut for cervical spine reconstruction after cervical multilevel corpectomy. J Spinal Disord Tech 23:321-327,2010
8. Jung-Hao Hsieh, Chieh-Tsai Wu*, Shih-Tseng Lee: Cervical intradural disc herniation after spinal manipulation therapy in a patient with OPLL: a case report and review of the literature. Spine 35(5): E149–E151, 2010 (*: correspondence author)
9. Bih-Yu Tsai, Kuang-Lin Lin, Tzou-Yien Lin, Cheng-Hsun Chiu, Wen-Jane Lee, Shao-Hsuan Hsia, Chieh-Tsai Wu, Huei-Shyong Wang: Pott's puffy tumor in children. Childs Nerv Syst 26:53–60,2010
10. Sai-Cheung Lee , Chieh-Tsai Wu , Shih-Tseng Lee , Po-Jen Chen: Cranioplasty using polymethyl methacrylate prosthesis. Journal of Clinical Neuroscience 16:56-63, 2009
11. Sai-Cheung Lee, Jyi-Feng Chen, Chieh-Tsai Wu, Shih-Tseng Lee: In situ local autograft for instrumented lower lumbar or lumbosacral posterolateral fusion. J Clin Neurosci. 2009 Jan;16(1):37-43.
12. Chen CC, Hsu PW, Erich Wu TW, Lee ST, Chang CN, Wei KC, Chuang CC, Chieh-Tsai Wu, Lui TN, Hsu YH, Lin TK, Lee SC, Huang YC. Stereotactic brain biopsy: Single center retrospective analysis of complications. Clin Neurol

Neurosurg. 2009 Dec;111(10):835-839. Epub 2009 Sep 17.
13. Jyi-Feng Chen, Chieh-Tsai Wu, Lee ST.; The use of a hollow polymethylmethacrylate cervical spacer with plating in the treatment of single level cervical disc disease.Chang Gung Med J. 2009 Jul-Aug;32(4):447-454.
14. Ming Horng Tsai, Alex Mun-Ching Wong, Tang-Her Jaing, Huei-Shyong Wang, Chuen Hsueh, Chieh-Tsai Wu: Treatment of Cerebellopontine Angle Tumors in Children -A Single Institution's Experience J Pediatr Hematol Oncol 31:832–834,2009
15. Yu-Ching Chang , Jiun-Chang Lee , Kuang-Lin Lin, Chieh-Tsai Wu , Alex Mun-Ching Wong : An unusual mechanism for brain abscess formation in a child. Childs Nerv Syst 25:1035–1038, 2009
16. 陳淑美;魏國珍;李石增;雷大雅;許永信;林子淦;莊啟政;徐鵬偉;吳杰才;謝宗哲;李世祥;張承能: Olfactory Groove Meningiomas: Surgical Experience from 35 Cases. Journal of The Chinese Oncology Society 25:38-45, 2009
17. Chieh-Tsai Wu,Shih-Tseng Lee, Jyi-Feng Chen, Kuang-Lin Lin, Shih-Hung Yen : Computer-Aided-Designed 3-Dimensional Titanium Mesh Used for Repairing Skull Base Bone Defect in Pediatric Neurofibromatosis 1: A Novel Approach Combining Biomodeling and Neuronavigation Pediatr Neurosurg 44(2):133-139,2008.
18. Po-Chuan Hsieh, Chieh-Tsai Wu*, Kuang-Lin Lin, Tang-Her Jaing, Tai-Ngar Lui, Shih-Ming Jung: The Clinical Experience of Medulloblastoma Treatment and the Significance of Time Sequence for Development of Leptomeningeal Metastasis. Childs Nerv Syst 24(1):1463–1467,2008(*: correspondence author)
19. Mei-Hwa Hu, Chieh-Tsai Wu*, Kuang-Lin Lin, Alex Mun-Ching Wong, Shih-Ming Jung, Chang-Teng Wu, Shao-Hsuan Hsia: Intramedullary spinal arteriovenous malformation in a boy of familial cerebral cavernous hemangioma. Childs Nerv Syst 24:393–396,2008. (*: correspondence author)
20. Tang-Her Jaing, Kuang-Lin Lin, Pei-Kwei Tsay, Chuen Hsueh, Po-Cheng Hung, Chieh-Tsai Wu, Chen-Kan Tseng: Treatment of Optic Pathway Hypothalamic Gliomas in Childhood: Experience With 18 Consecutive Cases. J Pediatr Hematol Oncol 30:222-224, 2008
21. Wen-Yu Chuang , Chi-Ju Yeh , Pao-Hsien Chu , Cheng-Chih Liao , Chieh-Tsai Wu, Chi-Cheng Chuang , Ping-Ching Pai , Chen-Kan Tseng , Shih-Ming Jung , Kuo-Chen Wei , Chen-Nen Chang: Expression of thyroid transcription factor-1 in brain metastases: A useful indicator of pulmonary origin. J Clinical Neuroscience 15: 643-646, 2008

Patents

1. 中華民國專利 新型第 M301642 號，名稱：鎖固螺釘及結合動態骨板之鎖固結構 李石增、吳杰才、陳志豐、許薰惠 2006/12/1 – 2016/6/18
2. 中華民國專利 新型第 M306498 號專利，名稱：膨脹螺釘組及其中空螺釘及內釘 李石增、陳志豐、吳杰才、許薰惠、劉南君 2007/2/21 – 2016/8/9
3. 中華民國專利 新發明第 I 297783 號，名稱：立體顯示裝置及其系統(Stereo Display Apparatus and System Thereof) 李石增、陳志豐、吳杰才、許薰惠 2008/06/11
4. 中華民國專利 新發明第 I 299294 號，名稱：可均勻對焦之雷射掃描系統及其方法 蔡朝旭、黃國忠、黃萬見、李石增、陳志豐、吳杰才 2008/08/1
5. 中華民國專利 新發明第 I 315195 號，名稱：網路醫療資訊系統 李石增、陳志豐、吳杰才、許薰惠、陳福榮、劉宗燦 2009/10/1
6. 中華民國專利 新發明第 I 324509 號，名稱：醫療用人骨修補裝置及其產生方法 李石增、吳杰才、嚴世宏、陳柏任、陳守義、王聖川
7. USA patent : Stereoscopic Display Apparatus (Accepted 2011 Dec),
8. 中華民國專利 201204322 偵測癲癇波之生理回饋式腦波機及其生理回饋方法 BIOFEEDBACK ELECTROENCEPHALOGRAPH FOR DETECTING EPILEPTIC WAVES AND BIOFEEDBACK METHOD THEREOF
9. 中華民國專利 201205329 生理回饋式腦波機及生理回饋方法 BIOFEEDBACK ELECTROENCEPHALOGRAPH AND BIOFEEDBACK METHOD
10. 中華民國專利 201114402 導引器及其製造方法

Technology Transfer

1. 定位校正裝置及挾持機構
2. 影像資料對位方法 。
3. 腦電位訊號分離系統及其方法
4. 醫療影像顯示裝置及其顯示操控方法
5. 適用於移動式多軸精密定位裝置之定位方法及其系統
6. 移動式機械手臂及移動支架
7. 移動式立體顯示裝置及其系統
8. 醫療定位用之機械手臂夾具

Highly Multiplexed, Quantitative Single Cell Proteomics for Clinical and Fundamental Applications in Oncology

James R. Heath

NSBCC Cancer Center and

Caltech Division of Chemistry and Chemical Engineering

Pasadena, CA

Highly Multiplexed, Quantitative Single Cell Proteomics for Clinical and Fundamental Applications in Oncology

James R. Heath

NSBCC Cancer Center and Caltech Division of Chemistry and Chemical Engineering, Pasadena, CA

Over the past few years we have developed a microchip platform called the Single Cell Barcode Chip (SCBC) that permits 20 or more cytoplasmic, membrane, and/or secreted proteins to be quantitatively assayed from individual cells, with up to 10,000 single cells analyzed in parallel. We have applied this technology in both fundamental and clinical applications, and I will discuss examples from each area. The clinical work involves separately profiling the engineered and acquired T cell immune responses in melanoma cancer patients participating in an engineered T Cell Receptor adoptive T cell immunotherapy trial being run by Dr. Toni Ribas at UCLA. For this study, we characterized the functional performance of several tumor-antigen-specific T cell phenotypes. We find that the assembled single cell data provides a compelling picture of the individual patient responses to the therapy, and that picture correlates well with clinical observations, and is helping inform our next generation clinical trials.

On the side of fundamental biology studies, we have investigated various physical aspects of the cancer glioblastoma multiforme (GBM, including the transition from normoxia to hypoxia. We have found that the transition is not continuous, but instead actually appears as a phase transition near 1.75% O_2 partial pressure. This observation leads to several significant predictions regarding to how hypoxic GBM tumors will respond to mTOR inhibitors. Those predictions are tested in both cell lines and tumor models, and found to be accurate.

CURRICULUM VITAE (Brief)

Jim Heath

Brief bio: Jim Heath is the Elizabeth Gilloon Professor and Professor of Chemistry at Caltech, and Professor of Molecular and Medical Pharmacology at UCLA. He serves as the Director of the NSB Cancer Center, an NCI-funded Cancer Center for Nanotechnology Excellence. He received his Ph.D. in 1988 from Rice University where he was the principle graduate student involved in the discovery of C_{60} and the fullerenes. He was a Miller Fellow at UC Berkeley between 1988 and 91, and joined the research staff at IBM Watson Labs in 1991. He took an faculty position at UCLA in 1994, and was the founding director of the California NanoSystems Institute (CNSI) prior to moving to his current position at Caltech in 2003. He has received a number of awards, including the Irving Weinstein Award from the American Association of Cancer Researchers and the Sackler prize in the physical sciences. In 2009 he was named by Forbes as one of the top 7 innovators in the world.

Disclosures: Founder: Integrated Diagnostics, Momentum Biosciences, NanoSys. Board Member: Sofie Biosciences, Women's Health Board, Qiagen.

Preclinical Testing of Experimental Therapeutics for Treating Brain Tumors: Raising the Bar for Clinical Trial Evaluation

C. David James, PhD

Department of Neurological Surgery and Brain Tumor Research Center, University of California, San Francisco, CA

Preclinical Testing of Experimental Therapeutics for Treating Brain Tumors: Raising the Bar for Clinical Trial Evaluation

C. David James, PhD

University of California, San Francisco, CA

This lecture will address a variety of topics related to the use of rodent models for pre-clinical evaluation of candidate therapeutics for treating brain tumors, and will include discussion of: maintenance options for tumor cell sources; the importance of appropriate anatomic modeling; brain tumor imaging approaches for orthotopic rodent models (bioluminescence and magnetic resonance); factors affecting experimental outcomes; use of therapeutic nanoparticles and associated administration options; acquired resistance to therapy; and novel combination therapies. In addition to these subjects, attendees of this lecture will be familiarized with the need for rigorous and stringent testing of candidate therapeutics, so that only the most promising therapies are advanced to clinical trial evaluation of efficacy when treating brain tumor patients.

CURRICULUM VITAE (Brief)

C. David James, PhD

Brief bio:

Dr. C. David James trained as a post-doctoral fellow at the Ludwig Institute for Cancer Research, Montreal, with Dr. Webster Cavenee, from 1986-89. During his post-doctoral training he developed an interest in the genetics and molecular biology of CNS tumors, which have served as the primary focus of his research for 25+ years. His first independent position was as a Senior Staff Investigator in the Department of Neurosurgery at Henry Ford Hospital in Detroit, MI, where he was a key contributor in launching the institution's first program in neuro-oncology research. In 1991 Dr. James relocated to Emory University as faculty in the Department of Neurosurgery, and, as before, helped initiate a program in neuro-oncology research. In 1996 he accepted a faculty position in the Department of Laboratory Medicine and Pathology at the Mayo Clinic, Rochester, MN, where he was promoted to Professor in 2001. During his tenure at Mayo (1996-2006) Dr. James' research leadership was of fundamental importance to establishing Neuro-Oncology as a premier program in the Mayo Comprehensive Cancer Center. In 2006 Dr. James joined the outstanding faculty of the University of California San Francisco Department of Neurological Surgery and Brain Tumor Research Center, where he serves as the Center's Associate Director. In addition to his independent as well as programmatic research efforts, that utilize CNS tumor genetic information for testing therapeutic hypotheses in rodent models, Dr. James has been a member of the editorial boards for the Clinical Cancer Research, International Journal of Oncology, Journal of Neuropathology & Experimental Neurology, and he is an Executive Editor for the journal Neuro-Oncology. Dr. James served as the Basic Science Director for the Society for Neuro-Oncology from 1999-2001, and is a current member of the Scientific Advisory Committees for the Pediatric Brain Tumor Foundation and the National Brain Tumor Society. In addition to these activities, he has served on numerous review committees for the National Institutes of Health, including his current membership with the Clinical Neuroimmunology and Brain Tumors Study Section. Dr. James' research has been continuously supported by the NIH since 1991, he has authored more than 150 peer-reviewed research publications, among which he is best known for his seminal contributions involving

genetic alterations that are associated with CNS tumor development.

Direct MR-guided Intratumoral Delivery of Therapeutics for GBM

Prof. Krzysztof Bankiewicz

Brain Tumor Research Center, University of California, San Francisco, CA

Direct MR-guided Intratumoral Delivery of Therapeutics for GBM

Prof. Krzysztof Bankiewicz

University of California, San Francisco, CA

Standard chemotherapy offers very limited efficacy to glioblastomamultiforme (GBM) patients, and this is mainly due to low penetration of drugs across the blood-brain barrier (BBB). Therefore, several drug delivery strategies, such as intra-tumoral implants, intra-arterial, convection-enhanced delivery (CED), nanoparticle (NP)-based and stem cell-based delivery are being developed to resolve this problem and achieve greater efficacy through more direct intervention.

Recurrence of GBM from the edge of surgical resection tumor is very common. Moreover, systemic chemotherapy usually cannot reach a sufficient local concentration before peripheral dose-limiting toxicity is encountered.CED maintains a pressure gradient at a cannula tip and, thereby, distributes agents within interstitial spaces in brain. CED can disperse small molecules and large particles over significant distances unlike diffusion. CED is also driven through perivascular spaces in part via the rhythmic contractions of blood vessels. Therefore, compared to simple injection, a higher concentration of drug with larger and more even volumes of distribution (Vd) can be achieved by CED.

We have developed a fully integrated and FDA-approved brain tumor delivery system that consists of an MR-compatible aiming device, a reflux resistant cannula, and predictive software, to maximize delivery of therapeutic agents to the brain tumor and peritumoral regions. This delivery platform allows for monitoring of nanoparticles,viral vector and small molecules distribution in ‘real time’ during intra-tumoral CED. Examples and potential of CED-based delivery of therapeutics in ongoing clinical trials will be demonstrated.

CURRICULUM VITAE

Krystof S. Bankiewicz

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Email: krystof.bankiewicz@ucsf.edu
Web: http://neurosurgery.ucsf.edu/bankiewicz/

EDUCATION

University Degrees

1983 M.D. Jagiellonian University, Krakow, Poland

1996 Ph.D. Institute of Neurology and Psychiatry, Warszawa, Poland
Thesis: "Experimental Studies Using Tissue Implantation for Treatment of Parkinson's Disease"

Training

1983 Medical License

1983-1984 Internship in General Surgery, Medical Academy of Warszawa, Poland.

1983-1985 Resident, Neuroorthopedic Postgraduate Medical Center, Warszawa, Poland.

1985-1988 Post-doctoral Fellowship, Surgical Neurology, NINDS, NIH, Bethesda, MD

Awards

1985 Fogarty Fellowship, National Institutes of Health, Bethesda, Maryland

1999 Patent Award, NINDS, NIH, Bethesda, Maryland

2000 Special Act or Service Award, NINDS, NIH, Bethesda, Maryland

2002 Drug Development Prize, Academy of Molecular Imaging

2007 Presidential Presentation, American Society of Gene Therapy

2008 Honorary Member, Polish Academy of Neurology

Academic & research position held

2009	Kinetics Foundation Chair in Translational Research, UCSF, San Francisco, CA.
2008-	Professor In Residence, Neurology Department, UCSF, San Francisco, CA.
2002-	Professor In Residence, Neurosurgery Department, UCSF, San Francisco, CA.
1998-2002	Associate Professor In Residence, Neurosurgery Department, UCSF, San Francisco, CA.*
	*98-00 - Adjunct series; - 01-02 In Residence series
1997-2001	Acting Chief, Molecular Therapeutics Section, NINDS, NIH, Bethesda, MD
1994-	Visiting Scientist, Laboratory for Functional Imaging, Lawrence Berkeley National Laboratory, University of California, Berkeley, CA.
1994-1997	Director, Division of CNS Implantation and Regeneration, The Parkinson's Institute, Sunnyvale, CA
1992-1997	Chief, Preclinical Studies, Somatix Therapy Corporation, Alameda, CA.
1991-1993	Chief, CNS Implantation Unit, Surgical Neurology Branch, NINDS, NIH Bethesda, MD.
1992-1993	Special Volunteer, Surgical Neurology Branch, NINDS, NIH, Bethesda, MD.
1991-1992	Visiting Scientist, Surgical Neurology Branch. NINDS, NIH, Bethesda, MD.
1988-1991	Visiting Associate Scientist, Surgical Neurology Branch, NINDS, NIH, Bethesda, MD.
1985-1988	Visiting Fellow, Surgical Neurology Branch, NINDS, NIH, Bethesda, MD.
1983-1985	Assistant Professor, Post-graduate Medical Center, Warszawa, Poland.
1980-1983	Research Associate, Department of Hematology and Internal Medicine, Medical School, Jagiellonian University, Krakow, Poland

RESEARCH AWARDS AND GRANTS

R01 NS050156-04 (Bankiewicz), 08/02/2006 – 06/30/2011

NIH

Focal Dopamine Indicated In Dyskinesias In MPTP Monkeys

Role: Principal Investigator

P50 CA097257-06 (Berger), 05/01/2007 – 04/30/2012
NIH
Brain Tumor SPORE Grant Project 3 (Park): Development Of Novel Lipidic Nanoparticle Therapeutics For Brain Tumor Treatment
Role: Co-Investigator

R01 NS056107 (Bankiewicz), 08/01/2007 – 07/31/2010
NIH
Preclinical Development Of A Gene Therapy For Niemann-Pick Disease, Type A
Role: Principal Investigator

R01 NS056107-02S1 (Bankiewicz), 09/01/2009 – 08/31/2010
NIH/ARRA (admin supplement)
Preclinical Development Of A Gene Therapy For Niemann-Pick Disease, Type A
Role: Principal Investigator

P01 CA118816-01A2 (Berger), 08/27/2007 – 06/30/2012
NIH/NCI
Imaging And Tissue Biomarkers In The Treatment of Brain Tumors Project 3 (Bankiewicz): Imaging To Optimize Convection-Enhanced Delivery
Role: Co-Investigator

P01 CA118816-01A2 (Berger), 08/01/2009 – 07/31/2011
NIH (admin supplement)
Imaging And Tissue Biomarkers In The Treatment Of Brain Tumors
Role: Co-Investigator

Genzyme Corp.Industry Research Contract (Bankiewicz), 03/27/2008 – 03/27/2011
Pilot Study Evaluating The Distribution Of AAV 2 Or 4 Into The CNS After ICV Injection In Normal Cynomolgus Monkeys
Role: Principal Investigator

Michael J. Fox Foundation (Bankiewicz), 10/01/2008 – 09/30/2010
Image-Guided Convective Delivery Of AAV Vectors
Role: Principal Investigator

X01 (Bankiewicz), 07/01/2009 – 06/30/2012

NIH-RAID
IND-Enabling Studies For AAV2-GDNF For Parkinson's Disease
Role: Principal Investigator

RC2 (Federoff), 09/30/2009 – 09/29/2011
NIH
A Novel Monkey Model for Parkinson's Drug Discovery
Role: Co-Investigator

U01 (Kasahara/UCLA), 07/01/2009 – 06/30/2013
NIH/NINDS
Translational Development Of Replication-Competent Retrovirus Vectors
Subcontract Co-Investigator

Kinetics Foundation (Bankiewicz), 01/01/2007 – 12/31/2013
Translational Studies in CNS Disorders
Role: Principal Investigator

R01 (Bankiewicz), 07/01/2010 – 06/30/2014
NIH (EUREKA)
A Nonhuman Primate Model Of Alzheimer's Disease
Role: Principal Investigator

U01 (Szoka), 09/01/2010 – 08/31/2015
NIH
Glioblastoma Therapy Via Local Delivery Of Nanocarrier Drugs
Role: Co-Investigator

Michael J. Fox Foundation (Zhang/Sangamo), 07/01/2010-06/30/2012
Development of a Zinc Finger Protein Therapeutic for the Potential Treatment of Parkinson's Disease
Role: Subcontract Principal Investigator

SELECTED PUBLICATION (within 5 years)

1. Eberling JL, Jagust WJ, Christine CW, Starr P, Larson P, Bankiewicz KS, and Michael J. Aminoff MJ. (2008) Results from a Phase I Safety Trial of hAADC Gene Therapy for Parkinson's Disease. Neurology May; 70
2. Dickinson, PJ, LeCouteur RA, Higgins RJ, Bringas JR, Roberts B, Larson, RF,

3. Yamashita, Y, Krauze, MT, Noble, CO, Drummond, D, Kirpotin, DB, Park, JW, Mitchel S Berger, MB, Bankiewicz KS (2008) Convection enhanced delivery of liposomes containing CPT-11 monitored with real time magnetic resonance imaging in a canine large animal model system. Journal of Neurosurgery May;108(5):989-998).
4. Krauze MT, Vandenberg SR, Yamashita Y, Saito R, Forsayeth J, Noble C, Park J, Bankiewicz KS. (2007) Safety of real-time convection-enhanced delivery of liposomes to primate brain: A long-term retrospective. Exp. Neurol 2008 Apr;210(2):638-44..
5. Fiandaca MS, Forsayeth JR, Dickinson PJ, Bankiewicz KS. (2008) Image-guided convection-enhanced delivery platform in the treatment of neurological diseases. Neurotherapeutics. 2008 Jan;5(1):123-7.
6. Fiandaca M, Forsayeth J, Bankiewicz K. (2008) Current status of gene therapy trials for Parkinson's disease. Exp Neurol. 2008 Jan;209(1):51-7
7. Forsayeth JR, Bankiewicz KS (2008). Development of AAV2-hAADC Gene Therapy for Parkinson’s Disease Designed to Enhance Dopamine Metabolism. Jpn J Neurosurgery 17 (4)323-4.
8. Cunningham J, Pivirotto P, Bringas J, Suzuki B, Vijay S, Sanftner L, Kitamura M, Chan C, Bankiewicz KS Biodistribution of adeno-associated virus type-2 in nonhuman primates after convection-enhanced delivery to brain.. Mol Ther. 2008 Jul;16(7):1267-75.
9. Richardson RM, Larson PS, Bankiewicz KS. Gene and cell delivery to the degenerated striatum: status of preclinical efforts in primate models. Neurosurgery. 2008 Oct;63(4):629-442.
10. Krauze MT, Vandenberg SR, Yamashita Y, Saito R, Forsayeth J, Noble C, Park J, Bankiewicz KS. Safety of real-time convection-enhanced delivery of liposomes to primate brain: a long-term retrospective. Exp Neurol. 2008 Apr;210(2):638-44.
11. Varenika V, Dickinson P, Bringas J, LeCouteur R, Higgins R, Park J, Fiandaca M, Berger M, Sampson J, Bankiewicz K. Detection of infusate leakage in the brain using realtime imaging of convection-enhanced delivery. J Neurosurg. 2008 Nov;109(5):874-80.
12. Kikuchi T, Saito R, Sugiyama S, Yamashita Y, Kumabe T, Krauze M, Bankiewicz K, Tominaga T. Convection-enhanced delivery of polyethylene glycol-coated liposomal doxorubicin: characterization and efficacy in rat intracranial glioma models. J Neurosurg. 2008 Nov;109(5):867-73.
13. Anatomical compression due to high volume convection enhanced delivery. Valles F, Fiandaca MS, Bringas J, Dickinson P, LeCouteur R, Higgins R, Berger

M, Bankiewicz KS. Neurosurgery. 2009 Sep;65(3):579-85; discussion 585-6.

14. Yin D, Valles FE, Fiandaca MS, Forsayeth J, Larson P, Starr P, Bankiewicz KS. Striatal volume differences between non-human and human primates. J Neurosci Methods. 2009 Jan 30;176(2):200-5.
15. Johnston LC, Eberling J, Pivirotto P, Hadaczek P, Federoff HJ, Forsayeth J. BankiewiczKS. Clinically relevant effects of AAV2-GDNF on the dopaminergic nigrostriatal pathway in aged Rhesus monkeys. Hum Gene Ther. 2009 Feb 9
16. Kells AP, Hadaczek P, Yin D, Bringas J, Varenika V, Forsayeth J, Bankiewicz KS. Efficient gene therapy-based method for the delivery of therapeutics to primate cortex. Proc Natl Acad Sci U S A. 2009 Feb 17;106(7):2407-11.
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Autlogous Dendritic Cell/Tumor Antigen Adjuvant Immunotherapy of Glioblastomas: Learning from Two Clinical Trials in Taiwan

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Autologous Dendritic Cell/Tumor Antigen Adjuvant Immunotherapy of Glioblastomas: Learning from Two Clinical Trials in Taiwan

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Glioblastoma multiforme and other WHO grade-4 gliomas (GBM) remain dismally fatal, thus requiring novel approaches to improving the current multi-modality therapeutic procedure. Recent clinical trials of GBM immunotherapy exploiting dendritic cell-based "vaccine" strategy have reported promising results, although factors that might affect the efficacy are largely unknown.

Using a two-team cooperative working model, we have carried out two successive clinical trials of autologous dendritic cell/tumor antigen adjuvant (ADCTA) immunotherapy: the initial phase I/II trial at Chang Gung Memorial Hospital-Linkou from 2002 to 2005 and the phase II/III at China Medical University Hospital-Taichung from 2005 to the present. The two clinical trials employed essentially the same protocol that included: [A] clinical team(s)'s works of informed consent patient recruitment, PBMNC apheresis, surgery, chemo- and radio-therapy, "vaccine" injection, clinical follow-up (imaging, laboratory, and other examinations) as well as general health care, and assessment of the therapeutic outcome; and [B] cGLP laboratory team's works of monocyte derivation of dendritic cells and tumor cell cultures, preparations of individual patients' personal lots of ADCTA "vaccine", following the standard operation procedures developed by previous translational research of my laboratory at Academia Sinica (1996-2002), processing of each ready-for-use ADCTA injection for delivery to the clinics, studies of patients' tumor-infiltrating lymphocytes before and after the ADCTA therapy, and post-trial translational research for possible later improvement of the immunotherapy protocol. Thus, the laboratory team is solely responsible for the innovative development and IP quality assurance of ADCTA therapeutic reagent preparation, while the clinical team is solely responsible for providing the "vaccine" injections as well as all standard GBM therapeutic procedures and, most importantly, personalized treatment and health care to enhance the safety and efficacy outcome of ADCTA adjuvant immunotherapy.

Using the usual exclusion criteria for patient recruitment, we recruited 16 patients without temodal treatment) to participate in the phase I/II trial and 40 patients (many also receiving temodal CCRT) in the phase II/III trial, who had the

demographic features of GBM in Taiwan. In respective trials, 16 and 35 patients had received at least 4 bi-weekly ADCTA injections, been followed for more than 24 months, and therefore can be evaluated by overall survival (the primary end-point). We found that the 1-year, 3-year and 5-year survival rates were: 68.8%, 25.0 % and 18.8 % for the 16 patients of the phase I/II trial (versus 58.0%, 3.0% and 0% of 63 historical control patients who received the standard multi-modality treatment without temodal chemotherapy), while 82.9 %, 38.6% and 15.4% for 35 patients of the phase III/IV trial (versus 57.3%, 8.0% and ? % of 128 historical control patients mostly treated with temodal). Statistical analyses by various methods consistently show high significance of benefit ($p<0.001$). We could also observe the effects of the ADCTA immunotherapy by MRI imaging as well as by isolation of tumor infiltrating lymphocytes that changed from mostly Treg cells (before ADCTA injection) to tumor-specific CD8 cytotoxic T lymphocytes (after the immunotherapy).

With respect to adverse effects of ADCTA immunotherapy, we found 20 of 35 patients (or 57%) had transient ctcae-v3 grade I/II serum ALT and/or AST elevation, which was probably, if not definitely, ADCTA-related. Also, lymphopenia varying from grade I to IV was detected in 28 of 35 patients (80%). Similarly, lymphopenia was observed in high percentage of the control GBM patients, indicaing that it was disease-associated rather than ADCTA therapy-related.

Some factors became apparent from the analyses of the overall survival results of our two clinical trials. [i] Old age, i.e. > 60 years, significantly compromised the benefits of ADCTA therapy; [ii] The immunotherapy was not effective during disease progression due to tumor recurrence, as observed in patients with KPS score decreasing from 70 or above to 50 or less at the start of ADCTA injection. [iii] The efficacy of ADCTA therapy was not affected by MGMT expression phenotype or IDH1/2 mutation status of the patent's tumor cells. [iv] Lymphopenia appeared to curtail the ADCTA efficacy, whereas transient serum ALT/AST elevation did not. [v] The use of un-irradiated glioma cells as immunogens might not be fully effective against the patient's post-irradiated recurrent tumors, as suggested by our comparative study of radiation-naïve and radiation-exposed glioblastoma stem-like cells of the same patients.

In conclusion, our two-team cooperative working model would be suitable for efficient and convenient application of ADCTA adjuvant immunotherapy of GBM in clinical neurosurgery/oncology practice. Although there are still rooms for improvement, incorporation of this immunotherapeutic approach into the standard

multi-modality procedure is likely to give life-saving and life-quality benefits for some GBM patients.

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Education and Research Training

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1963-1966 Tulane University Medical School Department of Medicine, Clinical Fellow in Nutrition and Metabolism; Graduate School Department of Biochemistry, New Orleans, Louisiana, USA. [Ph.D.,1966; Major Professor O. Neal Miller]

1966-1968 Damon Runyon Memorial Postdoctoral Fellow, Nucleic Acid Enzymology Section, Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA [Mentor: G. David Novelli]

Professional Positions and Experiences (Selected)

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2004-pres. Medical Chair Professor, Department of Biochemistry and Institute of Clinical Medicine, China Medical University; Director Cell/Gene Therapy Research Laboratory, Department of Medical Research, China Medical University Hospital, Taichung, TAIWAN

2009-pres Scientific Member, R.O.C. Executive Yuan National Science Council Review & Oversight Committee on National Health Research Institutes "Translational Medicine of Cancer" Program Project

2004-2008 Scientific Member, R.O.C. Central Cancer Control Oversight Committee (Cabinet Level), Executive Yuan, TAIWAN

1993-2004 Medical Chair Research Fellow and Professor, Institute of Biomedical Sciences, Academia Sinica, Nankang, Taipei, TAIWAN.

1993-2004 Professor (joint appointment), National Yang-Ming Univ. Graduate

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1993-2004 Professor of Biochemistry (Adjunct), National Taiwan University College of Medicine, Taipei, Taiwan,

1993-1999 Founding Director, Academia Sinia/Veterans General Hospital-Taipei and AS/National Taiwan University Hospital Cooperative Clinical Research Laboratories, DOH Clinical Center Program Project [subsequently National Health Research Institutes of Taiwan] ;

1996-1999 Distinguished Research Fellow and Associate Director, Cancer Research Division, National Health Research Institutes (on loan from Academia Sinica), Taiwan

1996-1999 Program Co-Director, Executive Yuan Department of Health/National Science Council Interagncy "Genes in Health Sciences" Frontier Science & Technolgy Research Program, Executive Yuan, Taiwan R.O.C.

[B] USA

1990-1993 US National Cancer Institute (NCI) Outstanding Investigator Award ReviewCommittee member;

1988-91 NCI Cancer Biology & Immunology Contract Review Committee member;

1983-1987 National Institutes of Health Experimental Virology Study Section member;

1986-1993 National Institute of Environmental Health Science Carcinogenesis Program research project principal investigator (PI);

1972-1980 NCI National Virus Cancer Program research project PI;

1972-1993 US Department of Energy (Atomic Energy Commission) Office of Health & Environmental Research continuous research projects Principal Investigator

1969-1995 Shared Faculty (**Professor 1972-1995), University of Tennessee**-Oak Ridge , Graduate School of Biomedical Sciences, Oak Ridge, TN, USA

1966-1993, Chief Molecular Genetics of Cancer Laboratory (formerly Biochemist and Group Leader, Enzymology of Carcinogenesis Group), Biology Division, Oak Ridge National Laboratory, Oak Ridge, TN USA

Research Activities and Major Grant Supports

Current - Cell-/gene-based cancer immunotherapy; clinical trial & translational medical research; small molecule modulation of RNA alternative splicing in human cancer cells;

Past - cancer gene therapy approaches; retroviral vector transgenic technology; endogenous retroviruses and retrotransposons in environmental carcinogenesis; Fv-1 host genetic control mechanisms of viral leukemogenesis; primer tRNAs of proviral

DNA synthesis; tumor characteristic isoaccepting tRNAs; mammalian multiple isoaccepting tRNAs; Riboflavin co-enzyme metabolism in hepatoma]

R.O.C. NSC Grant 98-2414-B-039 "Clinical relevance of microRNAs in glioblastoma multiforme and CD133(+) cancer stem-like cells" (2009-2012).

R.O.C. Executive Yuan Department of Health Translational Medical Research Program project (DOH94-TD-I-111-TM003), "Dendritic Cell-based Tumor Vaccine Therapy: Complement of Anti-Cancer Chemotherapeutics and Immune System" (2009-2010)

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R.O.C. National Program of Genomics/Proeomics Research Academia Sinica Program Project - "Gene-based Therapeutic Approaches and Gene Transfer Technology". (2003-2005)

R.O.C. Executive Yuan Department of Health grant: Cancer gene therapy – retroviral vector core and preclinical studies (DOH89-TD-1136) (1997-2001)

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RNA editing of miRNA binding sites in the U87MG glioblastoma cell line.

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RNA editing of miRNA binding sites in the U87MG glioblastoma cell line.

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Fueled in large part by next-generation RNA sequencing, the breadth and possible roles of RNA editing is beginning to immerge. The most common RNA editing event is catalyzed by the adenosine deaminase family (ADARs), and results in the conversion of adenosine to inosine (A-to-I editing).

Recently, several papers have revealed thousands of putative A-to-I editing sites in multiple cell lines as well as *in vivo*, affecting hundreds of expressed transcripts. The majority of identified edit sites occur in the 3' untranslated regions (UTRs) of expressed transcripts rather than coding regions, suggesting a potential regulatory role. We propose that one function of A-to-I editing of mRNA transcripts is to invoke microRNA regulation through modification of microRNA binding sites—also found predominantly in the 3' UTR. We present a computational pipeline to identify A-to-I editing events in the glioblastoma cell line U87MG. Using previous data in which ADAR1 was knocked down in U87MG cells, we demonstrate that our pipeline can distinguish true edits from false positives due to sequencing error or genetic modifications. Putative inosine-enabled microRNA binding sites are identified using a modified form of the miRanda algorithm. We demonstrate that these edits create hundreds of binding sites for microRNAs expressed in our data. We are now pursuing direct experimental validation of our novel microRNA binding site predictions through microRNA-bound mRNA capture and a U87MG Dicer knockdown.

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Harrington WR, Kim SH, **Funk CC**, Madak-Erdogan Z, Schiff R, Katzenellenbogen JA, Katzenellenbogen BSEstrogen dendrimer conjugates that preferentially activate extranuclear, nongenomic versus genomic pathways of estrogen action. *Mol Endocrinol*. 2006 Mar;20(3):491-502.

Frasor J, Danes JM, **Funk CC**, Katzenellenbogen BS Estrogen down-regulation of the corepressor N-CoR: mechanism and implications for estrogen derepression of N-CoR-regulated genes. *Proc NatlAcadSci U S A*. 2005 Sep 13;102(37):13153-7.

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PITX1 is Up-Regulated by Estrogen and Coordinates Gene-Specific Regulation by the Estrogen Receptor in Breast Cancer Cells. In Preparation.

ABSTRACTS

Stender JD. **Funk CC**, Charn TH, Barnett DH, Stossi F, Katzenellenbogen BS (2008). PITX1, an Estrogen Regulated Transcription Factor, Coordinates Gene-Specific Regulation by the Estrogen Receptor in Breast Cancer Cells.90th Annual Meeting of The Endocrine Society, San Francisco, CA USA, 2008. Proceedings.

Lasker MV, Gajjar MM, **Funk CC**, and Nair SK. Biochemical and Structural Studies of IL-1R-Associated Kinase-4 Death Domain and Their Implications for TLR Signaling.Keystone Symposium on Innate Immunity. Banff, Alberta, Canada, February 10-15, 2006.

AWARDS

Office of Creative Research and Activities Research Award 2001.The Effects of Phorbol Esters on Cotton Tail Rabbit Papillomas.(http://orca.byu.edu/Reports/Journals/2001journal.pdf)

NIEHS Environmental Toxicology Training Grant Appointee2004-05 (T32ES07326, 2003-2004)

Center for Teaching Excellence: Outstanding Teaching Assistant in Cell Biology 2008

Center for Teaching Excellence: Teachers Ranked as Excellent by Their Students, 6 semesters.

Personalized cancer therapy by whole cancer genome sequencing

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Personalized cancer therapy by whole cancer genome sequencing

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Cancers have been proven a genetic disease and undergo a rapid Darwinian evolutionary process. Late-stage cancer cells accumulate hundreds or thousands or more mutations: most of them are passengers while only a handful or more mutations are disease drivers. The genetic landscape of cancers is extremely diverse even that they share the same histopathology. Studies confirmed that cancers with different tissue origin can share the same driver mutations and can be effectively treated with the same drugs. These findings suggest a new way to classify cancers by its genetic makeup and that comprehensive catalogue of driver mutations for personalized cancer therapy. We conducted a retrospective genomic analysis by sequencing the entire genome and transcriptome molecules in the tumors and the matched control samples from ten gliomas patients: each patient had three or four tumor occurances. The 10 patients are classified into three categories: primary and secondary glioblastomas, and low-grade gliomas. Along with the driver mutations, we identified the backseat drivers that acted in concert with the drivers during the tumor genesis. Genetic changes among tumor recurrences suggest that each cancer recurrence underwent a similar developmental process with a few exceptions that the recurrent tumor was in fact a new incidence. In additional to point mutations, small INDEL, and copy number changes, the analysis of mobile element insertion provides new insights to the genomic instability and to that the root of tumor formation. Our results deconvolute both the complexity and the evolution of cancer genome in the original and recurring malignant brain tumors in human.

CURRICULUM VITAE

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EDUCATION

2003.10-2008.05 **PhD in Pharmacogenomics, University of Cambridge, United Kingdom**
Thesis title: Genetics of the anticoagulant drug warfarin
Supervisor: Dr. Panos Deloukas (The Wellcome Trust Sanger Institute, Cambridge, United Kingdom)

1998.09-2000.06 **MSc in Immunology, National Tsing-Hua University, Taiwan**
Thesis title: Novel multiple transcripts of murine CD79a generated by alternative splicing and the regulation of B cell activity by inducing specific autoimmune response against CD79b
Supervisor: Dr. Tse-Wen Chang

1994.09-1998.06 **BSc in Life Science, National Tsing-Hua University, Taiwan**
Undergraduate research project: Cloning and sequencing CH4 and migis domain of immunoglobulin ε chain in guinea pig, rabbit, and cattle.
Supervisor: Dr. Tse-Wen Chang

ACADEMIC EMPLOYMENT

2011.12-present *Research Scientist* at Institute for Systems Biology (Seattle, USA)
Manager: Dr. Leroy Hood
Project: Development of clinical applications using human iPS cells derived cardiomyocyte

2008.06-2011.12 *Post-doctoral Fellow* at Institute for Systems Biology (Seattle, USA)
Supervisor: Dr. Leroy Hood
Project: A systems approach to discover early diagnosis and prognosis biomarkers for glioblastoma multiforme

2007.12-2008.05 *Post-doctoral Research Associate* at Wellcome Trust Sanger Institute (Cambridge, United Kingdom)
Supervisor: Dr. Panos Deloukas
Project: Genetic factors underlying bleeding complication in warfarin treatment

2001.02-2003.09 *Bioinformatician* at the Institute of Biomedical Sciences, Academia Sinica (Taipei, Taiwan)
Supervisor: Dr. Ming-Jing Hwang
Projects: (1) UM method: Fast genome-wide sequence mapping program and its application; (2) Haploscape: in-silico haplotype identification by cross-referencing dbSNP and dbEST

PATENT

1. Chang TW, Sheu JJC, Huang JSW, Wu SCS, **Chen LYY**. Compositions and methods for induction of active autoimmunity.
   United States Patent: 20020102232
   European Patent: EP1284751

PEER REVIEW PUBLICATIONS

1. **Chen LY*,** Wei KC*, Huang ACY*, Wang K, Huang CY, Yi D, Tang CY, Galas, DJ, Hood LE. RNASEQR - A streamlined and accurate RNA-seq sequence analysis program. ***Nucleic Acids Research (In press).*** (IF:7.836) *Contributed equally (Corresponding author)

2. International Warfarin Pharmacogenetics Consortium. Warfarin pharmacogenetics: a single VKORC1 polymorphism is predictive of dose across 3 racial groups. (2010) ***Blood.*** 115(18):3827-34 (IF: 10.558; 26 citations)

3. International Warfarin Pharmacogenetics Consortium. Estimation of the warfarin dose with clinical and pharmacogenetic data. (2009) ***N Engl J Med.*** 360(8):753-64 (IF: 53.484; 129 citations)

4. **Chen LY***, Wadelius M*, Lindh J*, Eriksson N*, Ghori J, Bumpstead S, Holm L, McGinnis R, Rane A, Deloukas P. The largest prospective warfarin-treated cohort supports genetic forecasting. (2009) ***Blood.*** 113(4):784-92. *Contributed equally ("Must read" by the *Faculty of 1000 Medicine*) (IF: 10.558; 148 citations)

5. Wadelius M, **Chen LY**, Eriksson N, Bumpstead S, Ghori J, Wadelius C, Bentley D, McGinnis R, Deloukas P. (2007) Association of warfarin dose with genes involved in its action and metabolism. ***Hum Genet.*** 121:23-34 (IF: 5.047; 158 citations)

6. **Chen LY**, Eriksson N, Gwilliam R, Bentley D, Deloukas P, Wadelius M. (2005) Gamma-glutamyl carboxylase (GGCX) microsatellite and warfarin dosing. ***Blood.*** 106:3673-3674 (IF: 10.558; 26 citations)

7. Wadelius M, **Chen LY**, Downes K, Ghori J, Hunt S, Eriksson N, Wallerman O,

Melhus H, Wadelius C, Bentley D, Deloukas P. (2005) Common VKORC1 and GGCX polymorphisms associated with warfarin dose. ***The Pharmacogenomics J.*** 5:262-270 (IF: 4.398; 246 citations)

8. **Chen LYY**, Lu SH, Shih ESC, Hwang MJ. (2002) Single nucleotide polymorphism mapping using genome-wide unique sequences. ***Genome Res.*** 12:1106-1111 (IF: 13.588; 18 citations)

CONFERENCE ABSTRACT

Platform presentation

1. **Chen LY**, Lindh J, Earthrowl M, Eriksson N, Norris R, Coffey A, Wadelius M, McGinnis R, Rane A, Deloukas P. (2007) A search for genetic factors underlying bleeding complication in warfarin treatment. CSHL/Wellcome Trust Conference-Pharmacogenomics.

Poster presentation

2. **Chen LY**, Lindh J, Eriksson N, Wadelius M, McGinnis R, Rane A, Deloukas P. (2007) Genetic screening of 1500 warfarin receiving patients. European Human Genetics Conference.
3. **Chen LY**, Wadelius M, Ghori J, Bumpstead S, Earthrowl M, Coffey A, McGinnis R, Deloukas P. (2006) Genetic factors influencing Warfarin dose. The Wellcome Trust Sanger Institute Open Day.
4. **Chen LY**, Wadelius M, Earthrowl M, Coffey A, Rane A, McGinnis R, Deloukas P. Genetic factors influencing Warfarin dose. (2006) Joint 6th Human Genome Organization (HUGO) Pacific Meeting & 7th Asia-Pacific Human Genetics Conference.
5. **Chen LYY**, Lu SH, Gan R, Chiang AWT, Hwang MJ. EST mining of genome-wide gene-based haplotypes. (2003) 68th Cold Spring Harbor Laboratory Symposium on Quantitative Biology: The Genome of Homo Sapiens.
6. **Chen LYY**, Lu SH, Shih ESC, Hwang MJ. Single nucleotide polymorphism mapping using genome-wide marker sequences. (2002) The 6th Annual International Conference on Research in Computational Molecular Biology.
7. **Chen LYY**, Sheu JJC, Chang TW. Regulation of B cell activity by inducing specific autoimmune response against CD79b. (2000) Annual meeting of American Association of Immunologists.

DEGREE THESIS

2. **Chen LY**. (2007) Genetics of the anticoagulant drug warfarin. PhD Degree Thesis. University of Cambridge, United Kingdom
3. **Chen LY**. (2000) Novel multiple transcripts of murine CD79a generated by alternative splicing and the regulation of B cell activity by inducing specific autoimmune response against CD79b. Master's Degree Thesis. National Tsing-Hua University, Taiwan

HONOURS AND AWARDS

2003-2007	Wellcome Trust PhD scholarship, United Kingdom
2006	Travel award, Joint 6th Human Genome Organization (HUGO) Pacific Meeting & 7th Asia-Pacific Human Genetics Conference
2002	Travel award, Academia Sinica, Taiwan
1998-2000	Graduate fellowship, Ministry of Education, Taiwan

CERTIFICATES

2004	Intermediate Perl Programming, Certified by the Tom Christiansen Perl Consultancy, Wisconsin, United States
2001	C Language Programming, Certified by the Department of Computer Science and Information Engineering, National Taiwan University, Taiwan

OTHER POSITIONS

2009	*Ad hoc* reviewer, Clinical Medicine & Research (USA)
2007-present	Member, International Warfarin Pharmacogenetics Consortium

SKILLS

Experimental techniques	Basic and advanced molecular biology; cell culture (stem cell and various mammalian cell lines); protein expression (mammalian cells and E.coli) and purification; mouse immunization; ELISA; genotyping (Taqman, Illumina, Sequenom plateforms); Next generation sequencing (NGS).

Computer skills	Programming in C, Perl, and R; genetic analysis software (e.g. Haploview, PLINK, PHASE); NGS data analysis; GWAS; microarray data analysis; online bioinformatic resources (DAVID, NCBI, Ensembl, etc)

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