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The Gander

BY PAT KELLY

The *Medical Independent* blog takes a look at the more unconventional niches in science and research

To sleep, perchance to learn

Researchers have bolstered evidence to suggest that one of the most important functions of sleep is to boost the brain cells responsible for memory and learning.

The team, based at the Johns Hopkins School of Medicine, US, also say they have found evidence that sleep medications, sleep disorders and sleep deprivation interfere with the molecules responsible for 'recalibrating' these cells.

Studies in mouse models at Johns Hopkins show that when neurons are pushed to the maximum limit, their ability to learn and retain information becomes impaired.

Study lead Dr Graham Diering commented: "Our findings solidly advance the idea that the mouse and presumably the human brain can only store so much information before it needs to recalibrate.

"Without sleep and the recalibration that goes on during sleep, memories are in danger of being lost."

He added: "The bottom line is that sleep is not really down-time for the brain. It has important work to do then, and we in the developed world are short-changing ourselves by skimping on it."

The study was published recently in *Science*.

Of muscles and Batman's cape

Mathematicians based in NUI Galway have conducted research that may be of consequence for the development of artificial muscles, soft robotics, 'smart clothes' and energy harvesters.

The team was studying soft 'dielectric' membranes, which soften and stiffen-up when subjected to high voltage. However, until now, it has proven difficult to determine how much voltage these membranes could withstand before they short-circuit and break down. Prof Michele Destrade of the School of Mathematics, Statistics and Applied Mathematics at NUI Galway explained: "If you can remember the scene in *Batman Begins* where this huge bat cape emerges from a tiny folded piece of material, that's the kind of technology which is being developed currently in some labs around the world, especially in Harvard University and in China. It's the electric voltage that allows these special membranes to expand.

"Until now, it was not fully understood how much voltage these membranes could sustain. Some are a millimetre thick, but if they thin out too much when they stretch with the voltage, it can lead to a short-circuit and a catastrophic breakdown. We hope our mathematical formula will help advance science in this area."

Co-author at NUI Galway, Dr Giuseppe Zurlo, added that "the very near and real applications for these materials are artificial human muscles, or soft robots which can help organs function.

"The final equation is very compact," he added, "and it will provide most useful safety guidelines for future experiments on these fascinating materials."

The research was published last month in *Physical Review Letters*.

Communication strategy

Scientists have identified a peptide that viruses appear to be using to 'communicate' and it is hoped that their work may lead to breakthroughs in the field of targeted therapies for virus control.

Specifically focusing on *Bacillus subtilis*, they found viruses that attack this strain decide whether to infect or destroy their hosts via quorum sensing and a peptide they have dubbed 'arbitrium'. This may be the first identification of a molecular communication system between viruses, said the authors. Co-author of the study Dr Rotem Sorek of the Weizmann Institute of Science in Israel said in a statement: "The molecule we discovered enables each generation of viruses to communicate with successive generations by adding to concentrations of the arbitrium molecule.

"Each virus can then 'count' how many previous viruses have succeeded in infecting host cells and thus decide which strategy is best at any point in time."

The research was published in *Nature* and reported in *The Scientist*.

Pricey placebo?

Multivitamins are completely useless for most individuals and create nothing more than "very expensive urine", the President of the Australian Medical Association has stated.

Dr Michael Gannon stressed that patients with specific, significant deficiencies can benefit from targeted multivitamin use, but for the vast majority of people who take the supplements, they are wasting their time and money.

For most people, "there is no benefit to taking multivitamins and minerals", said Dr Gannon.

"Many of these products have 50 or more ingredients," he said. "It really is crazy stuff.

"If that's what you want to do, and you want to give some profits to the companies that produce those products, well good on you. That's not what I want to do."

Reacting to claims by the Australian Self-Medication Industry that "vitamin and mineral supplements can play an important role for the 52 per cent of Australian adults who do not eat the recommended intake of fruit or the 92

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per cent who do not eat the recommended intake of vegetables each day", Dr Gannon commented: "What a lot of Australians have is very expensive urine.

"What you need is a good diet; you're pissing the money down the toilet for no benefit."

The news was reported in *The Independent*.