Collaborate

合作。。。

News from the Joint Laboratory of Neuroscience & Cognition

神经与认知科学联合实验室信息

Joint Laboratory of Neuroscience & Cognition
An Initiative of the Queensland Brain Institute (QBI) and the Institute of Biophysics (IBP)

Issue 1 August 2011

DISTANCE NO OBSTACLE

Professor Rongqiao He (IBP)

There is a sentence from a Chinese poem that reads, "as long as you have a friend who knows your heart, distance can't keep you two apart".

Our Joint Laboratory between the Queensland Brain Institute (QBI) and Institute of Biophysics (IBP) is designed to keep labmates together to exchange ideas, skills and data in a way that allows for progress in our cooperative projects.

Before this Joint Laboratory was established, Australia felt a long way away but after the joining of QBI and IBP, we feel that The University of Queensland is close enough to be our next-door neighbour.

We collaborate to study: selective attention in learning and memory, and in psychiatric disorders; synaptic circuits in learning and memory, and in anxiety and depression; and we have recently begun investigating neural stem cells and dementia.

As our cooperation continues, our hearts will become nearer to Queensland, closer to our Australian colleagues, and together we will approach our common goals in the study of neuroscience and cognition.

Professor Perry Bartlett (QBI)

In 2010, with our friends at the Chinese Academy of Sciences IBP in Beijing, we began the first joint neuroscience laboratory between Australia and China.

This is an historic moment in neuroscience for our two countries and our focus is to dedicate resources to research brain disorders, such as dementia, depression and schizophrenia.

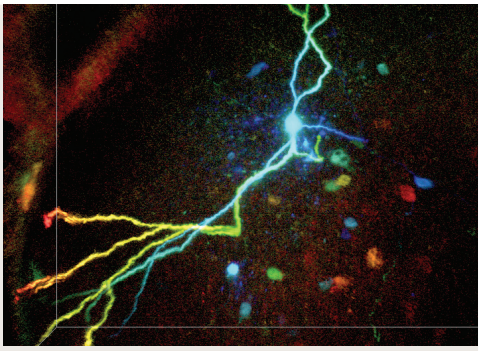
Dementia, for example, is expected to affect more than one million Australians and 60 million Chinese by the year 2050; a potentially enormous burden to our medical systems.

I believe that our collaboration will lead to a better understanding of the fundamental mechanisms controlling higher brain function and ultimately how we can overcome cognitive disorders.

Already much has been achieved and the future of our unique collaboration does indeed seem bright.

Prof Rongqiao HE (IBP) and Prof Perry Bartlett (QBI) in the foyer of the IBP building, alongside a statue of Professor Shizhang Bei, the Founder of the Institute of Biophysics. Right: A neuron in the medial amygdala in an acute brain slice.

1. 赫荣乔（IBP）和Perry Bartlett（QBI）教授在IBP门厅生物物理所创建人贝时璋教授塑像旁。2. 脑片中的中部杏仁核的一个神经元



天涯变近邻

赫荣乔教授 (IBP)

中国有句古诗说："海内存知己，天涯若比邻。"由澳大利亚昆士兰大学脑研究所（QBI）和中国科学院生物物理研究所（IBP）建立的联合实验室旨在让科研同仁们能够聚集在一起，通过交流想法、技术和数据促进我们共同项目的发展。联合实验室建立之前，澳大利亚对于我们还是一个感觉很遥远的国家；但当QBI和IBP合作后，昆士兰大学距离我们就像居于隔壁的邻居。

我们已经在多方面开展了合作：如学习记忆、精神障碍中的选择性注意研究、学习记忆、焦虑症以及抑郁症中的神经突触回路研究。最近，我们还开始共同探讨神经干细胞和痴呆症相关问题。

随着合作的继续，我们与澳洲昆士兰同事的心将贴得更近，同时我们将在神经和认知科学的研究过程中达到双方共同的目标。

Perry Bartlett教授（QBI）

2010年，我们和远在北京中国科学院生物物理研究所的朋友们建立了澳大利亚和中国神经认知科学的第一个联合实验室。这对我们两国的神经科学研究都是一个历史性事件，我们致力于研究脑功能失调及其相关疾病，包括痴呆、抑郁和精神分裂症等。

到2050年，仅痴呆这一项问题就将困扰100万澳洲人和6000万中国人，为我们医疗保障系统带来潜在的巨大压力。

我相信我们之间的合作将会有助于更好地理解控制大脑高级功能的基本机制并最终了解如何防治认知功能障碍。

我们之间的合作已经取得了很好的进展，将来必会取得更丰硕的成果。

HISTORY OF THE QBI-IBP COLLABORATION

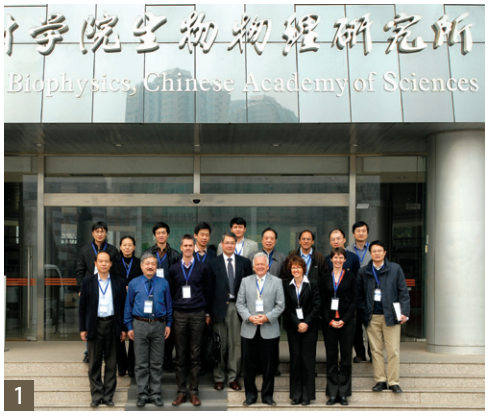
The Institute of Biophysics (IBP) and the Queensland Brain Institute (QBI) collaboration began in earnest when the Director of QBI, Professor Perry Bartlett visited the IBP in 2008 and met with Professor Rongqiao He (Deputy Director: IBP, Director: Centre for Brain and Cognitive Science and Executive Director: State Key Laboratory of Brain and Cognitive Science). The relationship progressed at joint workshops at the IBP (March 2009) and QBI (May 2009) when mutual areas of interest for collaborative research projects were identified.

This culminated in a Letter of Agreement being signed (August 2009) underpinning the establishment of a Joint Research Laboratory in Neuroscience and Cognition as a basis to cement future long-term research projects. This laboratory is bringing together complementary expertise and advanced technologies in cellular and molecular systems to discover how functions like learning and memory are regulated, and to use these discoveries to develop new techniques to treat the avalanche of neurological and mental disease facing both countries. Both institutes have committed dedicated laboratory space and money to this facility.

The openings of the Joint Laboratory in Neuroscience and Cognition took place firstly in Brisbane on 26 September 2010, opened by Professor Jinghai Li (Vice-President of the Chinese Academy of Sciences) and Ms Dianne Farmer MP, State Member for Bulimba, and then in Beijing on 4 November 2010, opened by Professor Jiayang Li (Vice-President of the Chinese Academy of Sciences).

An initial injection of funds was put in by both institutes, providing valuable resources to underpin the agreement ($150,000 by QBI and 1 million RMB Yuan by IBP). Since then additional funding has been obtained through competitive sources and includes a NIRAP grant, (Queensland Government National and International Research Alliances Program, *Utilising brain plasticity in health and disease*, $1 million, 2010-13) and a Q-CAS Biotechnology grant (Smart Futures Fund – Queensland-Chinese Academy of Sciences Biotechnology Projects Fund, *The effect of hypogeomagnetic field on brain function and development*, $250,000 for QBI and an equal amount of 1,500,500 RMB Yuan for IBP, 2011-2013). The IBP side was also supported by the CAS External Cooperation Program (1 million RMB Yuan, *The mechanism of information processing in visual circuit of Drosophila*, 2010-2012). A researcher at IBP also received funding through the CAS K.C.Wong Education Foundation (100,000 RMB Yuan, *Study of using the protein gradient of axon guidance molecules to improve the regeneration of injured spinal axons*, 2010-2012).

The aim of this newsletter is to highlight the research being undertaken in the laboratory and to showcase the researchers themselves.



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QBI-IBP的合作历程

中国科学院生物物理研究所（IBP）和昆士兰脑研究所（QBI）的合作始于2008年。 QBI的Perry Bartlett教授（所长）于08年首次访问中国科学院生物物理研究所，并与赫荣乔教授（IBP副所长，脑与认知科学中心主任，脑与认知科学国家重点实验室常务副主任）亲切会面，从而拉开了彼此合作的序幕。在此基础上，双方讨论和确认了开展合作研究的领域和项目，并分别在IBP（2009年3月)和 QBI（2009年5月)召开双边研讨会，推动双方合作的进程。

2009年8月，QBI-IBP成功签署建立中澳神经与认知科学联合实验室合作协议，这一举措将IBP 和 QBI 之间的合作推上了一个致力于长期项目研究的新阶段。该联合实验室借助双方互补优势，汇集细胞和分子系统领域的专业知识和先进技术，探索大脑学习和记忆功能的调节方式，开展新技术的研发，为中澳两国在防治神经和精神疾病方面提供新的理论和方法。IBP和QBI均已为联合实验室提供了配套的实验室和资金支持。

2010年9月26日，联合实验室在布里斯班举行了揭牌仪式，中国科学院李静海副院长和澳大利亚昆士兰政府代表Dianne Farmer MP 女士共同出席仪式并剪彩。同年11月4日，联合实验室北京挂牌仪式在中科院生物物理所举行，中国科学院李家洋副院长出席仪式并为实验室揭牌，中国科技部、澳大利亚昆士兰政府的领导和嘉宾也参加了成立仪式。

来自双方机构的启动经费保证了合作协议的顺利启动（QBI提供150,000澳元，IBP提供100万元人民币）。后续的补充经费包括NIRAP（昆士兰州国家和国际研究联盟的计划项目“脑可塑性与健康和防治疾病”，100万澳元，2010-13）和Q-CAS生物技术计划项目（中国科学院与昆士兰州生物技术合作计划项目“模拟空间亚磁环境对大脑功能和发育的影响”，QBI获 250,000澳元资助；IBP获150万元人民币资助，2011-2013年）。IBP方还获得了中科院对外合作项目（“果蝇视觉回路的信息处理机制研究”，100万人民币，2010-2012年）的资金支持。一名IBP研究人员获得中科院王宽诚科研基金资助（“神经导向蛋白定向梯度纳米偶联基质体内植入对神经损伤再生的作用”，100,000元人民币，2010 - 2011年）。

PHOTOS

1. Delegates from IBP and QBI at the first joint workshop of Neuroscience and Cognition, IBP, March 2009.
在第一届中-澳神经与认知科学研讨会上的QBI和IBP代表团成员，IBP，2009年3月

2. Signing of the Letter of Agreement between QBI and the IBP underpinning the formation of a Joint Research Laboratory in Neuroscience and Cognition, 14 August 2009. Front Row: Prof Rongqiao He and Prof Perry Bartlett. Back Row: Dr Zhibin Zhang, Ms Michele Robinson, Prof Jiayang Li, Prof Alan Lawson, Mr Gongping Ren, Mr Xuan Feng.
签署建立联合实验室协议，QBI，2009年8月。
前排：赫荣乔教授和Perry Bartlett教授
后排：张知彬教授（中科院生命科学与生物技术局局长），Michelle Robinson女士（昆士兰劳资关系部国际合作处主任），李家洋教授（中国科学院副院长), Alan Lawson教授（昆士兰大学副校长），任共平先生（中国驻澳布里斯班总领事），冯瑄先生（中国驻澳大使馆科技参赞）。

3. Delegates from QBI and IBP at the second joint workshop of Neuroscience and Cognition, QBI, May 2009. L-R: Prof Li Liu (IBP), Mr Xiaoke Xia (IBP), Prof Baolu Zhao (IBP), Prof Jianyuan Sun (IBP), Prof Pankaj Sah (QBI), Prof Rongqiao He (IBP), Prof Perry Bartlett (QBI), A/Prof Ying Liu (IBP), Ms Ma Li (IBP), A/Prof Yaobo Liu (IBP), Prof Shigang He (IBP).

ADDRESS BY PROFESSOR TAO XU (DIRECTOR IBP)

Dear colleagues and friends,

The establishment of the IBP-QBI Joint Laboratory of Neuroscience and Cognition is one of the most important accomplishments in IBP international collaboration. On behalf of the Institute of Biophysics, I would like to extend our heartiest gratitude to all the leaders, colleagues and friends who worked hard to make this possible. The first cooperative agreement between IBP and QBI was signed in Queensland in August 2009, which laid a strong foundation for a successful collaboration. I would like to thank the Ministry of Science and Technology of China for giving us valuable resources and constructive advice. The Bureau of International Cooperation and the Bureau of Life Sciences and Biotechnology of the Chinese Academy of Sciences provided assistance, effort, and most importantly, funding support. I would like to express our special gratitude to Professor Perry Bartlett for his dedication and commitment which facilitated the collaboration in a smooth, productive manner.

> "...further strengthens the **link between** scientists from both countries."

IBP scientists have a special bond with Australian scientists. In recent years, we have developed fruitful cooperation with many Australian scientists from different research areas. For example, three years ago, another joint research unit, the China-Australia Joint Centre for Phenomic Research was established between IBP and the Australian National University. Today, the newly established joint laboratory further strengthens the link between scientists from both countries. With complementary strengths and distinctiveness, we believe our two institutes have many more areas for collaboration, such as neurodegenerative diseases, brain mapping and non-coding RNA. We are confident that through sincere, friendly cooperation and hard work, we can achieve more and make great contributions to society. I wish the joint laboratory great success. Thank you!

PHOTOS

3. 在第二届中-澳神经与认知科学研讨会上的QBI和IBP代表团成员，QBI，2009年5月。（从左至右依次为）刘力教授(IBP)，夏小科副处长(IBP)，赵保路教授(IBP)，孙坚原教授(IBP)，Pankaj Sah教授(QBI)，赫荣乔教授(IBP)，Perry Bartlett教授(QBI)，刘缨副教授(IBP)，马丽女士(IBP)，刘耀波副教授(IBP)，何士刚教授(IBP)。

4. Prof Jiayang Li (CAS Vice-President) and Prof Perry Bartlett (Director, QBI) unveil the plaque at the opening of the IBP-QBI Laboratory of Neuroscience and Cognition, 4 November 2010.
李家洋教授（中国科学院副院长）与Perry Bartlett教授（昆士兰大学脑研究所所长）为中-澳神经与认知科学联合实验室的成立剪彩，2010年11月4日。

5.Unveiling the plaque at the opening of the QBI-IBP Laboratory of Neuroscience and Cognition, in Brisbane 26 September 2010. L-R: Mr Gongping Ren, Prof Perry Bartlett, Prof Jinghai Li, Ms Dianne Farmer MP, Prof Debbie Terry, Prof Li Liu.
中-澳神经与认知科学联合实验室揭牌仪式，布里斯班，2010年9月26日。从左到右依次为：任共平先生（驻布里斯班总领事），Perry Bartlett教授，李静海教授（中国科学院副院长），Dianne Farmer女士（昆士兰州议员），Debbie Terry教授（昆士兰大学副校长），刘力教授。。

6. Professor Rongqiao He (IBP Deputy Director General), Professor Jiayang Li (Chinese Academy of Sciences Vice-President) and Professor Perry Bartlett (QBI Director) celebrate the opening of the IBP-QBI Laboratory of Neuroscience and Cognition.
中国科学院副院长李家洋教授与昆士兰大学脑研究所所长Perry Bartlett教授、生物物理研究所副所长赫荣乔教授共同庆祝中-澳神经与认知科学联合实验室正式成立。

7. Prof Perry Bartlett (middle) receiving the Q-CAS Joint Biotechnology Projects award. Left: Mr Andrew Fraser MP (Treasurer of Queensland). Right: Mr Gongping Ren (Former Consul-General, PR China, Brisbane).
Perry Bartlet教授接受Q-CAS 联合生物技术项目奖。Andrew Fraser先生（左，澳大利亚昆士兰州财政部兼贸易发展部部长），任共平先生（右，中国驻澳布里斯班总领事）

徐涛教授致辞

亲爱的同事们、朋友们，

IBP-QBI神经与认知科学联合实验室历经一载，终于成功建立。就IBP国际合作来说，此联合实验室的建立至关重要。在此我谨代表中国科学院生物物理研究所，对长期以来支持联合实验室建设的领导、同事和朋友们，致以衷心感谢。2009年8月，IBP和QBI在昆士兰首度携手，签订合作协议，为之后的工作奠定了坚实基础。在这里，我想感谢中国科学技术部，为我们提供了宝贵的资源和建设性意见，感谢中科院国际合作局和生物技术局长久以来的关心、支持与资助。此外，我要特别感谢Perry Bartlett教授，正是他全心全意的奉献和言而有信的承诺，才让我们的合作得以畅通无阻，成效显著。

生物物理所的科学家们与澳大利亚科学家缔结深厚的感情。近年来，在诸多不同的研究领域中，我们与澳大利亚科学家实现了卓有成效的合作。例如，三年前，我们和澳大利亚国立大学建立了“中澳表型组学联合中心”。今天，我们新成立的联合实验室进一步加强了两国科学家之间的联系。中澳双方互补性的优势和各具特色的专长，让我们对未来在更多领域实现合作充满信心，这些领域包括神经退行性疾病、脑功能成像、非编码RNA等等。我们坚信，通过真诚、友好的合作和努力，我们可以造就更多辉煌，为社会做出更大的贡献。我预祝联合实验室在不久的将来取得更大的成功！

谢谢！

中国科学院生物物理研究所所长

徐涛教授

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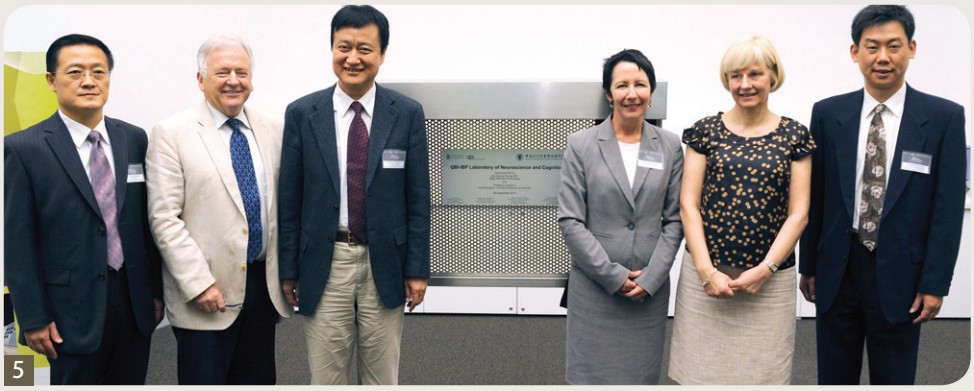

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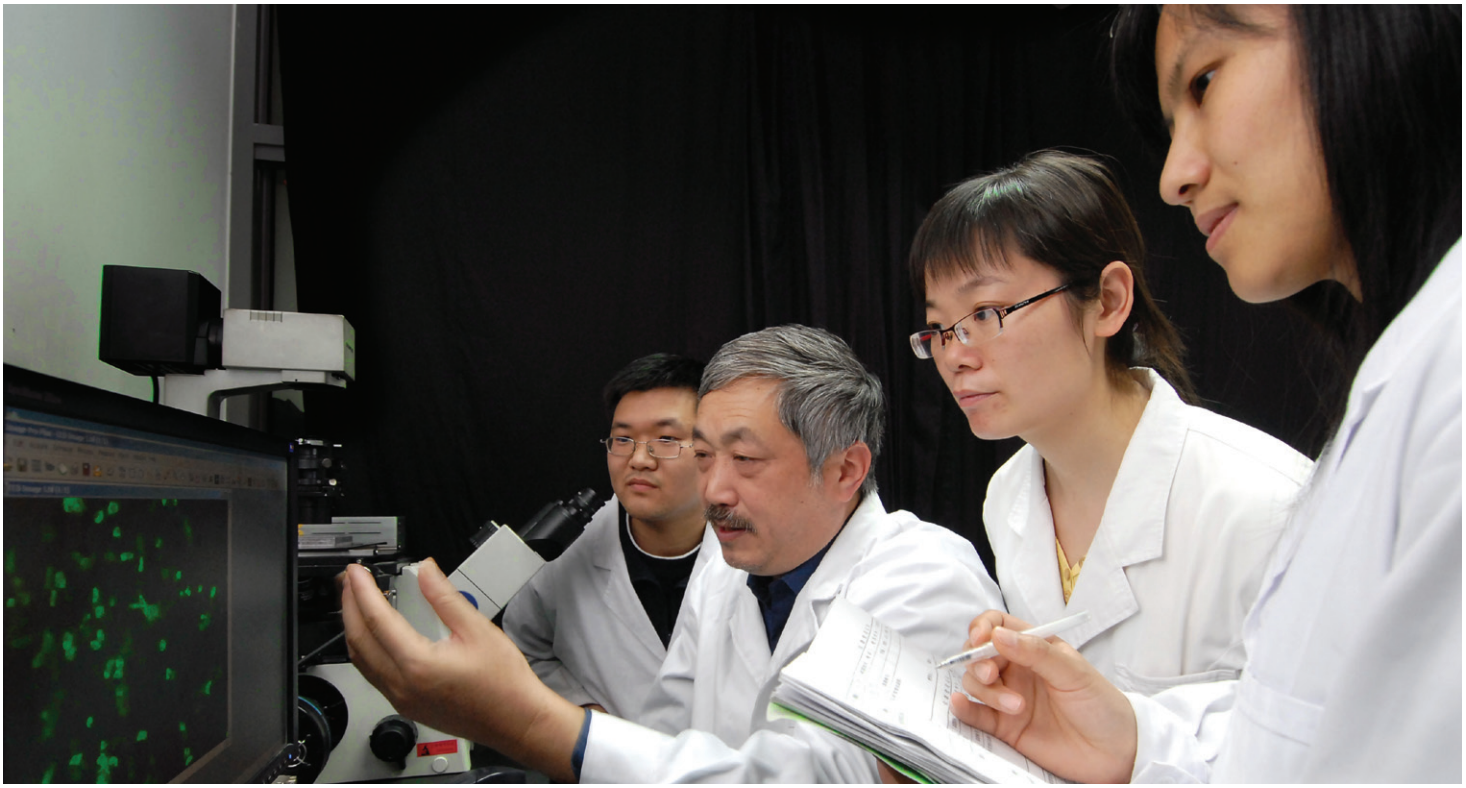
NEW TEST FOR SENILE DEMENTIA COULD SOON BE ON THE CARDS

老年痴呆症的新检测方法将成为可能。。



Prof Rongqiao He discusses research results with students in the joint laboratory. 赫荣乔教授与学生讨论实验结果。

Together, Professor Rongqiao He from IBP and Professor Perry Bartlett from QBI, and their respective groups, are working towards a better understanding of dementia.

The most common from of dementia is that associated with Alzheimer's disease (AD).

In many investigations, the presence of amyloid-containing plaques, together with neurofibrillary tangles, has been shown to be a hallmark of AD.

> "This **non-invasive** process of measuring formaldehyde in the urine could therefore potentially be used to **diagnose dementia.**"

The collaborative work of Dr He's and Dr Bartlett's laboratories may soon change the standards of identifying dementia.

It is widely known that exposure to formaldehyde induces cognitive impairment in humans and memory loss in animals.

Recent studies in humans have shown that formaldehyde at pathological levels can induce plaque deposition and misfolding of Tau protein to form globular amyloid-like aggregates.

Based on these discoveries, the group has established that endogenous formaldehyde may be a marker for progressive dementia.

Dr He and colleagues have found that the Mini-Mental State Examination scores currently used to measure dementia are inversely correlated to formaldehyde levels in the urine.

This non-invasive process of measuring formaldehyde in the urine could therefore potentially be used to diagnose dementia.

This project may assist in preventing or delaying further cognitive decline, as advances in diagnostic techniques may lead to earlier identification of the onset of dementia.

Dr Jing Lu, who has recently graduated from Dr He's laboratory, will join Dr Bartlett's group in July. Associate Professor Ying Liu and Dr Weichuan Mo from IBP are also expected to visit QBI later this year.

Professor Rongqiao He (IBP) & Professor Perry Bartlett (QBI)

生物物理研究所赫荣乔教授与昆士兰脑研究所Perry Bartlett教授、以及他们各自的团队已经展开合作，以期更好的探索老年痴呆的发病机制。最常见的老年痴呆即阿尔茨海默氏病(AD)。在许多调查中发现，淀粉样蛋白斑块和神经元纤维缠结是出现AD的标志。

赫教授与Bartlett教授的合作工作将建立痴呆症识别的标准。

大家都知道暴露于甲醛中会引发人的认知能力下降及动物记忆力的丧失。

近期对人类进行的研究发现，致病剂量的甲醛可以引发蛋白斑块沉积和Tau蛋白的错误折叠，从而引起类球状淀粉样蛋白聚集。根据这些发现，该团队已经证实内源性甲醛可能是痴呆进行性发展的一个测量标准。

赫教授及其同事发现，测量痴呆等级的简易智能精神状态检查量表(Mini-Mental State Examination)评分与尿液中甲醛的含量成反比例关系。

这种非损伤性测量尿液甲醛含量的方法可能被用于痴呆的诊断。

先进的诊断技术可以更早检测痴呆发生，所以该项目的开展，有助于预防及延缓认知功能的降低。

最近刚从赫荣乔教授实验室毕业的卢静博士于7月加入Bartlett教授的研究组。

生物物理研究所刘缨副教授和莫炜川博士也于8月份访问了QBI。

Professor Rongqiao He (IBP) & Professor Perry Bartlett (QBI) 赫荣乔教授与*Bartlett*教授的合作

EMOTIONALLY ATTACHED TO UNDERSTANDING SYNAPTIC CIRCUITS

Professor Pankaj Sah

The amygdala is a region of the brain that is involved in emotional processing, and damage to this region can lead to an array of disorders from anxiety to post-traumatic stress.

Pharmacological treatment of these disorders is difficult due to the range of side effects of the therapeutic agents currently available.

The development of a more specific treatment requires a better understanding of the physiology of information processing in the amygdala.

To this end, a collaboration has been established between Professor Sah's (QBI) and Professor Jianyuan Sun's (IBP) laboratory to study the properties of inputs carrying nociceptive information to the amygdala.

This collaboration combines the skill of two different labs – Dr Sah's expertise in the anatomy and physiology of the amygdala and Dr Sun's expertise in synaptic transmission.

The exchange of ideas has already begun, with Dr Sun's PhD student, Xufeng Qui, recently spending time in Brisbane at the beginning of the year learning about the amygdala.

Later this year, postdoctoral fellow Cornelia Strobel from Dr Sah's lab will travel to IBP in Beijing to spend several months learning new techniques and sharing her expertise with Dr Sun's laboratory.

Dr Sah says he believes that the collaboration will lead to a clearer understanding of how sensory inputs enter the amygdala and how this information is processed locally.

Professor Jianyuan Sun (IBP) & Professor Pankaj Sah (QBI)

从情绪角度理解神经突触回路回路

杏仁核是大脑参与情绪控制的区域之一，该区域的损伤会导致一系列神经紊乱，小到焦虑症大到创伤后的应激障碍。

目前该类疾病很难治疗，主要的原因在于现阶段治疗该类疾病的药剂都具有一定副作用。因此我们需要通过对大脑杏仁核的信息传递过程进行更为全面的研究来找出行之有效的治疗方法。

为了达成这个目标， Sah教授(QBI)和孙坚原教授(IBP)建立了合作，致力于阐明疼痛刺激在杏仁核的信息传递特征。

本项合作联合了两个实验室的优势——Sah教授在杏仁核解剖学和生理学的研究上有丰富经验，孙教授在突触传递研究中具有独特的专长。

目前该联合项目已经启动，孙教授的博士生邱徐峰已于今年年初在布里斯班学习和掌握了脑杏仁核的解剖学特征及相关的知识，这次访问也为两个实验室的联合项目拉开了帷幕。

今年年底，Sah教授实验室的博士后Cornelia Strobel将前往北京，进行为期几个月的学习，并与孙教授的实验室成员分享她的专长。

Sah教授说，他相信这项合作会让大家弄清楚感知信息是如何输入脑杏仁核，以及这种信息在脑杏仁核里是如何进行处理的。

孙坚原教授（IBP）和Pankaj Sah教授(QBI)

Pankaj Sah以及联合实验的成员都将努力以期更好的理解大脑杏仁核是如何处理感知信息的。

PROFILE: DR. WEICHUAN MO (IBP)

I completed my PhD in Professor Rongqiao He's laboratory at IBP this summer, and will soon join Professor Perry Bartlett's laboratory at QBI for the cooperative project "The effects of hypogeomagnetic field (HGMF) on brain function and development".

The objective of the joint project is to elucidate the involvement of the geomagnetic field (GMF) in brain development and function, and examine whether the removal of the GMF causes changes to the brain at the molecular, cellular and anatomical levels.

HGMF is one of the three main environmental factors in outer space.

Previous work from IBP research partners gives the first report of HGMF-associated learning and memory defects.

The work on the mechanisms of the effect of HGMF on brain development and function will provide useful data for the healthcare of astronauts during long-term space missions, and will contribute to the understanding of the mechanisms of biomagnetic interaction.

QBI has extensive technical expertise in neuroscience and molecular biology, world-leading expertise in neural stems cells, cutting-edge MRI facilities, and a strong research focus on axonal guidance and spinal cord injury research.

Continuing my research at QBI with this expertise at hand will help me to reveal the effects of HGMF on neural stem cell populations and axonal guidance, and enable the discovery of a more detailed and accurate magnetic responding mechanism in the HGMF.

资料: 莫炜川博士(IBP)

我于今年夏天在赫荣乔教授的实验室获得了博士学位，我将加入Perry Bartlett教授的研究团队，开展合作项目“模拟空间亚磁环境（HGMF）对大脑功能和发育的影响”研究。

该联合项目的目标是阐明地磁场在大脑发育和功能过程中的作用，以及检测屏蔽地磁场是否会造成大脑在分子、细胞和解剖水平的变化。

HGMF是外太空的三大特殊环境因素之一。

此前，IBP同事首先报道了HGMF导致不同动物学习记忆能力受损的现象。

HGMF对脑发育和功能影响机理的研究，将为宇航员在长期太空作业的健康保护提供有用的数据，也将促进对生物磁响应机理的进一步认识。

QBI拥有神经科学和分子生物学领域的技术专家、世界一流的神经干细胞专家、先进的MRI设施以及实力很强的轴突导向和脊髓损伤研究中心。在QBI跟随这些专家继续我的研究，将有助于揭示HGMF对神经干细胞群及轴突导向的影响，并进一步更加详细和准确地揭示HGMF响应机制。

COOPER AND LIU COLLABORATE TO DIRECT AXON GUIDANCE RESEARCH

Axon guidance is one of the most fundamental processes underpinning the formation of the complex architecture of the mammalian brain.

Failure of axon guidance systems during development can cause abnormal axon growth and thus severe neurological conditions, including epilepsy, autism, schizophrenia and intellectual disability.

As a result of this critical relationship, Associate Professors Helen Cooper (QBI) and Yaobo Liu (IBP) have established a working relationship, based on a common interest in exploring the molecular mechanism underlying this process.

The Cooper and Liu laboratories have each identified several guidance receptors essential for the development of key axon tracts in the embryonic central nervous system.

The two labs believe the mechanism that guides the axons during early embryonic development is also needed to establish a neural circuit during learning and memory-based neuron formation.

More specifically, the receptors they have identified to guide embryonic axons may also be important where axons emerging from newborn neurons must navigate to their correct targets.

The labs are now combining their expertise to identify molecular regulators of axon growth and pathfinding.

As part of this project, Mr Zhenhui Huang, a PhD student from Dr Liu's laboratory at IBP, will visit QBI for approximately six weeks later this year.

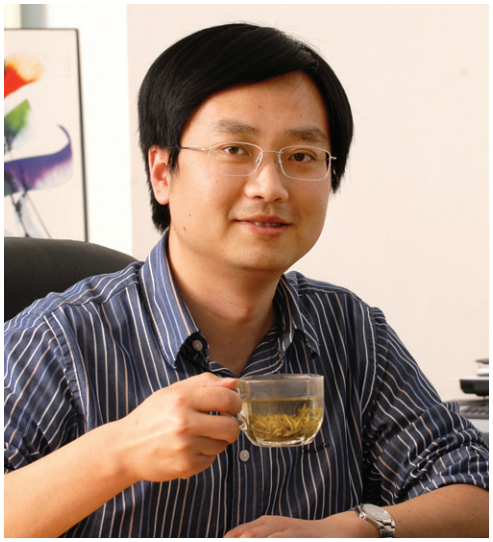
Muru Sheekar, one of Dr Cooper's Research Assistants, will visit China in August to learn and share techniques with the Liu Laboratory.

In addition, Dr Cooper will visit Dr Liu's laboratory in IBP in October.

Dr Cooper says she believes that understanding how these complex molecular mechanisms operate in the embryo will lead to innovative therapeutic strategies to regulate axon tract formation in the injured or damaged adult brain.

Dr Liu says he hopes the collaboration can provide new insights into diseases such as dementia and depression.

Associate Professor Yaobo Liu (IBP) & Associate Professor Helen Cooper (QBI)



Associate Professor Yaobo Liu enjoying a cup of green tea. 刘耀波副教授

轴突导向研究

轴突导向是哺乳动物复杂的大脑结构建立中最重要的过程之一。

在发育过程中，轴突导向障碍会导致轴突生长异常，并进而导致严重的神经功能障碍，包括癫痫症、自闭症、精神分裂症以及智障。

鉴于这种紧密的联系，Helen Cooper副教授(QBI)和刘耀波副教授（IBP）建立了合作伙伴关系，共同研究这一过程中的分子机理。

Cooper和刘的实验室分别发现了数个轴突导向受体，这些受体对胚胎中枢神经系统中主要轴突束发育有重要作用。

双方实验室都认为胚胎早期发育时期轴突导向的机理也参与学习记忆依赖的神经环路建立。

更具体来说，即已发现的胚胎神经轴突导向机理可能对神经元新生轴突的正确投射也很重要。

两个实验室现在将集各方之所长来发现轴突生长及其导向的分子调节机制。

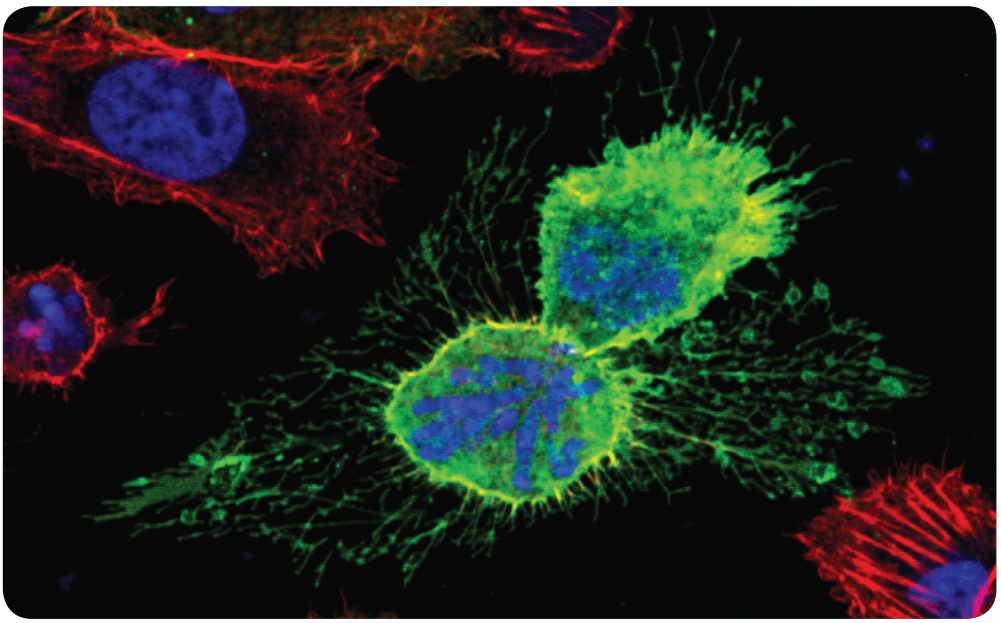
作为该项目的一部分，刘耀波副教授实验室的博士生黄振晖将赴QBI进行约六周的访问学习。

Cooper副教授的研究助理Muru Sheekar将于八月份来刘教授的实验室学习并进行技术交流。

另外， Cooper副教授已于7月访问了刘教授在IBP的实验室。

Cooper副教授说，她相信对胚胎中这些复杂分子机理的了解将会引导建立创新的治疗策略，以此来帮助受伤或损坏后的成人大脑中神经轴突的重新形成。

刘耀波副教授说，他希望这个合作能够为痴呆和抑郁等疾病研究提供新的视角。



Cells in action: a dividing epithelial cell (green) is surrounded by non-dividing cells (red).
细胞动态：正在分裂的上皮细胞（绿色）和周围的未分裂细胞（红色）

Associate Professor Helen Cooper. Cooper副教授

BEHAVIOUR OF FLIES LINKS TO LEARNING & SELECTIVE ATTENTION

Selective attention is the process of filtering out information unrelated to the task at hand.

This is a particularly important cognitive process for animals to be able to survive in the wild.

In a highly information-rich environment, selective attention allows for the processing of the most valuable information.

Professor Li Liu (IBP) and Associate Professor Bruno van Swinderen (QBI) are together looking to uncover the mechanisms of learning and attention in the *Drosophila* brain, to better understand how these processes might govern behaviour.

Dr Liu and Dr van Swinderen are combining powerful genetic tools and electrophysiology to explore the cellular mechanisms of selective attention.

Dr Liu's laboratory has found that a part of the fly brain, the fan-shaped body, is required for visual learning, and is currently dissecting the neural circuits involved.

Dr van Swinderen's group has conducted electrophysiological recordings from the fly, and found rhythmic, repetitive neural activity associated with transient activation of the neurons in the fan-shaped body.

Interestingly, they have also found information to suggest that sleep and learning effects might converge on the same part of the fly brain.

The joint laboratory is now investigating whether this structure might modulate sleep, learning, and attention by generating oscillatory activity that might impact synaptic function.

Dr Liu says he believes these studies will assist in better understanding selective attention in learning and memory, but will also promote the knowledge of attention in mammals.

Ms Yanqiong Zhou (IBP), Dr Liu's PhD student, has recently arrived in Brisbane and will spend her time investigating the influence of neural oscillations on selective attention, and Dr Bart van Alphen (QBI) will be travelling to Beijing later this year to supervise a genetic screen.

Professor Li Liu (IBP) & Associate Professor Bruno van Swinderen (QBI)

通过对果蝇行为学的研究来探索学习和选择性注意

选择性注意是一种过滤掉与当前任务无关信息的过程。这是动物在野外生存的一个非常重要的认知过程。在一个信息相当丰富的环境中，选择性注意能够有效地处理最有价值的信息。

刘力教授(IBP)以Bruno Van Swinderen (QBI)副教授将通过对果蝇中枢神经系统的研究，共同揭示果蝇脑参与学习及选择性注意的机制，从而更好的理解这些机制调控行为的过程。

刘博士和Van Swinderen博士将会利用强大的遗传工具，并结合电生理学来探寻选择性注意的细胞及回路机制。

刘博士的实验室已经发现视觉学习需要果蝇脑中的扇形体结构，他们目前正在解析与之相关的神经回路。

Van Swinderen博士的团队通过对果蝇进行电生理学记录，发现有节律性的、重复的神经活动，伴随着扇形体神经元瞬间的激活。

有趣的是，他们找到一些证据，表明睡眠和学习的效果可能与果蝇脑中的同一个结构相关。

联合实验室正在研究这个结构是否通过产生振荡性兴奋来影响突触功能，从而调节睡眠、学习及注意活动。

刘博士说他相信这些研究不仅能够帮助我们更好地理解学习和记忆中的选择性注意，而且能促进对哺乳动物相关认知机制的认识。

刘教授的博士生周艳琼 (IBP)刚刚抵达布里斯班，她将开展有关神经元兴奋性振荡对选择性注意影响的研究。Bart van Alphen博士(QBI)年底将到北京，开展一个遗传筛选项目的工作。

MAY WE HAVE YOUR ATTENTION? THANKS, NOW WE'LL MEASURE IT...

Professors Raymond Chan (IP), David Shum (Griffith University) and Jason Mattingley (QBI) have developed a number of behavioural paradigms to measure selective attention.

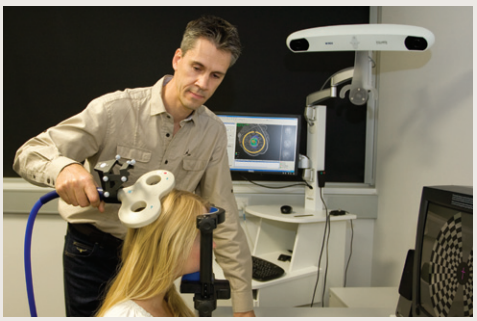
Central amongst these is a new task to measure how the human brain responds when dividing attention between multiple simultaneous sources of visual information.

By using scalp-recorded electroencephalography (EEG), the group has obtained maps of ongoing brain activity in response to frequency tagged visual stimuli.

Using these maps, they can then identify whether areas of the brain are responding more or less to certain visual inputs.

The group has found that when focusing on a particular visual feature, such as colour, the brain's response to that feature is selectively enhanced, whereas responses to unattended features are suppressed.

The researchers have also shown that the attentional load, which is the "perceptual difficulty", of a task can also selectively alter brain responses.



Professor Jason Mattingley prepares an EEG.
Jason Mattingley教授在进行脑电图实验。

The group now aims to use these sensitive new tasks to index abnormal brain activity in patients with attention disturbances, including schizophrenia, stroke and attention deficit hyperactivity disorder.

Both Dr Mattingley and his postdoctoral fellow, Dr Luca Cocchi, are planning to travel to Beijing in early 2012 to visit Dr Chan and his laboratory.

Professor Raymond Chan (Institute of Psychology) & Professor Jason Mattingley (QBI)

请大家注意，激动人心的时刻到了!

陈楚侨(中科院心理所), David Shum (Griffith大学) and Jason Mattingley(QBI) 教授开发出多种检测选择性注意的行为模型。

其中最重要的是建立了一个新的方法来检测人类大脑在多种视觉信息同时出现分散注意力时是如何作出反应的。

通过对头皮脑电波(EEG)的测量，该小组已经获得了不同频率视觉刺激与不同大脑活动的对应图表。

通过这些图表，他们能够识别大脑不同区域是否对特定的视觉输入有不同的反应。

该团队发现当着重于特定视觉特征（例如颜色）时，大脑对这一特征的反应将会选择性地被加强，与此同时一些针对其它特征的反应将会被抑制。

研究人员同样发现对一项任务的"注意负载（或认知困难）"同样可以选择性地改变大脑的反应。

该团队现在希望用这些更敏感的新方法来标识注意力紊乱病人的不正常大脑活动，例如精神分裂症，中风和注意力缺陷障碍。

Mattingley教授和他的博士后 Luca Cocchi博士计划在2012年初去北京访问陈教授实验室。

合作。。。

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