Curriculum Vitae

Personal Information:

Name:	Changqing Chris Kao M.D., Ph.D.
Date of Birth:	May 18, 1955
Sex:	Male
Place of Birth:	Jilin, China
Citizenship:	U.S.
Languages:	Chinese, English
Business Address:	
	Research Associate Professor Department of Neurological Surgery Vanderbilt University Medical Center T-4224 MCN Nashville, TN 37232-2380
Telephone Number:	Office: (615) 322-6492 Lab: (615)343-7580 Cell: (615) 275-8896 Pager (615) 539-7945 Fax: (615) 343-6948
E-mail:	chris.kao@vanderbilt.edu

Education:

Ph.D. Neurophysiology, 1994. Virginia Commonwealth University, Richmond, Virginia

WHO Fellowship, 1986-1987, Pain research, Medical College of Virginia

M.S. Electrophysiology, 1983, Bethune University of Medical Science, Changchun, China

M.D. Medicine/neurology, 1980, Bethune Medical College, Changchun, China

Academic Appointments and Other Significant Work experiences:

DBS and pallidotomy microelectrode mapping since 1996. Have more than 200 DBS cases mapping experiences. Currently, Vanderbilt is the primary hospital in the nation doing StarFix microplatform for DBS implants.

Nov. 2005- present Research Associate Professor

Director of Services for Functional Surgery, SMS
Department of Neurological Surgery
Vanderbilt University Medical Center

Feb. 2001-Nov. 2005 Research Assistant Professor
Director of Services for Functional Surgery, SMS
Department of Neurological Surgery
Vanderbilt University Medical Center
Microelectrode brain mapping for functional neurosurgery (DBS)
Electrophysiology on nerve stimulation, epilepsy, pain control, and head injury.

July 1999- Jan. 2001 Research Associate
Dept. Pharmacology/Neurotrauma Center
Medical College of Virginia
Electrophysiology, Patch clamp, GABAa receptor and traumatic injury/coma;
Single Unit monitoring and brain mapping in OR for pallidotomy

Nov.1997-June 1999 Research Associate
Neurotrauma Center
Medical College of Virginia
Thalamocortical oscillation and neurotrauma, electrical stimulation and micro-EEG recording;
ICU EEG and extracellular monitoring for traumatic coma patents
OR monitoring for Parkinsonian surgery

July 1994-Oct. 1997 Postdoctoral fellow
Dept. of Neurology
Comprehensive Epilepsy Center
Medical College of Virginia Hospital
Absence and States Epilepsy research
Brain slices (rat and human) in vitro model and corticalthalamic electrical stimulation
Setting up OR monitoring system for human exteacellular recording and multisensory mapping for pallidotomy

1990-July 1994 Ph.D. candidate
Adviser Dr. Barry E. Stein
Dept. Physiology
Virginia Commonwealth University
Superior colliculus and visual, auditory, and somatosensory evoked potential and brain mapping; deep brain stimulation

Nov 1988-1989 Visiting Doctor
Dept Physiology

Pain and CNS responses, noceceptive perception, microelectrode recording and stimulation

Feb. 1987-Oct. 1988 Vice Chairman
Attending neurologist, Lecturer
Dept. Neurology and electrophysiology
Bethune Medical College
Clinical duty and teaching medical students

Nov. 1986-Jan. 1987 WHO fellowship fellow
Medical College of Virginia
Pain and superior colliculus

1983-Oct. 1986 Lecturer/Assistant Professor
Bethune Medical College, Changchun, China
Clinical and teaching
Electro-acupuncture research

1980-1983 Master Student
Electrical stimulation of nuclei accumbes and analgesia

US Patents:

1. 60063.0001 USP1, Apparatus and Methods of Multi-modal 3-D Targeting in Deep Brain Stimulation. Wei-Chiang Lin, Anita Mahadevan-Jansen, Peter E. Konrad, Chris Kao
2. Optical Stimulation Devices for Experimental and Human Use(pending). Mahadevan-Jansen, A., Konrad, PE., Jansen, ED., Wells, J., Kao, C.
3. Flat Cut Bit for Cranial Perforator (pending, Attorney Docket No. V054078.14US) Changquing Chris Kao, Peter E. Konrad
4. Adjustable Universal Platform For Surgical Navigation, Approach, and Implantation(Pending) C. Chris Kao, J. Michael Fitzpatrick, and Rob Labadie
5. Methods and system for brain stimulation(Pending) Chang-Qing Chris Kao, Peter E. Konrad
6. Diagnostic hydraulic generator and monitor for upper extremity rigidity and active resistance tester(Pending) Chang-Qing Chris Kao, Peter e. Konrad

<u>Research Grants</u>

2005-2010 Co-investigator 20% RO1 Optical Stimulation of neural tissue. PI: Jansen ED $1865315

2004-2009 Co-investigator. *Safety and Tolerability of Neurostimulation in Early Stage Parkinson's Disease.* PI: P. David Charles. Medtronic Neurological Inc. $650, 000.

2003–2007 Co- investigator. *Optical stimulation of neural tissue in rat*. Medical Free Electron Laser Center. Dept. of Defense. F49620-01-1-0429. 20% effort. PI: Piston, D Konrad P

2003–2004 Consultant. 5% SPAWAR SYSTEMS /DARPA/NAVY, Department of Defense, Brain-computer Interfacing, PI: Baudenbacher F $350000 DSR #16966.

2005-2008 Co-investigator. 3% Laser stimulation: a novel concept for cochlear implants, PI: Richter CP(Northwestern University) Jansen ED(Vanderbilt subcontract PI).

2006-3, 2010 Co-investigator 8% RO1 #4-22-420-0291Computer-assisted placement of deep brain stimulators, PI: Benoit M Dawant, beginning May 1,2006 thru 2/28/07.

2005-2009 Co-investigator, 2.5% effort. Pulsed laser neurostimulation-Aculight Box NIH/Aculight SBIR Center 4-22-430-0845 PI-Duco Jansen

2006-2008 PI Sriram grant "Neuroimaging and neuroprotection of primary oligodendrogliopathy" Consultant 10%

Professional Memberships and Associations

Member of New York Academy of Science
Member of American Society of Stereotactic and Functional Neurosurgery
Member of National Neurotrauma Society
Member of Society for Neuroscience
American Society of Electroneurodiagnostic Technologists, Inc. (ASET)
Member of International Association for the Study of Pain (1986-1997)
Member of Chines Association of Physiology Science

Awards and Honors:

Chancellor's Research Award, Vanderbilt University 2006
Graduate assistantship, Department of Physiology, Medical College of Virginia, 1990-1994
James S. McDonnell Foundation Award for Summer Institute In Cognitive Neuroscience at Dartmouth College and Medical School, Hanover, New Hampshire, June 26-July 7, 1989
World Health Organization Fellowship 1986-1987

Research Interests and Selected Laboratory Skills:

Deep Brain Stimulation intraopertative microelectrode mapping;
Mechanism of Deep Brain Stimulation;
Development of Neurosurgical Instrumentation;
Optical pulsed laser stimulation on neural tissue;
Mechanism of suppressed dynamic of thalamocortical oscillation in traumatic injured brain (Kao et al 1999) and therapeutic intervention: electrical stimulation of pacemaking

in comatose and pesistant vegetative state patients;
Role of enhanced GABAa inhibition in traumatic coma;
Electrophysiological instrumentation and EEG brain mapping.

Extracellular and Intracellular recording;
Patch clamp instrument theory and operation
Slice preparation: Hippocampal, thalamocortical (rat, mouse, and guinea pig) superior colliculus (rat, mouse, and kitten)
Whole cell patch clamps recording in both blind and visualized slices
Patch clamp single channel recording in cultured neurons
Neuronal culture and enzyme isolated neurons
Combined recording and labeling techniques (biocytin, lucenfer yellow)
Histology techniques (paraffin and cryostat, sectioning, staining and imaging analysis
Immunohistochemistry (ACHE)
Surgical skills
Data acquisition system of pClamp, WCP, and Igor electrophys
Computer skills of PC and Mac (Windows98, Office97, Word processing, Graphics, SlideWrite, Power point, Access, Excel, Sigma plot, Origin

New abstracts since coming to Vanderbilt:(Feb 2001-present)

1. Harrison CH, Manus ND, Gill CE, Kao CC, Remple MS, Davis TL, Neimat JS, Konrad PE, Charles PD. Firing Patterns of STN in Early Stage PD Patients Implanted with DBS. Movement Disorders 2007;22(Suppl. 16):S10-11.
2. Kao C. PE Konrad, J Wells, E D Jansen, A Mahadevan-Jansen, Optical stimulation of heart pacemaking in rat (patent filling)
3. Chris Kao ,Romain Carron, Benabid, Alim Louis and Peter Konrad Recovering effects of thalamocortical stimulation on ischemia-induced inactivation of cortical oscillation in rat brain slices
4. D'Haese P-F, Pallavaram S, Niermann K, Spooner J, **Kao CC**, Konrad PE, and Dawant BM. Automatic selection of DBS target points using multiple electrophysiological atlases. Lecture Notes in Computer Science, MICCAI 2005.
5. Spooner J, Yu H, D'Haese PF, Pallavaram S, **Kao CC**, Humbert G, Dawant B, and Konrad PE. Fully-automated Deep Brain Stimulation target selection better than traditional methods. AANS Annual meeting, San Francisco, CA, April 22 – 27. 2006.
6. **Kao CC**, Spooner J, Yu H, Davis T, Fang J, Hedera P, Cooper M, Charles PD, and Konrad PE. Direct zona incerta stimulation produces efficacy in treating Parkinson's disease – an intraoperative study during the STN mapping. *American Society for Stereotactic & Functional Neurosurgery* meeting, Boston, MA, June 1 – 4, 2006, accepted.

7. Spooner J, Tatsas A, Abel T, Yu H, **Kao CC**, Konrad PE, and Davis TL. Deep brain stimulation in white matter superior to STN is effective in Parkinson's disease: a 5-year postmortem analysis. *American Society for Stereotactic & Functional Neurosurgery* meeting, Boston, MA, June 1 – 4, 2006, accepted.

8. Konrad PE, Margolin L, Franklin R, and **Kao CC**. Customized stereotactic system for research in animals: Advantages of a rapid-prototyped platform over traditional stereotactic frames. *Society for Neuroscience* annual meeting, Atlanta, GA, October 14 – 18, 2006, accepted.

9. Konrad PE**, Kao CC**, Franck JI, Spooner J, Yu H, Charles PD, Fang JY, and Davis TL. Deep brain stimulating electrodes placed using a novel miniature stereotactic frame: Clinical Experience from 144 patients. *10th International Congress of Parkinson's Disease and Movement Disorders*, Kyoto, Japan, October 28 – November 2, 2006, accepted.

10. Kao CC, Spooner J, Yu H, Charles PD, Davis TL, Fang JY, and Konrad PE. Improved patient comfort and surgical efficiency using the Starfix Stereotaxy System in 106 patients undergoing DBS implantation. *10th International Congress of Parkinson's Disease and Movement Disorders*, Kyoto, Japan, October 28 – November 2, 2006, accepted.

11. Kao CC, Yu H, Spooner J, Hedera P, and Konrad PE. Train stimulation has identical efficacy as continuous stimulation in VIM DBS: a strategy to prolong battery life. *10th International Congress of Parkinson's Disease and Movement Disorders*, Kyoto, Japan, October 28 – November 2, 2006, accepted.

12. Konrad PE, Spooner J, Yu H, Hedera P, and **Kao CC**. Improved energy efficiency in train versus continuous stimulation of STN for rigidity suppression in a PD patient. *10th International Congress of Parkinson's Disease and Movement Disorders*, Kyoto, Japan, October 28 – November 2, 2006, accepted.

13. Kao, C ., J Spooner, H Yu, T Davis, J Fang, P Hedera, M Cooper, D Charles, P Konrad Direct zona incerta stimulation produces efficacy in treating Parkinson's disease- an intraoperative study during the STN mapping. ASSFN June 1-4, 2006, Boston

14. Spooner J., H Yu, P D'Haese, S Pallavaram, C Kao, G Humbert, B Dawant, P Konrad. Fully-automated Deep Brain stimulation target selection better than traditional methods. AANS June 2006, San Francisco.

15. Feng H., G Mathews, C Kao, R Macdonald Seizure stage-dependent alterations of GABAa receptor phasic inhibition and allosteric modulation during development of status epilepticus. Society for Neuroscience, October, 2006 Atlanta

16. Konrad, P., L Margolin, R Franklin, C Kao. Intervene diseased human brain bilateral simultaneously: Microrecordings/DBS implantations using customized bilateral platform in DBS surgery. Society for Neuroscience, October 2006, Atlanta

17. D'Haese P-F, Pallavaram S, Niermann K, Spooner J, **Kao CC**, Konrad PE, and Dawant BM. Automatic selection of DBS target points using multiple electrophysiological atlases. Lecture Notes in Computer Science, MICCAI 2005.

18. Spooner, J., P.-F. D'Haese, PE Konrad, BM Dawant, DA Sun, **C Kao** Computer-generated selection of subthalamic nucleus targets for Deep brain stimulation: A case report. 2005 Congress of Neurological Surgeons Annual Meeting, October 8-13, Boston, MA
19. Gajendiran, M, EA. Lima, PE. Konrad, **C. Kao**, FJ. Baudenbacher Effects of low and high frequency thalamic stimulation on spontaneous cortical local field potentials of thalamocortical rat brain slices. Society for Neuroscience 2005 November 12-16, Washington DC
20. **Kao, C**., T Davis, D Charles, J Fang, J Albea, P Konrad Correlating Symptoms and Neuronal Activities- Bilateral Simultaneous Microrecordings from Parkinson's and Essential Tremor Patients. ASSFN 2004 Neuromodulation, October 1-3, Cleveland, OH
21. **Kao, C**, D Charles, T Davis, J Fang, J.R. Albea, P.E. Konrad Asymmetry of overactivity between left and right subthalamic nucleus parallels severity of extremity symptoms in Parkinson's disease patients. 8th International Congress of Parkinson's Disease and Movement Disorders, June 2004, Rome, Italy
22. Cetinkaya, E, P.-F. D'Haese, **C Kao**, P E Konrad, J. M Fitzpatrick, B M. Dawant Method for Identifying Brain Nuclei from Micro-Electrode Signals ASSFN 2004 Neuromodulation, October 1-3, Cleveland, OH
23. D'Haese, P F, E Cetinkaya, **C Kao**, P E Konrad, B M. Dawant Creation and Use of an Atlas of Optimal Positions for the Fully Automatic Selection of DBS Target Points ASSFN 2004 Neuromodulation, October 1-3, Cleveland, OH
24. D'Haese, P F, E Cetinkaya, **C Kao**, P E Konrad, B M. Dawant Deep Brain Electrophysiological Atlas for Deep Brain Stimulators (DBS) Implantation. ASSFN 2004 Neuromodulation, October 1-3, Cleveland, OH
25. Gajendiran, M., E A. Lima, P Konrad, **C Kao**, F J Faudenbcher. High Resolution Multi-electrode Mapping of Thalamocortical Oscillations in In Vitro Rat Brain Slices During High Frequency Deep Brain Stimulation. ASSFN 2004 Neuromodulation, October 1-3, Cleveland, OH
26. Wells, J, K. Mariappan, J. Albea, E D Jansen, P E Konrad, A Mahadevan-Jansen, **C Kao** Optical Stimulation of Neural Tissue Society for Neuroscience, October 2004 San Diego, CA
27. Davis TL, D Charles, **C Kao**, J Fang, GM Fenichel PE. Konrad The anatomic specificity of rest tremor suppression. 8th International Congress of Parkinson's Disease and Movement Disorders, June 2004, Rome, Italy
28. **Kao,C** J. Albea, PE Konrad Asymmetry of hyperactivity between left and right subthalamic nucleus parallels severity of extremity symptoms in Parkinson's disease patients. Society for Neuroscience, New Orleans, Louisiana, Nov. 8-12, 2003
29. Albea, JR., **CC Kao**, A Fatakia, D Jansen, A Mahadevan-Jansen, PE Konrad Optical Stimulation of Peripheral Nerve. 2003 American Association of Neurological Surgeons Annual Meeting
30. Albea, JR., **CC Kao**, PE Konrad Simultaneous Bilateral Subthalamic DBS with Parallel Neurophysiologic Localization Data. 2003 American Association of Neurological Surgeons Annual Meeting

31. Konrad, PE.,J Franck, J Song, **C Kao**, R Franklin, F Haer Microframe-Based deep brain stimulation utilizing STarFix ^{TM}: Experience from Vanderbilt University and St. Mary's Regional Medical Centers. Neuromodulation 2002: Defining the Future June 28-30, 2002 Aix-Les-Bains, France
32. Shieh, C., **Kao, CC**., Konrad, P. Strength-duration curve and chronaxie for essential tremor patients with DBS implants. 7th National Parkinson Foundation International Symposium on Parkinson's Disease Research. Nov 8, 9, 2001 Dan Diego
33. Konrad, P and **Kao, CC** Treatment of diffuse central neuropathic pain through the use of cingulum neuromodulation. 2001 June 8-10, Cleveland, Ohio. International Symposium of Neuromodulation-Defining the future
34. **Kao, CC**., Konrad, P., Davis, T., and Zhang J. Minimal tissue reaction to thalamic lead implantation for tremor: A 22-month post-mortem study. 2002 Annual Meeting of American Association of Neurological Surgeon
35. Konrad, P., **Kao, CC**., Davis, T., Shieh, C. Evidence for strength-duration curve in humans undergoing thalamic stimulation for tremor control. 2002 Annual Meeting of American Association of Neurological Surgeon

Publications
Papers and Theses:

1. Pierre-François D'Haese, Hong Yu, Srivatsan Pallavaram1, Chris Kao, Peter E. Konrad and Benoit M. Dawant Computer-aided Programming of Deep Brain Stimulation for the Treatment of Movement Disorders **(Accepted** SPIE2007)
2. Srivatsan Pallavaram1, Hong Yu, Pierre-Francois D'Haese1, John Spooner, Tatsuki Koyama, Bobby Bodenheimer, Chris Kao, Peter E. Konrad, Benoit M. Dawant1 Automated selection of anterior and posterior commissures based on a deformable atlas and its evaluation based on manual selections by neurosurgeons (accepted SPIE2007)
3. Wells, Jonathon Chris Kao, Konrad, Peter Thomas Milner Jihoon Kim Mahadevan-Jansen, Anita Jansen, E. Duco Biophysical mechanisms of transient optical stimulation of peripheral nerve. BIOPHYSICAL J 2007 (93) 2567-2580
4. Chris Kao Romain Carron, Benabid, Alim Louis and Peter Konrad Recovering effects of thalamocortical stimulation on ischemia-induced inactivation of cortical oscillation in rat brain slices Paper preparation (manuscript preparation)
5. Spooner, John, Hong Yu, Chris Kao, Karl Sillay, Peter Konrad 2007 Neuromodulation of the Cingulum for Neuropathic Pain after Spinal Cord Injury Journal of Neurosurgery 107:169-172, 2007
6. Hua-Jun Feng, Gregory C. Mathews ,Chris Kao ,and Robert L. Macdonald, Seizure Stage-Dependent Alterations of $GABA_A$ Receptor Phasic Inhibition and Allosteric Modulation During Development of Status Epilepticus. (J Neurophysiology Submitted)
7. Wells J, Konrad PE, **Kao CC**, Jansen ED, and Mahadevan-Jansen A. Stimulating nerves with laser precision. *SPIE*, submitted April 2006.

8. Wells J, Konrad PE, **Kao CC**, Jansen ED, and Mahadevan-Jansen A. Pulsed laser versus electrical energy for peripheral nerve stimulation. *Journal Neural Modulation*, submitted April 2006.
9. Wells J, Mahadevan-Jansen A, Bendett M, Webb J, Ralph H, **Kao CC**, Konrad PE, and Jansen ED. Lasers Stimulate New Techniques in Nerve Studies. *Biophotonics Intenational*, 13 (10): 30-32, (2006).
10. Wells J, Konrad PE, **Kao CC**, Mahadevan-Jansen A, and Jansen ED. A comparative study of the methodology and recorded potentials elicited from nerves stimulated with pulsed laser D'Haese P-F , Cetinkaya E, Konrad PE, Kao C, Dawant BM. Computer-aided placement of deep brain stimulators: from planning to intra-operative guidance. *IEEE Transactions on Medical Imaging*, 24(11): 1469-1478, 2005.
11. Wells J, **Kao CC**, Jansen ED, Konrad PE, and Mahadevan-Jansen A. Application of infrared light for *in vivo* neural stimulation. *Journal of Biomedical Optics*, 10(6): 64003-11 (2005).
12. Wells J**, Kao C**, Mariappan K, Albea J, Jansen ED, Konrad P, Mahadevan-Jansen A. Optical stimulation of neural tissue *in vivo*. *Optics Letters*, 30(5):504-506, 2005.
13. Fitzpatrick JM, Konrad PE, Nickele C, Cetinkaya E, and **Kao C**. Accuracy of customized miniature stereotactic platforms. *Stereotactic and Functional Neurosurgery*, 83 (1): 25–31, 2005.
14. **Kao, C**., Spooner, J., Charles, D., Davis, T., Fang, JY., Albea, J., Konrad, PE., Asymmetry of Simultaneous Subthalamic Nucleus Recordings Parallels Severity of Extremity Symptoms in Parkinson's Disease Patients. Movement Disorders (manuscript ready for submission)
15. Wells J, **Kao C**, Jansen ED, Konrad PE, and Mahadevan-Jansen A. Application of infrared light for *in vivo* neural stimulation. *Journal of Biomedical Optics*, Accepted, June, 2005.
16. D'Haese P-F , Cetinkaya E, Konrad PE, **Kao C**, Dawant BM. Computer-aided placement of deep brain stimulators: from planning to intra-operative guidance. *IEEE Transaction on Medical Imaging,24:11 1469-1478*, 2005.
17. Wells J, Konrad PE, **Kao CC**, Mahadevan-Jansen A, and Jansen ED. A comparative study of the methodology and recorded potentials elicited from nerves stimulated with pulsed laser versus standard electrical energy. (In preparation for submission to Journal of Biomedical Optics, 2005).
18. **Kao, CQ**., Goforth, PB., Ellis, EF, Satin, LS Potentiation of GABA(A) currents after mechanical injury of cortical neurons. J Neurotrauma. 2004 21(3): 259-70
19. B.M. Dawant, R. Li, E Cetinkaya, **C Kao**, J.M. Fitzpatrick, and P.E. Konrad "Computerized Atlas-Guided Positioning of Deep Brain Stimulators: A Feasibility Study", Lecture Notes in Computer Science (LNCS) 2717, Proceedings of the Second International Workshop on Biomedical Image Registration, J.C. Gee, J.B. Maintz, and M.W. Vannier (eds), pp. 142-150, 2003

20. **Kao, C**, Charles, D., Davis, T., Fang, J., Albea, J., Konrad, PE Asymmetry of overactivity between left and right subthalamic nucleus parallels severity of extremity symptoms in Parkinson's disease patients. Movement Disorders, 19, Suppl. 9 s220, 2004
21. Davis TL, Charles, D., **Kao**, C., Fang, J., Fenichel, GM., Konrad, PE The anatomic specificity of rest tremor suppression. Movement Disorders, 19, Suppl. 9 s319, 2004
22. Reeves, TM., **C-Q Kao**, L.L. Phillips, and J.T. Povlishock, Presynaptic excitability changes following traumatic brain injury in the rat. J Neuroscience Res 2000, 60: 370-379
23. **Chang-Qing Kao** and Douglas A. Coulter Physiology and pharmacology of corticothalamic stimulation-evoked responses in rat somatosensory thalamic neurons in vitro. J.of Neurophysiology 77:2661-2676, 1997
24. John W. Gibbs III, Yun-fu Zhang, **Chang-Qing Kao**, Kathryn L. Holloway, Kwang-Soo Oh, and Douglas A. Coulter Characterization of GABAA receptors function in human temporal cortical neurons. J. Of Neurophysiology 75(4) 1996
25. Chang-Qing Kao, John G. McHaffie, M. Alex Meredith, and B.E. Stein Functional Development of a Central Visual Map in Cat. J. Neurophysiology 72(1) 1994, 266-272.
26. **Chang-Qing Kao**, Ph.D. dissertation: Visual development of superior colliculus. Virginia Commonwealth University Library, May, 1994
27. **Chang-Qing Kao**, John G. McHaffie, and Barry E. Stein Multiple, Overlaping Sensory and Motor Maps pp 94-95, The Merging of The Senses, BE Stein and MA Alex, A Bradford Book, The MIT Press, Cambridge, Massachusetts, 1993
28. John G. McHaffie, **Chang-Qing Kao** and Barry E. Stein Nociceptive neurons in the rat superior colliculus: Response properties, topography and functional implications. JOURNAL OF NEUROPHYSIOLOGY 62: 2 1989 (510-525).
29. **Chang-Qing Kao**, Master Theses: Morphine analgesia and acupuncture in the lateral habenular nucleus. Norman Bethune University of Medical Sciences Library. July, 1983
30. **Changqing Kao** and Wang Shao Effect of stimulation of nucleus accumbens and naloxone micro injection on nociceptive unit discharges in the lateral habenula nucleus. Acta Physiologica Sinica 1985 37(1), 24-30
31. **Changqing Kao** and Wang Shao Effects on discharging from lateral habenula nucleus by naloxone micro injection into nucleus accumbens Journal of Bethune University of Medical Sciences 1985 11(1), 42-46
32. **Changqing Kao** and Wang Shao Effect of nucleus accumbens on pain-discharges of parafascicular nucleus in rat. Acupuncture Research 1984 9(4) 313-316
33. **Changqing Kao** and Wang Shao The role of forebrain-habenula nucleus raphe magnus system in acupuncture analgesia. The Second National Symposium on Acupuncture and Moxibustion and Acupuncture Anesthesia, Beijing, China 1984

Abstracts and Presentations:

1. Chang-Qing Kao, P.B. Goforth, Earl F. Ellis, Leslie S. Satin, Mechanical injury-induced Enhancement of GABAa function in cortical neurons and implications for clinical TBI-induced coma. 2000, Abstract for National neurotrauma Society
2. Chang-Qing Kao, P.B. Goforth, Earl F. Ellis, Leslie S. Satin, Mechanical injury-induced enhancement of GABAa currents in cortical neurons. 2000, Abstract for Society for Neuroscience.
3. Chang-Qing Kao, J.T. Povlishock, and T.M. Reeves, Suppression of slow cortical oscillation recorded in vitro following traumatic brain injury in adult rats. Society for Neuroscience Abstract 1999
4. Chang-Qing Kao, J. Zhu J.T. Povlishock, L. L. Phillips, T.M. Reeves, and M.R.Bullock, Lactate as a postinjury metabolic substrate in spontaneous cortical oscillation. National Neurotrauma Society Abstract, J Neurotrauma 16:991,1999
5. Jepei Zhu, C-Q. Kao, J.T. Povlishock, L. L. Phillips, M.R.Bullock, and T.M. Reeves. Endogenous lactate acid sustain evoked synaptic responses in vitro hippocampal slice during glucose deprivation. National Neurotruma Society Meeting, 1999
6. Thomas M Reeves, C-Q. Kao, JT Povlishock, MR Bullock, Combined electrophysiological recording and microdialysis in severe human head injury. National Neurotrauma Society Abstract, J Neurotrauma 16:971, 1999
7. Chang-Qing Kao, Neurotrauma Seminar presentation Slide talk): Neurotrauma Effects on Thalamocortical Activity: Suppression of Slow Cortical Oscillation. June 1999
8. Chang-Qing Kao, John T. Povlishock, Linda L. Phillips, and Thomas M. Reeves Presynaptic excitability increases following traumatic brain injury. 16th Annual National Neurotrauma Society Meeting. 1998
9. Chang-Qing Kao and Douglas A. Coulter Local inhibitory responses in thalamocortical relay neurons: comparison of rat and guinea pig in vitro. Society for Neuroscience Abstract, 22:104, 1996
10. Chang-Qing Kao, D.A. Coulter, Characterization of the corticothalamic excitatory synaptic potential in thalamic neurons. Society for Neuroscience Abstract, 21:113, 1995
11. Chang-Qing kao, B.E. Stein and D.A. Coulter Postnatal development of excitatory synaptic function in deep layers of superior colliculus. Society for neuroscience Abstract 20:1186, 1994
12. Chang-Qing Kao, presentation in Department of Physiology: Visual development of superior colliculus, May 1994
13. Chang-Qing Kao, Barry E. Stein, and D.A. Coulter Postnatal development of synaptic responses in deep layers of superior colliculus slices studied using whole cell patch techniques. Society for Neuroscience Abstract, 19: 768,1993.
14. P. Redgrave, M. Simkins, J.G. McHaffie, C.-Q. Kao, S.J. Goldberg and B.E. Stein. The role of nociceptive superior colliculus neurons in approach behaviors Society for neuroscience Abstract 19: 1407, 1993

15. Chang-Qing Kao, J.G. McHaffie, M.A. Meredith and B.E. Stein. Physiological maturation of the visual topography in the cat superior colliculus. Society for Neuroscience Abstract, 17: 1378, 1991
16. B. E. Stein, P. Redgrave, C.-Q. Kao, and J.G. McHaffie Nociceptive neurons in the superior colliculus and their role in approach and withdrawal behaviors. 7th World Congress on Pain Abstracts pp.258, 1993
17. Chang-Qing Kao, J.G. McHaffie, M.A. Meredith, H.R. Clemo and B.E. Stein. Comparative magnification of the vibrissa representation in the superior colliculus of rodents and cats. Society for Neuroscience Abstract, 16: 223, 1990.
18. Chang-Qing Kao, John G. McHaffie and Barry E. Stein Response properties and somatotopy of vibrissa-activated neurons in rat superior colliculus. SOCIETY FOR NEUROSCIENCE ABSTRACT 15: 388, 1989
19. Chang-Qing Kao, John G. McHaffie and Barry E. Stein Response properties and organization of nociceptive neurons in the rat superior colliculus. Society for Neuroscience Abstract 13: 986,1987