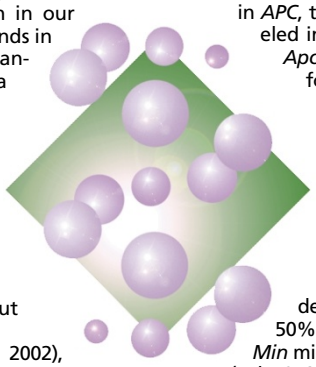
© 2002 Nature Publishing Group http://genetics.nature.com

# TOUCHING**base**

## Why chicks like it hot

It seems perverse that the species that created such technical marvels as the telescope and the clock radio also invented cheese in a can. We voluntarily eat foods that contain hot peppers and induce pain in our mouths. We can be observed waving our hands in front of our mouths, and downing large quantities of water to stave off the pain of a jalapeño. 'Lower' mammals tend to stay away from these noxious nibbles. The bird is another story, though. It consumes hot peppers with abandon, never to be seen waving a wing in front of its beak with the hope of relieving pain. In fact, birds are the primary seed-dispersal vectors for hot peppers. It turns out that this isn't because they have a higher tolerance to pain than we, but because they don't feel the pain.



In a recent issue of *Cell* (vol. 108, 421–430; 2002), Sven-Eric Jordt and David Julius (Univ. of California, San Francisco) provide an explanation for the difference in pain perception between mammals and birds. A compound called capsaicin that activates a non-selective vanilloid receptor, VR1, on sensory motor neuron endings, causes the familiar burning sensation from hot peppers. The receptor is also activated by noxious heat stimuli. Exploiting its homology to rat VR1, the researchers cloned the chicken ortholog and demonstrated that the avian channel is activated by noxious heat stimulation, but is insensitive to capsaicin. Using chimeric rat–chicken VR1 receptors, they were able to narrow the region responsible for the functional difference between rat and chicken receptors down to an 8-residue region found only in the rat channel. They then demonstrated that the region is part of the receptor's capsaicin-binding pocket. They went on to demonstrate that chicken VR1 is incapable of detecting endogenous vanilloid-like agonists of rat VR1, such as anandamide, indicating that the vanilloid-detection function of the rat receptor is absent in the avian version. In addition to birds, reptiles and toads are also insensitive to capsaicin. Thus, it seems that evolution has selected in mammals a VR1 receptor that can detect both noxious heat and vanilloid-like agonists.

## One exceptional mating cage

Familial adenomatous polyposis (FAP) is a dominantly inherited disorder that predisposes to the development of colorectal cancer in middle age. Caused by a mutation in *APC*, the genetic basis of FAP has been well modeled in *Min* mice, which are heterozygous for an *Apc* truncation. These mice are also renowned for putting genetic modifiers on the map, as the severity of polyposis is greatly influenced by genetic background. In the decade since the identification of *Mom1*—encoding a phospholipase A2—as a modifier of the *Min* phenotype, a small number of genetic modifiers of other traits have been identified. Additional modifiers of polyposis have been hard to come by, however, despite the fact that *Mom1* accounts for only 50% of the genetic variance in polyp number in *Min* mice. In the January issue of *Genome Research* (vol. 12, 88–97; 2002), Karen Silverman and colleagues (Jefferson Medical College) report the identification of a second *Mom* locus, *Mom2*, and the serendipitous manner of its discovery offers many lessons. The authors crossed *Min* mice on a C57BL/6J background with wildtype DBA/2J mice. In four of the mating cages, the offspring had the expected intermediate number of intestinal polyps. In the fifth cage ("one exceptional mating cage"), however, the offspring showed a wide range in polyp number, with some mice apparently polyp-free. After excluding sex differences and strain contamination as possible causes, the authors concluded that one parent harbored a spontaneous mutation conferring resistance to polyposis. In a gentle warning to the community of researchers working on FAP, they note that their spontaneous *Min* mutant was purchased from The Jackson Laboratory, suggesting that siblings or cousins of this mouse may be widely used and could be confounding experiments on this model strain. Silverman *et al*. were finally able to map *Mom2* to a small region on chromosome 18, and it turns out that it has a powerful modifying effect, suppressing 88%–95% of polyps in *Min* mice. The identity of the gene is unknown, but here's a tantalizing clue: the region contains *Smad4*, mutations in which are responsible for some cases of juvenile polyposis in humans.

## How to be DNA chic

When *Nature Genetics* featured a knitted double helix on January's issue, we anticipated a trickle of queries by a few die-hard knitters, rather than the avalanche of e-mails that quickly appeared. The designer of the helix, June Oshiro (Rutgers Univ.) has also designed a scarf (see inset), the pattern for which can be found at http://noodle.pds.k12.nj.us/june/DNAScarf.html. If knitting is not your bag, T-shirts and ties featuring the double helix can be purchased on the web, not to mention jewellry. There are instructions for making double-helix beaded earrings, complete with color coded bases at *The History of Everything: Classroom Activities* website. For those less industrious, sterling silver earrings and pendants are available at http://www.neuromart.com. Perhaps you're interested in something more permanent. Why not a DNA tattoo? One creative design is based on a crop circle that 'appeared' in Wiltshire, England, can be purchased at http://www.luckyfishart.com. However, you may prefer something a bit subtler—in which case, there is the perfume and cologne line, DNA, by Bijan. The manufacturers preferred the Linus Pauling triple helix over the more popular Watson-and-Crick model, but make no mistake: you'll smell like DNA. There is DNA repair skin cream that is "designed to repair damage to cellular DNA caused by exposure to solar radiation." And if that doesn't do the trick, Atzen has a line of products that brag of immediate results, owing to the "antioxidant and regenerating properties of Integral DNA™". And then there is the office. Need a paper weight? Try encapsulating a vial of your DNA in clear resin; the kit is available at www.dnacapsules.com. You say tennis is your game? Try Prince's new DNA Helix 16 string for "a soft, forgiving response as well as greater resiliency and power." We could go on, but you probably get the point. There seems to be a limitless number of uses for DNA and its elegant form.

*Printed with kind permission of June Oshiro.*

**DNA Helix Seaman's Scarf.** Modelled by Thomas Montville (Rutgers Univ.)