International Innovation showcases a selection of healthcare research published in recent editions. These pieces are free to access online at www.internationalinnovation.com

EUROPEAN BIOTECHNOLOGY NETWORK

The biotechnology sector in Europe has undergone major developments in recent years, but there remain plenty of barriers that can seriously obstruct much needed advances in important areas such as medicine. International Innovation talks to Claire Skentelbery, Secretary General of the European Biotechnology Network, about how the organisation is uniting researchers and companies across Europe so that together they can overcome the political and financial issues that oppose biotechnological innovation.

SWETTE CENTER FOR ENVIRONMENTAL BIOTECHNOLOGY

Based at Arizona State University, USA, the Center develops microbiological systems that improve scientists’ ability to harness renewable resources or protect against environmental pollution. At the 2013 Pujiang Innovation Forum, Director Professor Bruce Rittmann spoke about the value of combining engineering approaches with microbiology and chemistry.

Nanotechnology brings together researchers from diverse fields of science – surface science, semiconductor physics, organic chemistry, molecular biology, etc. – in the study and manipulation of matter on an atomic, molecular and supramolecular scale. Excitingly, nanoscale analysis has the potential to significantly influence other areas. We ask our contributors to weigh in on this potential.

Q: What has been the focus of your research at the nanoscale, and how do you see advances in nanoscience impacting other areas of science and, more generally, society?

Professor Robert Haddon (University of California, Riverside, USA):

Our research is mainly focused on the manipulation of the electronic and magnetic structure of carbon-based substances at the nanoscale, with the goal of producing new and functionally useful materials and devices. Ultimately, nanoscience advances will have a large impact in biology, medicine and society in general.
A NANO MAGNET FOR BIOMEDICINE

Scientists at Yokohama National University, Japan, are driving magnetic nanoparticle research forward in order to develop innovative biomedical technologies. Associate Professor Yuko Ichiyanagi discusses her fascination with nanoparticles, the development of a novel mass spectrometry technique and the exciting potential applications of her current research.

NEW DRUGS FOR NEONATAL SEIZURES

Coordinated by University College Cork, Ireland, and University College London, UK, the NEMO expert consortium is focusing on seizures in newborns to provide evidence-based improvements in neonatal care. The goal is to reduce the burden of motor or cognitive disability resulting from neurological damage.

NOVEL MEDICINES

Leveraging the advantages of nanotechnology, investigators from the University of Queensland, Australia, are developing innovative nanomaterials for molecular imaging and drug delivery, an advancement with particularly important implications for cancer. Dr Kristofer Thurecht discusses the benefits of combining different imaging techniques, the applications of cancer treatment and his vision for the future of nanomedicine.

RESEARCH AT THE NANOSCALE

Researchers at Wayne State University, USA, are developing a variety of disease-specific nanoparticles and drug delivery systems at the cutting edge of therapeutic design. Professor Olivia Merkel shares details of her activities to design nanoparticles that can target cells for gene therapy and the techniques she uses to observe realistic cell responses in the lab.

REWARDS IN ALL THE WRONG PLACES

Over thousands of years of evolution, the human body has developed a reward system to reinforce activities that are important for survival and adaptation. Professor Chantal Martin-Sotoch’s research into psychiatric disorders shows that this system does more than strengthen activities and feelings that result in positive outcomes.

INHALED NANOMEDICINES TO STOP NASTY INFECTIONS

US pharmaceutical company Aradigm is developing pioneering antibiotic products with applications in the prevention and treatment of severe respiratory infections, as well as biodefence. Dr Jim Blanchard and colleagues Drs David Cipolla, Jürgen Froehlich and Igor Gonda provide an insight into their organisation’s work using liposomal encapsulation for inhaled antibiotic development.