

when the electrons in atomic orbitals are shared across the rings in a particular way to form bonds with unusual properties. Incorporating other atoms into these structures while maintaining these properties has proved difficult.

The researchers made a lead-containing analogue of an aromatic five-membered ring — the cyclopentadienyl anion — and used it to create a dilithioplumbol, another aromatic five-membered ring molecule. They say this could lead to new catalysts and materials.

CANCER BIOLOGY

Cells combat chemo

Genes Dev. doi:10.1101/gad.1897010 (2010)

Resistance of tumours to a common chemotherapy drug called cisplatin is linked to improved DNA repair in mouse models of lung cancer, researchers have found.

Cisplatin damages DNA and is used to treat various cancers. However, most tumours that respond to the drug eventually become resistant. Tyler Jacks at the Massachusetts Institute of Technology in Cambridge and his colleagues found that tumours that had been treated with cisplatin over 12 weeks cleared damaged DNA more quickly than previously untreated cancers. Long-term cisplatin use was also associated with higher expression of genes involved in DNA repair.

NEUROSCIENCE

Sharpening social skills

J. Neurosci. doi:10.1523/jneurosci.5538-09.2010 (2010)

Giving people the hormone oxytocin enhances their socially reinforced learning and improves their capacity to emotionally empathize with others. The findings support the idea of using the hormone — known for stimulating uterine contraction during childbirth — to treat disorders such as schizophrenia.

René Hurlemann at the University of Bonn in Germany, Keith Kendrick at the Babraham Institute in Cambridge, UK, and their colleagues asked male volunteers to perform a learning task. A nasal squirt of oxytocin improved the volunteers' performance when their choices were reinforced by images of smiling or angry faces, but not when their cue was a red or green light. In an empathy test, those treated with the hormone also scored similarly to untreated women, who normally score higher than men on such tests. The authors suggest that the amygdala — a brain region linked to emotional learning — helps to mediate oxytocin's effects.

CLIMATE CHANGE

Fewer, taller, fiercer

Geophys. Res. Lett. doi:10.1029/2010GL042518 (2010)

Using a climate simulation with greater resolution than conventional models, researchers have found that tropical cyclone clouds will grow taller in a warmer world. This could explain the increased intensity of storms predicted by this and other models.

Yohei Yamada of the Japan Agency for Marine-Earth Science and Technology in Yokohama and his colleagues used a prototype global cloud-system-resolving model with 14-kilometre resolution. They simulated spring-to-autumn cyclone activity for climate conditions in 2004 and those in which carbon dioxide concentration is twice the present level. They predict that, although storm clouds will heighten, global storm frequency will decrease by 40% by 2100, which is consistent with previous findings.



IMMUNOLOGY

Inflammatory good guys

J. Exp. Med. doi:10.1084/jem.20100050 (2010)

Inflammation is getting the blame for a growing number of ills, including tumour development. An oft-cited example is the link between ulcerative colitis and colon cancer. But new findings complicate the picture: three key proteins that form part of the inflammasome — a protein complex that triggers inflammatory responses — actually protect against colitis and the cancer it can induce.

Jenny P.-Y. Ting and her co-workers at the University of North Carolina at Chapel Hill induced colitis in mice in which the gene for the protein NLRP3, PYCARD or caspase-1 had been knocked out. The mice showed heightened disease and a greater incidence of cancer.

W. MCNAMEE/GETTY

JOURNAL CLUB

Kevin Mitchell
Trinity College Dublin

A neurodevelopmental geneticist explores how one mutation can lead to multiple diseases.

Work in psychiatric genetics has revealed that certain deletions or duplications of small chromosomal regions — termed copy-number variants (CNVs) — drastically increase the risk of disorders such as autism and schizophrenia. The findings are contributing to a shift in how we think about the cause of disease: away from a model involving a combination of common gene variants in each individual to one in which single, rare mutations in any of a large number of genes lead to disease in a high proportion of people.

However, it has come as a major surprise that many such mutations increase the risk not just of one disorder but of many — suggesting that primary insults to neural development may manifest themselves differently from one individual to another.

Evan Eichler at the University of Washington in Seattle and his colleagues investigated one possible reason: genetic background effects (S. Girirajan *et al. Nature Genet.* **42**, 203–209; 2010). Previous studies had identified CNVs at a specific location on chromosome 16 in patients with autism or schizophrenia. Eichler *et al.* found that such mutations are also enriched in patients with developmental delay or cognitive disabilities.

Interestingly, among these cases, the researchers found a sixfold increase in the occurrence of a second CNV in other parts of the genome. Notably, these patients had a different set of symptoms from those with either single CNV alone.

This kind of modifying effect — due to additional, rare mutations in the background — is probably typical in human biology. With a growing understanding of the observable effects of mutations, it will be important and, in the near future, feasible to take each individual's entire genetic make-up into account when studying the roots of psychiatric disease.

Discuss this paper at <http://blogs.nature.com/nature/journalclub>