

CHEMISTRY

Nitrogen radical synthesized

Nitrogen is essential to life. A crucial step in the nitrogen cycle is the conversion of the nitrite ion NO_2^- to the nitric oxide molecule NO by the enzyme copper nitrite reductase, which is found in a variety of bacteria.

Trevor Hayton and his colleagues at the University of California, Santa Barbara, have synthesized a copper-nitrosyl radical that has been proposed to play a key part in this reaction. They found that it contains a surprisingly long bond between the copper and nitrogen atoms, and suggest that this arrangement provides a model of how the nitric oxide interacts with the copper during its formation.

J. Am. Chem. Soc. doi:10.1021/ja105930b (2010)

NEUROSCIENCE

Soccer Samaritans

Fans of different soccer teams are often sworn enemies — but would they go so far as to refuse to help a rival fan in pain?

Grit Hein at the University of Zurich in Switzerland and her colleagues used functional magnetic resonance imaging to scan the brains of fans of two rival football teams, identified by coloured wristbands (pictured). The

volunteers watched either a fellow fan or a rival receive a painful electric shock to their hand. Fans could then choose to help the other person by enduring half the pain themselves, or to watch either the person endure the pain, or a video about football.

Activity in two different brain areas predicted fans' reactions. In those that chose to help, a region associated

with empathy called the anterior insula was activated. By contrast, in those that let their rival suffer, the nucleus accumbens showed activation — which was stronger if they had rated that particular foe more negatively before the test.

Neuron 68, 149–160 (2010)

IMMUNOLOGY

Keeping the peace

Most of the proteins — known as cytokines — in the interleukin 1 family are thought to spark inflammation while defending the body. Charles Dinarello at the University of Colorado Denver in Aurora and his colleagues show that one cytokine in

the group instead dampens inflammation. The finding reveals the function of IL-37, which has been mysterious since it was discovered a decade ago.

The researchers first used RNA interference to turn off production of IL-37 in blood cells. Those cells showed an increased immune response when treated with molecules common to bacterial membranes to mimic infection. When they expressed the human form of IL-37 in transgenic mice, they found that it protected the animals against organ damage caused by severe infection, probably by reducing the production of pro-inflammatory cytokines. *Nature Immunol.* doi:10.1038/ni.1944 (2010)



EVOLUTIONARY BIOLOGY

Colourful bacterial resistance

Parrots' brightly coloured feathers are not only useful for visual signalling, but also protect against microbial damage.

Edward Burt Jr at Ohio Wesleyan University in Delaware and his colleagues exposed parrot feathers of varying colours and species to *Bacillus licheniformis*, a feather-degrading bacteria, over a five-day period.

They found that white feathers degraded the

most rapidly. Yellow feathers, which contain low levels of psittacofulvin, a pigment that is resistant to bacterial breakdown and found only in parrots, came a close second.

Red feathers, which contain higher levels of psittacofulvins, and blue, green and black feathers, which all contain melanin, broke down much more slowly.

Biol. Lett. doi:10.1098/rsbl.2010.0716 (2010)



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