EDINBURGH-ZHEJIANG JOINT SYMPOSIUM
Inaugural Meeting, 23rd – 24th August 2011

Monday 22nd August 2011

18:00 Welcome reception at Confucius Institute

Tuesday 23rd August 2011

9:00 Welcome – Professor Jonathan Seckl

9:15 Overview of Edinburgh Global – Professor Jeremy Bradshaw

9:30 Overview of research activities and structure of the School of Biomedical Sciences and Centre for Integrative Physiology:
- Professor Gareth Leng
- Professor Mike Shipston

10:00 Overview of research activities and structure of the Department of Neurobiology, Zhejiang University
- Professor Shumin Duan

Coffee

11:00 Professor Xiao-ming Li
"*Receptor tyrosine kinase ErbB4 regulates excitability and GABA release of interneuons and is involved in epilepsy"*

11:30 Dr Matt Nolan
"*In vivo homeostatic regulation of neuronal activity"*

12:00 Dr Ying Shen
"Plasticity in Cerebellar Purkinje Cells"

Lunch and Poster Session

13:30 Professor Shumin Duan
"ATP-mediated neuron-glia interactions: physiological and pathological relevance"

14:00 Professor Mike Cousin
"*Activity-dependent bulk endocytosis of synaptic vesicles: mechanism and function"*

14:30 Professor A. Mark Evans
"Ion channel regulation by AMP-activated protein kinase: A key to the control of energy supply at the whole-body level"

Coffee

continued ..

EDINBURGH-ZHEJIANG JOINT SYMPOSIUM
Inaugural Meeting, 23rd – 24th August 2011

Tuesday 23rd August 2011 *(continued)*

15:00 Professor Jianhong Luo
"Molecular mechanisms for assembly and membrane trafficking of NMDA receptors"

15:30 Professor David Wyllie
"Structure-function studies of NMDA receptors"

16:00 Drinks reception and Poster Session

18:00 Free evening

Wednesday 24th August 2011

9:00 Professor Megan Holmes
"Early-life programming of Affective behaviours"

9:30 Professor Aimin Bao
"Stress, depression and the impact of sex differences"

10:00 Dr Jizeng Du
"CRFR1: a crucial controller in brain-endocrine-immune network disorder caused by plateau hypoxia"

Coffee

11:00 Dr Paul Kelly
"Genetic predisposition to psychiatric illness and the response of the brain to recreational drugs"

11:30 Dr Xue-Qun Chen
"Gestation at high altitude: Occurrence of CRF receptor methylation in the rat brain of embryos and offspring"

12:00 Professor Michael J. Shipston
"Ion channel regulation by protein palmitoylation"

Lunch and Poster session

13:00 Visit to Queens Medical Research Institute

13:30: Tour of the Scottish Centre for Regenerative Medicine

14:00 Presentation from Scottish Enteprise: TBC

continued ..

EDINBURGH-ZHEJIANG JOINT SYMPOSIUM
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Wednesday 24th August 2011 *(continued)*

14:30 Ian Murphy - Edinburgh Research and Innovation

15:00 Dr Mike Capaldi, Edinburgh Bioquarter: At the heart of Scottish Life Science

15:30 Dr Mike Finnen The Edinburgh Bioquarter Commercialisation Programme

Coffee

Tour of the Clinical Research Imaging Centre

19:00 Symposium dinner at the Tower Restaurant

Thursday 25th August 2011

10:00-12:00 One on one discussions
Time available for discussion and development of possible research collaborations between Zhejiang University and University of edinburgh

13:00 e-Learning and Postgraduate Exchange
Professor Jeremy Bradshaw
Medicine and Veterinary Medicine Masters

13:30 Dr Paula Smith
Edinburgh Surgical Sciences Qualification

14:00 Dr Gill Aitken
Masters in Clinical Education

14:30 Professor Mayank Dutia
Postgraduate exchange with the School of Biomedical Sciences

Coffee

15:00 Dr Linda Hu
Prospective example of shared teaching of undergraduate students

15:30 Dr Paul McLaughlin
New distance learning M.Sc. in Next Generation Drug Discovery

16:00 Dr Kim Picozzi
e-Learning Initiatives / Masters programmes from the School of Biomedical Sciences

16:30 Dr Doug Roy
Translational Medicine

continued ...

EDINBURGH-ZHEJIANG JOINT SYMPOSIUM
Inaugural Meeting, 23rd – 24th August 2011

Thursday 25th August 2011 *(continued)*

Round table discussion

19:00 Symposium dinner for e-Learning and Postgraduate Exchange Dinner

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Professor Shumin Duan

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Research Focus

Our laboratory is interested in the mechanisms underlying synaptogenesis and activity-dependent synaptic plasticity. In particular, we are interested in exploring the role of glial cells in these processes. We are also interested in signaling mechanisms within glial cells

Main approaches used:

- Dual patch-clamp recordings from cultured neurons or in brain slices.
- Morphological studies using confocal microscopy and electron microscopy
- Living cell imaging combined with gene transfection using GFP fusion proteins to study the trafficking of organelles and proteins
- Transgene or conditional knock-out mice specifically targeting molecules in glial cells using specific promoters or Cre-loxP systems.

Ongoing projects

- Release of signaling molecules from glial cells
- Functions of NG2 glial cells in the brain
- Functional roles of adhesion molecules expressed in glial cells

Selected publications

Tong, X., Li, X., Zhou, B., Shen, W., Zhang, X., Xu, T., and Duan, S.*. Ca2+ signaling evoked by activation of Na+ channels and Na+/Ca2+ exchangers is required for GABA-induced NG2 cell migration. ***J. Cell Biol.,*** 2009, 186, 113-128. Highlighted in **Nature Reviews Neurosc**, 2009, 10: 622-623: Exchange to Migration. Highlighted in ***J. Cell Biol.,*** 2009, 186: 2: Brain-repairing cells follows trail of GABA.

Song, A., Wang, D., Chen, G., Li, Y., Luo, J., Duan, S.*, and Poo, M. A selective filter for cytoplasmic transport at the axon initial segment. ***Cell***, 2009 136: 1148-1160.

Zhang Z., Chen G., Zhou W., Song A., Wang W., Xu T., Luo Q., Gu X., Duan S.* , Regulated ATP release from astrocytes via lysosome exocytosis. ***Nat Cell Biol*** 2007, 9: 945-953.

Ge W., Yang X., Zhang Z., Wang H., Deng Q., Duan S.* Long-Term Potentiation of Neuron-Glia Synapses Mediated by Ca2+-Permeable AMPA Receptors. ***Science***, 2006, 312, 1533-1537

Shen W., Wu B., Zhang Z., Dou Y., Rao Z., Chen Y., Duan S.* . Activity-induced rapid synaptic maturation mediated by presynaptic cdc42 signaling. ***Neuorn***, 2006, 50: 401-414 (Cover story) Comment in: Atasoy and Kavalali, Presynaptic Unsilencing: Searching for a Mechanism. ***Neuron,*** 2006, 50:345-346

Professor Xiao-Ming Li

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Research Focus

Our long-term goal is to understand the molecular mechanisms underlying the formation, maintenance and regulation of neuronal and synaptic functions, in identifying targets to develop therapeutic strategies for treating neurological disorders including ischemic injury, schizophrenia, neuromuscular disorders and epilepsy. The human brain contains billions of neurons. They are specialized to receive and integrate a host of electrical and biochemical signals. This highly efficient communication among neurons is made possible by synapses – contacts formed between two neurons. Despite significant progress in our understanding of the anatomic structures of synapses, little is known about mechanisms of synapse formation and function, specifically, responsed to pathological change.

So, the first component of our research is to understand the mechanisms of synapse formation and function and what goes wrong at neurons or/and synapses in neurological diseases. Furthermore, our research will identify targets to develop therapeutic strategies for treating disorders whose pathogenesis involves abnormal neuronal and/or synaptic structure and function. (Nature Neurosci. 2008; Journal of Neurosci. 2009).

The second type of our research is schizophrenia. Schizophrenia is a devastating illness that affects approximately 1% of the world's population. It is characterized by chronic positive symptoms (hallucination, delusion, and thought disorder), negative symptoms (social withdrawal, apathy, and emotional blunting), and cognitive deficits. The pathophysiological mechanisms of such synptoms of schizophrenia have not been enough informative to approach the clinical therapeusis. Based on this, my research activities also focus on the neural circuitry and firing pattern of cortex, and the alterations of this firing pattern and circuitry in psychiatric disorders based on schizophrenia. (Neuron, 2007). These studies will define the pathogenetic and pathophysiological processes that give rise to the cognitive deficits of schizophrenia and to identify potential targets for therapeutic interventions.

The third interesting for us is stroke. Stroke is the third leading cause of death and number one cause of disability in the world. Neurons in certain regions of the brain (e.g. CA1 pyramidal neurons in hippocampus and medium spiny neurons in neostriatum) are highly vulnerable to transient cerebral ischemia. The mechanisms of such selective cell death following ischemia remain unknown. We are interested in revealing the mechanisms of neuronal damage following cerebral ischemia and provide basis for developing therapeutical interventions. (J. Neurosci, 2007, Neurosci. Lett. 2003). Also, these studies will improve understanding of the mechanisms of brain damage upon resuscitation following cardiac arrest.

Selected publications

Lei Wen, Yi-Sheng Lu, Xin-Hong Zhu, Xiao-Ming Li, Ran-Sook Woo, Yong-Jun Chen, et al. (2010). Neuregulin 1 regulates pyramidal neuron activity via ErbB4 in parvalbumin-positive interneurons. Proc Natl Acad Sci U S A. 107(3):1211-6.

Ping-Chung Chen, Lu-Ning Qin, Xiao-Ming Li, Brandon Walters et al (2009). The proteasome-associated deubiquitinating enzyme Usp14 is essential for the maintenance of synaptic ubiquitin levels and the development of neuromuscular junctions. Journal of Neuroscience, 29(35):10909-19.

Li, X.M.*, Dong, X.P.*, Luo, S.W., Zhang, B., Lee, D.H.,et al. (2008). Retrograde regulation of motoneuron terminal differentiation by muscle β-catenin. Nature Neurosci. 11(3): 262-268. (* Co-first author) (In News and View by Drs. Amy K.Y. Fu, Zelda Cheung and Nancy Y. Ip, Nature Neurosci. 11(3): 244-246, 2008).

Woo, R.S.*, Li, X.M.*, Tao, Y., Carpenter-Hyland, E., Huang, Y., ,et al (2007) Neuregulin-1 enhances depolarization-induced GABA release. Neuron. 54(4): 599-610. (* Co-first author) (Highlighed in Preview by G. Fischbach, Neuron 54:495-497,2007; in News and View by L. W. Role and D. A. Talmage Nature 448:263, 2007 and Nature Review Neuroscience, 8:492,2007).

Li, X.M., Yang, J.M., Hu, D.H., Hou, F.Q., Zhao, M., Zhu, X.H et al. (2007) Contribution of down-regulation of L-type calcium currents to delayed neuronal death in rat hippocampus after global cerebral ischemia and reperfusion. J neurosci. 27(19): 5249-5259.

Professor Ying Shen

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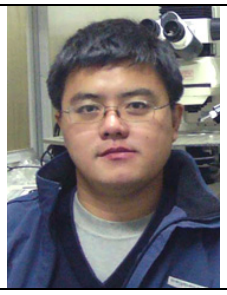

Research Focus

Cellular and molecular mechanisms underlying neural signaling pathway

The major research fields of Laboratory of Cellular and Molecular Mechanism of on Neuronal Signal Transduction include the functions of excitatory receptors and intracellular signal protein in signal transduction and synaptic plasticity in cerebellum and hippocampus. Our achievements include:

1. detailed analysis of characterization of glutamate receptors in retina and their function in retinal photo transduction.
2. exploring and analysis of synaptic plasticities in cerebellar Purkinje cells.
3. first evidence of immediate early gene SRF in hippocampal LTP.
4. first data to illustrate the function of cPLA2alpha I neuronal toxicity.

Ongoing projects:

1. Molecular and cellular genetic mechanism of neuronal development and degenerative disease. (National Key Basic Research Developing Project, 973)

2. Function of glutamate in insulin secretion and the molecular mechanism of the glutamate action (China-Slovenia Intergovernmental Science and Technologic Co-operative Fund)

3. Long-term potentiation of neuronal glutamate transporter and its molecular mechanism (NSFC)

4. Neuroglia controls cerebral blood flow: cellular and molecular mechanism (Talent Project of Zhejiang Provincial Science Fund)

5. Expression of NMDA receptors on astrocyte and its modulation of synaptic plasticity (NSFC)

6. Molecular mechanism study on NMDA receptor subtype assembling, membrane expression and functional differentiation.(Key Project of NSFC)

7. Function of cPLA2alpha in neurotoxicity and blood vessel activity and molecular mechanism (New Centrury Talent Project of Ministry of Education)

8. An investigation of the role of the PICK1-ICA69 complex in AMPA receptor trafficking and synaptic plasticity (NSFC-RGC)

Selected publications

Sun CL, Su LD, Wang XX, Li Q, Zhou SY, Shen Y. Cerebellar Long-Term Depression is Deficient in Niemann-Pick Type C Disease Mice. In press.

Su LD, Sun CL and Shen Y* (2010). Ethanol Acutely Modulates mGluR1-DependentLong-Term Depression in Cerebellum. Alcohol Clin Exp Res. 34(7):1140-5.

Su LD and Shen Y (2009) Blockade of glutamate transporters facilitates cerebellar synaptic long-term depression, NeuroReport, 20, 502.

Shen Y, Kishimoto K, Linden DJ and Sapirstein A (2007) Cytosolic phospholipase A2 alpha activity is required for the electrophysiological sequelae of neurotoxic NMDA treatment in hippocampal CA1 pyramidal neurons. Proc. Natl. Acad. Sci USA, 104, 6078.

Steinberg JP, Takamiya K, Shen Y, Xia J, Rubio ME, Yu S, Jin W, Thomas GM, Linden DJ and Huganair RL. (2006) Targeted in vivo mutations of the AMPA receptor subunit GluR2 and its interacting protein PICK1 eliminate cerebellar long-term depression. Neuron, 49, 845.

Professor Jianhong Luo

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Research Focus

We are most interested in molecular and cellular mechanisms for membrane trafficking of glutamate receptors and synaptic function, especially focusing on ER quality control, dynamic regulation of NMDA receptor subtypes, and its relation to synaptic function. We are also interested in single molecular detection to elucidate the details of the biophysical processes in receptor activation and signal transduction.

Main approaches used:

1. DNA cloning and mutagenesis to generate genetically tagged vectors;
2. Living cell imaging of cultured neurons transfected with GFP or its variant fusion proteins and fluorescent resonant energy transfer assay (FRET) in combination with total internal reflection fluorescent microscopy (TIRFM).
3. Transgenic or conditional knock-out mice specifically targeting the molecules associated to synaptic function.

Ongoing projects

1. Receptor and ion-channel trafficking: structural basis, regulation and function in neuronal signaling.
2. Structural basis and regulation for differential function of NMDA receptor subtypes.

Selected publications

Shuang Qiu, Xiao-min Zhang, Jing-yuan Cao, Wei Yang, Ying-gang Yan, Ling Shan, Jie Zheng , and Jianhong Luo* (2009) An Endoplasmic Reticulum Retention Signal Located in the Extracellular Amino-terminal Domain of the NR2A Subunit of N-Methyl-D-aspartate Receptors. J. Biol. Chem. 284(30):20285-20298.

Huayi Bai, Jun Cao, Na Liu, Lin Xu, and Jianhong Luo, Sexual behavior modulates contextual fear memory through dopamine D1/D5 receptors, Hippocampus, in press
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Liu CQ, Chen Z, Liu FX, Hu DN, Luo JH*, Involvement of brain endogenous histamine in degeneration of dopaminergic neurons in 6-hydroxydopamine-lesioned rats, Neuropharmacology, 2007, 53(7):832-41.

Wei Yang, Chanying Zheng, Qilin Song, Xiujuan Yang, Shuang Qiu, Chunqing Liu, Zhong Chen, Shumin Duan, and Jianhong Luo*. A Three Amino Acid Tail Following the TM4 Region of the N-Methyl-D-aspartate Receptor (NR) 2 Subunits Is Sufficient to Overcome Endoplasmic Reticulum Retention of NR1-1A Subunit Journal of Biological Chemistry, 2007;282(12):9269-78.

Shuang Qiu, Yu-lin Hua, Fan Yang, Yi-zhang Chen, and Jian-hong Luo* Subunit Assembly of N-Methyl-D-aspartate Receptors Analyzed by Fluorescence Resonance Energy Transfer JBC 280(26):24923–24930

Professor Aimin Bao

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Research Focus

Our team aim to determine the neurobiological basis of signs and symptoms of psychiatric, neurological, and neuroendocrine disorders in order to find new targets for rational therapeutic strategies.

The focus for the coming 5-years of our project will be on depression, Parkinson's disease, Alzheimer's disease, schizophrenia and sex differences in the brain that play a role in many of the symptoms of these disorders. Techniques used are clinical studies, brain- imaging, hormone and transmitter assays, quantitative immunocytochemistry, quantitative in situ hybridization and laser dissection microscopy followed by QPCR. In addition, the biological rhythms of hormones and neurotrasmitters that we observed during the physiological or pathological situations mentioned above will be followed up.

Ongoing Projects:

- Interaction among the prefrontal cortex (PFC), the aminergic systems and the hypothalamus in the pathogenesis of depression (the China Exchange Programme of the Royal Netherlands Academy of Arts and Sciences (KNAW) 09CDP011)

- The neurobiology of depression: is GABA involved in the activation of peptidergic neurons in the hypothalamic paraventricular nucleus? A postmortem study (Hersenstichting, Grants No. 14F06(2).07)

- Role of the hippocampal Akt/FKHRL signal pathway on the HPA-axis activity in stress responses (National Natural Science Foundation Project, 30870772)

- Interaction between nitrogen oxides and sex hormones in depression – a postmortem study (Graduate Innovative Research Grant, Zhejiang 2008) .

Selected publications

Bao AM*, Lucassen PJ, Swaab DF. The Neuroendocrinology of Psychiatric Disorders. Encyclopedic Reference of Neursocience. Edts. M.d.Binder, N.Hirokawa and U.Windhorst. Springer Verlag 2009, 2641-2645.

Swaab DF, Bao AM, Garcia-Falgueras A, Hofman MA, Ishunina1 TA. Sex differences in the human forebrain. Human Nervous System 3th edition Eds J. Mai and G. Paximos. Academic Press/Elsevier 2009 (in press).

Liu CQ, ShanL, Balesar R, Luchetti S, Van Heerikhuize JJ, Luo JH, Swaab DF, Bao AM*. A quantitative in situ hybridization protocol for formalin-fixed paraffin-embedded archival postmortem human brain tissue. Methods. (inpress).

Bao AM*, Swaab DF. Corticotrophin-releasing hormone and arginine vasopressin in depression: focus on the human postmortem hypothalamus. Vitamins and Hormones, Volume 81- Hormones of the Limbic System. Edt. Gerry Litwack, Academic Press/Elsevier 2009 (in press).

Bao AM*, Meynen G, Swaab DF. The stress system in depression and neurodegeneration: focus on the human hypothalamus. Brain Res. Rev. 2008; 57(2): 531-53.

Professor Jizeng Du (and Dr Xue-Qun Chen)

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Research Focus

1. Neurobiology
Molecular mechanism of neuro-endocrine-immune network;
Mechanism of hypoxia related brain disease;
Behavior of learning and memory and synapse plasticity;
Central neuroimmune function;
Stress: pivotal effects of neuropeptide CRF and its receptors family

2 .Physiology:
Hypoxia physiology
Comparative physiology of functional genome and Proteome
Physiological basis of development and aging
Environment adaptation and molecular evolution

Projects

1. the National Basic Research Program 973
"Injury and adaptation mechanism of high altitude hypoxia and other environment factors and its intervention strategy" Part 4: Neuro-Endocrine-Immune network in hypoxia injury and adaptation. No. 2006CB504100, 2006-2011

2.National Natural Science Foundation of China
1) Major Program:
Injury and adaptation mechanism of high altitude hypoxia and cold, Part 4, No. 30393134, 2003-2008

2) General Program:
Research on peptide CRF gene family cloning of small vertebrate dominant species in Tibet Plateau and functional comparison. No.30570227, 2006-2008

An investigation of IGF gene family cloning of three species of small mammals in Tibet Plateau and hypoxia adaptation. No. 30570227, 2008-2010

Effect of pregnancy intermittent hypoxia on the HPA axis in rat offspring and involvement of CRF receptors. No. 30871221,2009-2011
Study on the p53 mutation of small mammals in Tibet Plateau and adaptation to environment. No. 30870300,2009-2010

Selected publications

Xin-Jiang Lu, Xue-Qun Chen, Jian Weng, Heng-Yi Zhang, Daniel T et al. Hippocampal spine-associated Rap-specific GTPase-activating protein induces enhancement of learning and memory in postnatally hypoxia-exposed mice. Neuroscience (2009).

Zhao Y, Chen X, Du JZ (2009) Cellular adaptation to hypoxia and p53 transcription regulation. J Zhejiang Univ Sci B 10, 404-10

Fan, J. M., Chen, X. Q., Jin, H. & Du, J. Z. Gestational hypoxia alone or combined with restraint sensitizes the hypothalamic-pituitary-adrenal axis and induces anxiety-like behavior in adult male rat offspring. Neuroscience 159, 1363-73 (2009).

Cao, Y. B. Chen XQ, Wang S, Chen XC, Wang YX, Chang JP, Du JZ. Growth hormone and insulin-like growth factor of naked carp (Gymnocypris przewalskii) in Lake Qinghai: expression in different water environments. Gen Comp Endocrinol 161, 400-6 (2009).

Victoria Matey, Jeffrey G. Richards, Yuxiang Wang, Chris M. Wood, Joe et al The effect of hypoxia on gill morphology and ionoregulatory status in the Lake Qinghai scaleless carp, Gymnocypris przewalskii. J Exp Biol 211, 1063-74 (2008)