

Curriculum Vitae

Johnny Li-Yang Chiang (蔣禮陽)



Date of birth June 15, 1977
Citizenship Taiwan
Entry clearance Tier 1 (UK Highly Skillful Migrant)
Phone +44-1825-762076(H); +44-794-2862038(M)
E-mail liyang.chiang@gmail.com ; malerodent@hotmail.com
Address 6 Oakley Court, Selby Road, Uckfield, TN22 5EB, England
Languages Chinese (Native language), English (Fluent), German (Basic)

RESEARCH INTERESTS

Somatic sensation (touch and pain) is least understood amongst other sensations (e.g. hearing, smelling, vision and taste). Sense of pain (touch) provides a protection mechanism to organisms – it provides the ability to organisms to respond to potentially unpleasant or damaging stimuli. Lack of touch and pain in human may be lethal and life-threatening.

My research interests are to reveal the mechanism of pain sensing at peripheral as well as central nervous system (CNS). At periphery, the lab will be focused on studying the transduction mechanism using mammalian dorsal root ganglion (DRG) neurons as an experimental model. It is believed that neuropathic pain and chronic pain share some of the important features with long term memory in terms of synaptic plasticity. In order to study how sensory transduction is altered in neuropathic pain or chronic pain and how information derived from periphery is regulated at CNS, I will collaborate with other nationally and internationally well known scientists from Canada, Germany, Korea, Mainland China and Taiwan.

PROFESSIONAL EXPERIENCE

Dec 2004 – Mar 2009. Doctorate Researcher

Mar 2009 – Jul 2010. Postdoctoral Staff Scientist

Max-Delbrück-Center for Molecular Medicine, Berlin, Germany

Main projects:

- Role of skin-specific proteins in mechanosensory transduction and neurite bifurcation.
- Ultrastructural study of the nerve/skin interface using transmission electron microscopy (TEM)
- Characterization of sensory neuron electrophysiology and identification of molecules involved in mechanosensitive channel gating
- Cell biology of sensory neuron innervation in the cutaneous layer (skin)
- Development of a bioassay system for drug discovery using sensory neurons as a template
- Engineering surface structure of various ECM proteins to mediate axonal outgrowth of live cells in culture

- Bioassay development and identification of biomarkers of nociceptors and touch receptors

Techniques:

- Electrophysiology: Whole-cell patch clamp, perforated patch, calcium imaging, High-throughput electrophysiology: multielectrode arrays (MEAs)
- Electron Microscopy: Transmission electron microscopy (TEM), scanning electron microscopy (SEM), immuno-gold techniques (RT techniques and cryo-techniques), cryo-electron microscopy
- Fluorescence microscopy and others: Atomic force microscopy (AFM), Multi-photon confocal microscopy, photo-bleaching technique using confocal microscopy (FRAP)
- Molecular biology: Quantitative RT-PCR, DNA transfection, western blotting, in-situ hybridization, ECM protein purification, immunocytochemistry, immunohistochemistry, RNAi, mass spectrometry, SILAC mass spectrometry
- Cell biology: primary mammalian dorsal root ganglion (DRG) neuron culture, keratinocytes culture, sympathetic superior cervical ganglion (SCG) neuron culture, squamous cell carcinoma culture, co-cultures of neurons and skin cells, 3-D cultures, patterned cultures
- Behavioral study: Animal movement analysis in transgenic mice using ACTIMO System.
- Nanotechnology: BioMEMS, microcontact printing (μ CP)

Achievements:

Established a novel TEM method ([Hu* & Chiang* et al. EMBO J. 2010](#)) to study the interface between cultured sensory neuron and underlying ECM substrate. Developed an assay combining microscopic techniques, electrophysiology, molecular biology, cell biology, nanotechnology to study the mechanism underlying mechanosensation and neurite branching and have identified a novel protein required for mechanosensitive channel gating and characterized the role of a very important skin-derived disease gene molecule laminin-332 in mechanotransduction and neuron growth cone bifurcation ([Chiang et al. Nat. Neurosc. 2011. Accepted. In press](#)).

INDUSTRIAL PLACEMENT

Current (Since July 2010)

R&D Scientist, Scientifica Ltd, Uckfield, East Sussex, UK

Major Role:

- Involved in developing 2-photon microscope modules and supervised development of a high throughput screening-instrumentation for recording LTP/LTD from brain slices and QT prolongation from Purkinje fibres.
- Coordinate field service, system testing and building up instruments.
- Liaison between end customers and other scientists in the R&D department aiming to develop next generation applications to provide experimental tools to Neuroscientists.
- Provide trainings to international distributors and organise roadshows and workshops in universities.

2008 Internship (6 months)

Contract Researcher. 3D Pharma GmbH, Zurich, Switzerland

- Helped set up high throughput compound screening and safety pharmacology (hERG) template at GLP level.

- Provided service to major Pharmaceutical companies including Bayer and Novartis.

2001-2005 Part-Time

Representative. Tianhui Technology LLC (Family Business; based in China).

- Interacted on behalf of company proprietor between customers, production, suppliers and sales' representatives.
- To secure natural rubber supply from Malaysia/Indonesia and ensure manufacturing quality in China.

2000-2001 Full-Time

Analyst Assistant. Cold Spring Bioventure Fund. Taipei, Taiwan.

- Helped identify leads in technology transfer and commercialisation of life science products.
- Helped commercialisation of QQ^R and passing through FDA (toxicology test) regulation then successfully launched this product into Taiwanese food market within 1 year.

EDUCATION

- **2004-2009 Dr.rer.nat (Ph.D.) Neurophysiology & Biophysics**

Max-Delbrück-Centre for Molecular Medicine / Freie Universität Berlin, Berlin, Germany

- **2002-2004 M.Sc. Molecular Bioengineering** *Master thesis mark: excellent.*

Max Planck Institute of Cell Biology and Genetics / Technische Universität Dresden, Dresden, Germany

- **2001-2002 M.Sc. Computer Science (Bioinformatics)**

University of Bristol, Bristol, United Kingdom

- **1996-2001 B.S. Geography**

National Taiwan University, Taipei, Taiwan

PUBLICATIONS

- **Chiang LY**, Poole K, Oliveira BE, Duarte N, Sierra Y, Bruckner-Tuderman L, Koch M, Hu J and Lewin GR. Laminin-332 coordinates mechano-transduction and growth cone bifurcation in sensory neurons. *Nature Neuroscience* (2011). doi: 10.1038/nn.2873. *Articles* Impact Factor = **14.35** (2010); Impact Ranking = 4/230 (**Top 1.7%**) in Neuroscience field.

Significance of findings: The mechanism for sensory mechanotransduction is a poorly understood field and extremely difficult to study. I have established an in vitro model to study it. Then I identified and characterised a novel function of a skin-derived protein in this field and for the first time revealed the role of this protein in a devastated human disease.

- Hu J*, **Chiang LY***, Koch M and Lewin GR. Evidence for a protein tether involved in somatic touch. *The EMBO Journal* (2010) 29, 855–867. doi:10.1038 (*First authors) *Featured Article* Impact Factor = **10.06** (2007); Impact Ranking = 16/262 (**Top 6%**) in Molecular Biology field.

Significance of findings: how sensory neurons build up connections with their surrounding vicinity at the ultrastructural level in order to sense change of tension or displacement was poorly understood and has been a controversy over many years. I have established a novel bioassay to study the interaction between neurons and extracellular matrix. Using this assay, we revealed existence of a protein entity and characterised its role in somatic sensation. These findings also helped answer the long-standing controversy of how mechano-sensitive ion channels are gated.

- Martinez C, Benckendorff AG, **Chiang LY**, Wang R, Milenkovic N, Wetzel C, Hu J, Stucky CL, Parra MG, Mohandas N and Lewin GR. Stomatin and sensory neuron mechanotransduction. *J. Neurophysiol.* (2007) 98 (6): 3802-3808
Impact Factor = **3.48** (2010); Impact Ranking = 22/75 in Physiology field.
- **Chiang LY** and Huang BD. Convergent evolution revealed by a computational approach. *Bioinformatics.* *in review.*
Impact Factor = **4.96** (2010); Impact Ranking = 2/27 (**Top 6%**) in Bioinformatics and Computational Biology field.
- **Chiang LY**, Erdmann B, and Lewin GR. A novel in-vitro method to engineer axon branching and growth. *Paper in preparation.*
- **Chiang LY**, Elgar D and Canas T. A hyper-sensitive PMT module to study cellular activities in mammalian brain. Paper in preparation.

JOINT INDUSTRIAL PROJECTS

- Project Director (since 2010). Developing a high-throughput drug screening (LTP/LTD) setup for GlaxoSmithKline Pharmaceutical Company (GSK Internal Project number: R&D2011008). Project Budget: £200K (app. RMB 2 million). Project near to completion. Prohibited from publication due to commercial confidentiality.
- Project Leader (since 2010). Joint project with Group of Applied Optics, Imperial College London to develop a hyper-sensitive 2-Photon detection module (Project Director: Dr. Tony Canas). When completed, results can be widely applied to Neuroscience or other life science study.

INVITED PRESENTATIONS AND CONFERENCE PROCEEDINGS

- Invited speech. Mechanotransduction and neuron bifurcation. Nanjing University of Chinese Medicine. Nanjing, China. 2011.
- Workshop. Using IR-DIC, -oblique and -DODT to increase contrast to visualize brain slices. Cambridge workshop. Cambridge, UK. 2011.
- Invited speech. The role of laminin-332 in mechanotransduction and neuron bifurcation, Institute of Molecular Biology seminar series, Academia Sinica, Taiwan. 2010.
- Poster Presentation. μ CP as a novel method to study the biophysical properties of sensory neurons, *FENS, Netherland.* 2010
- Invited speech. Laminin-5 as an inhibitory factor to mechanosensitivity, *Berlin Brain Days*, Germany. 2008
- Poster presentation. Role of the extracellular matrix in function and development of sensory mechanotransduction. *International Berlin Spring Meeting*, Berlin, Germany. 2008
- Poster presentation. A tether link required for touch. *International Berlin Spring Meeting*. Berlin, Germany. 2008
- Invited on-line broadcast. How do we perceive sense of touch or pain? *Taiwan Macroview Television Service.* 2007
- Poster presentation. The role of the extracellular matrix in sensory mechanotransduction. *EuroHear Consortium -The Structure and Operation of the Hair Bundle*, Paris, France. 2006
- Poster presentation. A putative mechanotransduction tip link identified by TEM. 33rd *Conference of the Deutsche Gesellschaft für Elektronmikroskopie (MC2007)*. Saarbrücken, Germany. 2006

TEACHING EXPERIENCE

Mentored postgraduate students and senior undergraduate students from Freie Universität Berlin and Humboldt Universität Berlin in tutorials of transmission electron microscopy and patch-clamp techniques.

IT SKILLS

Experience in programming languages: ANSI C, Java™, Assembly, Perl

AWARDS AND HONERS

- 2008 Prize for Best Scientific Image, MDC Image Contest.
- 2006 Max Delbrück PhD Fellowship.
- 2001 President Award, National Taiwan University.
- 1996 Prize for Taiwan's Young Talents in Math and Physics.

EXTRACURRICULAR ACHIEVEMENTS

- Finalist, Tesco Cup Mini-Marathon, Berlin, Germany
- Gold Medal (50M-Butterfly), National Taiwan University Athletic Game, Taiwan
- Silver medal (50M-Breaststroke), National Taiwan University Athletic Game, Taiwan
- Silver Medal (50M-Breaststroke), Arena Taiwan Swimming Cup
- Guinness World Record, 10000 Men Swimming Across the Sun Moon Lake, Taiwan
- Certified Life Guard, National Water Life Saving Agency, Taiwan