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Rural idylls

Anecdotally, many have suggested that “getting away from it all” to a country retreat reduces the stress of a busy urban lifestyle. A German group provides the first empirical evidence to support this notion. Healthy people were scanned using functional MRI while performing a paradigm inducing social stress. Participants who had grown up in an urban environment had greater amygdala activity in response to the task, known to signal negative affect and environmental stress, than people who had had a rural upbringing. Although German cities may be more stressful than British ones, should we bear this in mind when siting major neurological units?

Nature 2011;474:498–501

Steroids for status?

Some rare and catastrophic childhood epilepsy syndromes are helped by corticosteroids, such as West’s, Landau–Kleffner and Lennox–Gastaut syndromes. Researchers from America and Italy showed – in a pilocarpine-induced status epilepticus rat model – that dexamethasone protects against status and better maintains blood-brain barrier integrity (measured using serum S100b and Evans Blue brain extravasation). They then gave corticosteroids to 43 inpatients with refractory epilepsy or status episodes, aged 5 months to 22 years. This had highly variable benefits, from none to complete seizure control (average seizure reduction was around 50%). Corticosteroid therapy was effective across all epilepsy syndromes studied, though focal epilepsies responded the best.

Plos One 2011;6:e18200

Light at the end of the tunnel

The ability to switch on and switch off specific groups of neurons has long been a holy grail of neuroscience. Optogenetics, a term coined in 2005, involves inserting an ion channel into the cell membrane, targeted to a specific neuronal type, which can be

switched on and off using a light pulse. The technology utilises microbial light-activated proteins known as opsins. With different ion channels sensitive to different light wavelengths, it offers an exquisitely sensitive tool for studying the brain. Although only 6 years since its inception, optogenetics has already been shown to modulate behaviour in the rodent, and is being investigated in the primate. Voted a “Breakthrough of the Decade” by *Science* and “Method of the Year 2010” by *Nature Methods*, it will not be long before its incredible potential is utilised in human studies.

Annu Rev Neurosci 2011;34:389–412
<http://www.stanford.edu/group/dlab/>

Skinny jeans

Removing uncertainty from drug side effects has to be a step forward. In Taiwan, 7.7% of people with epilepsy had the HLA-B*1502 allele, conferring risk of skin reactions to carbamazepine. Those with the allele were advised to avoid carbamazepine – all others were prescribed the drug. Among the 4877 people studied, none developed either Stevens–Johnson syndrome or toxic epidermal necrolysis; 4% had mild transient rash, clearly demonstrating the power of pharmacogenomics on a population level. For Caucasians, the risk allele is not known. An international consortium performed a genome-wide association study of 22 subjects with carbamazepine-induced hypersensitivity syndrome and 43 with carbamazepine-induced maculopapular exanthema. The HLA-A*3101 allele was significantly associated with carbamazepine hypersensitivity ($p=3.5 \times 10^{-8}$): its presence increased the risk from 5% to 26%, whereas its absence reduced the risk from 5% to 3.8%.

N Engl J Med 2011;364:1126–33
N Engl J Med 2011;364:1134–43



Armadillo, photo by Tom Friedel.
www.birdphotos.com

Please wash your hands after touching that armadillo, Sir

The British are often mocked for their sentimental relationships with pets and anthropomorphism of animals. Further reasons to remain a safe emotional (and physical) distance from certain critters come from the southern United States. It is not widely known that wild armadillos are a large natural reservoir for *Mycobacterium leprae*, being particularly susceptible due to their unusually low body temperature. Whole genome resequencing clearly showed human and armadillo strains to be identical. Perhaps 50–84 cases of human leprosy in the USA each year come directly from the animal known to Aztecs as the “turtle rabbit”.

N Engl J Med 2011;364:1626–63

Taking virtual consultations to a new extreme

By 2023, a group of scientists across the European Union aim to build a “virtual brain”. Prof Markham, head of the Human Brain Project, and his team have spent 6 years building a proof of concept “Blue Brain”, currently simulating about 360 000 neurons, equivalent to the brain size of a small rodent. A human brain, for comparison, has 100 billion neurons. Conceived as a model to investigate brain disorders, if this mammoth project succeeds it will profoundly change how we understand our patients, and perhaps, even whom we understand our patients to be.

<http://www.humanbrainproject.eu/>