How deep is your sleep?

Reading brain activity for better anaesthesia

More than 40 million people have major surgery in China each year. For every one of them the nature of consciousness is a very practical concern. Too low a dose of anaesthetic could see you wake up during the operation. Too high a dose could have long term health consequences.

Currently, the best monitoring devices can only monitor a suite of secondary indicators of consciousness. A Guangdong company has partnered with the University of Southern Queensland (USQ) with the aim of making anaesthesia easier and safer. They're creating an intelligent device to directly measure the depth of unconsciousness and adjust the anaesthetic dose in real time.

Such a device would:

- minimise side effects of anaesthetics
- allow more accurate dosing of general anaesthetic pharmaceuticals
- reduce the incidence of intraoperative awareness ('waking up' during a medical procedure)
- improve patient comfort
- reduce the overall cost of care.

The partnership could also lead to innovative technologies to diagnose and treat sleep disorders.

Shenzhen Delica Medical Equipment is a global leader in the supply of machines to measure brain activity and cerebral blood flow, and other neurological devices.

H. pylori

Also…

Can we better identify and treat heart attacks? Researchers from Shandong University and Flinders University hope that a study of 10,000 patients at 22 hospitals in Shandong Province will provide answers. The two universities are also developing wearable monitors to measure respiration, pulse, blood oxygen and other physiological measures.

500 million Chinese are infected with Helicobacter pylori, a major cause of stomach ulcers and stomach cancers, and one that's becoming resistant to many antibiotics. The Marshall Centre for Infectious Diseases Research and Training is working with Chinese hospitals and universities to create specialist research centres and laboratories to tackle the issue. These include a research centre at the West China Hospital in Chengdu and an outpatient service at Shanghai East Hospital, which Nobel Laureate Barry Marshall launched in June 2017.

Cancer, inflammation and infectious diseases are the focus of The Joint Centre for Translational Medicine at Nanjing University, in partnership with The University of Melbourne and the Walter and Eliza Hall Institute of Medical Research. Their aim is to fast-track discoveries in basic research from the laboratory to the clinic.

They've invested $500,000 in the work of Professor Yan Li from USQ. She is a leader in brain modelling and using electroencephalography signals for decoding brain activities.

Their partnership has already helped Delica improve the precision of a device that measures blood flow through the brain.

While general anaesthesia is one of the safest routine procedures in medicine today, we still don't completely understand how it creates 'unconsciousness'. The thalamus plays a role in sleep regulation, consciousness and alertness, and coordinates parts of the cortex as we change between sleep states.

Professor Li's team has developed a model to interpret the mass of neuron activity in the thalamus and cortex.

"Our latest research, including our model, will help Delicia develop new devices for brain activity monitoring and non-invasive cerebral blood measurement, and even the diagnosis of neurological diseases.

"We can help them produce affordable medical instruments that can be used in hospitals around the world, to improve the quality of people's lives," Professor Li says.
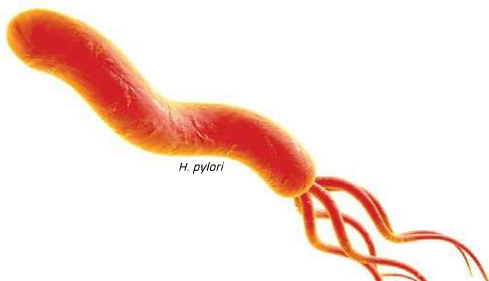
In 2016 the researchers received a grant as part of the Australian Government's Global Connections Fund, leading to the investment by Delicia in 2017.
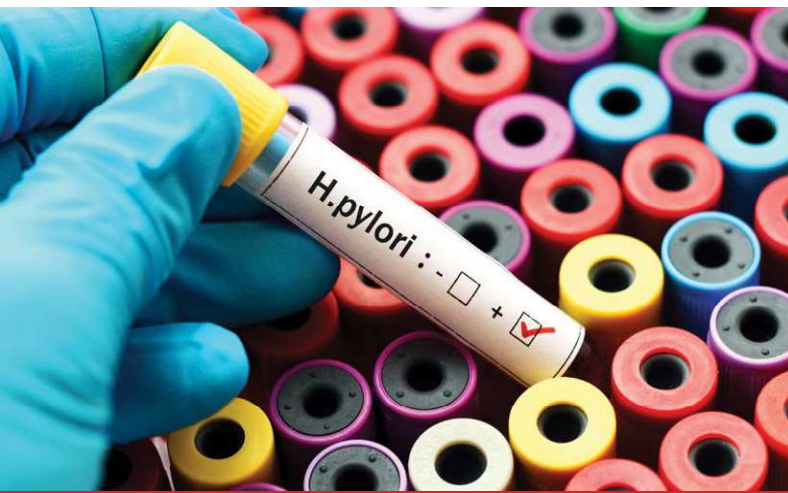
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Australian Government

MEDICAL TECHNOLOGIES AND PHARMACEUTICALS

你的睡眠有多深?

解读大脑活动，提高麻醉效果

中国每年有超过 4000 万人接受大手术。对于他们来说，意识的本质是一个非常现实的问题。麻醉剂剂量太低可能会让病人在手术过程中醒来，剂量过高则可能会对健康造成长期影响。

目前最好的监控设备也只能监控意识的次要指标。广东一家公司与南昆士兰大学 (USQ) 展开合作，力求使麻醉变得更方便、更安全。他们正在研发一种智能设备，用来直接测量无意识的程度并实时调整麻醉剂剂量。

这种设备可以：

- 尽量减少麻醉剂的副作用
- 更准确地控制全身麻醉的剂量
- 降低"术中知晓"的几率（"术中知晓"即在手术中醒来）
- 提高患者舒适度
- 降低整体护理成本

这项合作还有可能带来能够诊断和治疗睡眠障碍的创新技术。

深圳市德力凯医疗设备股份有限公司是大脑活动、脑血流量以及其他神经系统测量仪器的世界一流供应商。

德力凯为南昆士兰大学李燕教授的研究投资了 50 多万澳元。李教授是大脑建模和使用脑电图信号解码大脑活动的专家。

这项合作已经帮德力凯提升了一种测量大脑血流设备的精确度。

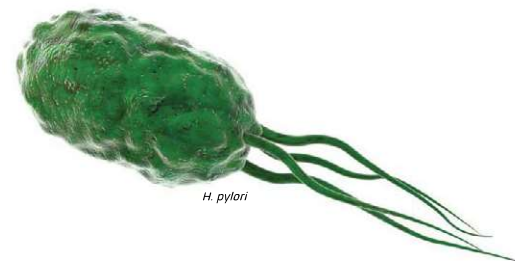虽然全身麻醉是当今医学中最安全的常规程序之一，但我们仍然不能完全理解它是如何让人失去意识的。丘脑控制睡眠调节、意识和警觉性，并且在不同的睡眠状态下协调大脑皮层的不同区域。

李燕教授的团队开发了一个模型来研究丘脑和大脑皮层中大规模的神经元活动。

"包括上述模型在内的最新研究成果将有助于德力凯研发用于大脑活动监测、非侵入式测量脑血液以及神经系统疾病诊断等领域的新设备。我们的研究也能帮德力凯生产出价格合理的医疗器械，"李燕教授说，"这些产品可以在世界各地的医院得到广泛应用，从而改善人们的生活质量。"

2016 年，李燕教授的研究团队获得了澳大利亚政府全球连通基金的资助，随后德力凯于 2017 年赞助了50 万美元。

更多合作

我们能有办法更好地诊断和治疗心脏病吗？山东大学和弗林德斯大学的研究人员希望从对山东省 22 家医院的 1 万名患者的研究中找到答案。这两所大学也在研发监测呼吸、脉搏、血氧含量和其他生理指标的可穿戴式设备。

中国有5 亿人感染了幽门螺杆菌。这种细菌是导致胃溃疡和胃癌的罪魁祸首，并且对许多抗生素都具有抗药性。针对这个问题，澳大利亚马歇尔传染病研究中心与中国的医院和大学展开合作，建立了专门的研究中心和实验室，包括在成都华西医院设立的研究中心和由诺贝尔奖获得者巴里·马歇尔 (Barry Marshall) 于 2017 年 6 月在上海东方医院开设的门诊部。

癌症、炎症和传染病是南京大学中澳转化医学研究院的研究重点。该研究院由南京大学、墨尔本大学和沃尔特与伊丽莎·霍尔医学研究所共同成立，旨在把在实验基础研究中获得的成果快速应用到临床治疗。

英文版右上角：李燕教授和她的团队希望研发出更精确的麻醉程度衡量方法（图片来自南昆士兰大学）；其他图片鸣谢 Shutterstock

欲了解更多信息，请访问：
www.china.embassy.gov.au

H. pylori

澳大利亚政府

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