Stomach stingers

Sea anemones have a novel way of chewing: their gut repeatedly stings prey with toxins that rip up tissue. This also enables them to process food without secreting acids that could disrupt other tasks involving the gut, such as reproduction.

Doug Wechsler/NPL

Survival of the smartest

Bird brains were as big and complex 55 million years ago as they are today. This helps to explain how the ancestors of modern birds out-survived other ancient birds and pterosaurs: brainy species cope better with environmental changes.

IN BRIEF

SEASONAL ANATOMY

Sound-producing muscles in fawn cusk-eels *Lepophidium profundorum* swell and shrivel according to the seasons. In summer, they bloom to four times their normal size in males, but halve in females. Summer is the mating season, when males need to make noise, while females may burn the tissue to fuel egg development (Biology Letters, vol 4, pp707–10).

THE BEE SIDE

Patches of native plants on roadsides, even those along busy motorways, host more than twice as many bees (and more bee species) as ditches filled with flowering weeds. Based on this finding, millions of hectares of habitat worldwide that are already excluded from future development could serve as oases for nature's most important pollinators (Biol. Conservation, vol 141, pp2632–40).

DUPING THE BABYSITTER

Japanese lycaenid caterpillars *Niphanda fusca* infiltrate carpenter ant colonies and trick the insects into caring for them. They mimic the specific scent of colony members and thus blend right in. Though they look and act nothing like their hosts, the worker ants consider them to be kin and just another mouth to feed (Royal Soc: Bio. Sci., vol 276, pp551–8).

Susumu Yamaguchi

Wood frogs *Rana sylvatica* survive icy conditions in North America by retaining their urine, which lowers the freezing point of their body tissues.

J M Storey/Carleton University

The case of the cryogenic frog

Meet the frogs that utilise urine to avoid succumbing to an icy death.

Wood frogs *Rana sylvatica* live primarily in the cold regions of North America, and in many parts of their range they freeze stiff each winter. Come spring, they thaw and hop back to life without a hint of frostbite or any other health problems. They pull it off, in large part, by holding their pee.

Jon Costanzo and Richard Lee from Miami University noted that wood frogs retain up to 25 times more urea (the main waste product in urine) in winter than in spring. To see if this compound might help to prevent damage from freezing, they captured wild frogs, drained their bladders and then rehydrated them with either saline (water with key salts) or a saline-urea solution. Then they exposed the frogs to increasingly chilly temperatures, similar to those the animals typically experience in the wild, until they were fully frozen. A few days later, the amphibians were thawed and given a physical examination.

Unlike the 'saline-only' frogs (35 per cent of which never woke up), those loaded with urea not only survived, but had little to no tissue damage, and most fully recovered their faculties within 24 hours. Within two days, all of them were alert, had normal reflexes and could perform demanding tasks, such as righting themselves after being flipped onto their backs.

In other words, 'holding it' was critical to these frogs' survival. Urea in high concentrations may work like antifreeze, lowering the freezing point of any present liquid. Hence, tissues may get slushy, but they never fully freeze to death, thus evading major injury.

ICE WARNING

- *Rana sylvatica* is one of only three frogs found in the Arctic.
- This study identifies urea as a novel 'cryoprotectant.'
- The frogs gradually accumulate urea in response to a drop in water availability, not temperature. This may prepare their tissues before it becomes dangerously cold.
- The freezing of tissue triggers the production of glucose, another crucial cryoprotectant. However, unlike urea, it must be synthesised and transported throughout the body. This takes time, and could leave frogs vulnerable to sudden cold snaps, making early urea saturation key.
- Urea accrual also appears to slow down the frog's metabolism, which minimises baseline energy use during hibernation.

SOURCE: Journal of Experimental Biology vol 211, pp2969–75 LINK: http://tinyurl.com/ar6p86

DAVID BRIAN BUTVILL, ZOOLOGIST
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DISCOVERIES

The uber-macho eland

This giant antelope settles most disputes without getting physical.

Fights between male African elands *Tragelaphus oryx*, the world's largest antelope at up to more than 900kg, are invariably intense, dangerous and energetically costly – but remarkably rare.

The animals settle most disputes by eyeing each other up for signs of strength before engaging in combat. He who looks less macho backs down and peace is restored. Until now, however, the physical evidence that is used and exactly how it conveys toughness have remained unknown. It turns out that an eland's body is like a billboard.

Jakob Bro-Jørgensen from the University of Jyväskylä in Finland and Torben Dabelsteen from the University of Copenhagen observed and photographed about 50 wild male elands in Kenya, quantified their physical characteristics and then analysed how these traits correlated with their fighting ability. They also assessed whether their features (and their correlations) changed over time.

They identified multiple attributes that advertise three separate components of fighting ability. Firstly, aggression is largely signalled by colouring – the more belligerent animals have greyer bodies and darker face markings. Hormones such as testosterone largely determine aggression, and are strongly linked to the production of the dark pigment melanin in skin and hair.

Fighting experience, on the other hand, is conveyed by the size of an animal's dewlap – a flap of thick skin below the neck – which grows bigger with age, not with body size as one might expect.

Finally, the antelopes literally announce their strength via a loud knee click, produced by sliding a leg tendon over a forelimb bone; it vibrates like a guitar string. Bigger and more muscular individuals have longer, thicker tendons, which produce lower tones.

Put it all together and the message is clear: dark, thick-necked, loud-clicking thugs are to be avoided. In this way, elands can effectively put each other in their respective places, so to speak, without lifting a leg, and reduce risky brawls to a minimum.

SOURCE: BMC Biology, doi:10.1186/1741-7007-6-47) LINK: http://tinyurl.com/ankzrg

Male African elands advertise their fighting ability to rivals through physical attributes, such as dark fur and a pronounced dewlap.

Tony Heald/naturepl.com

POSERS THEY ARE NOT

- Elands are depicted in African cave art more often than any other animal.
- All of the identified body signals honestly reflect fighting skill. This means elands can 'predict' outcomes and thus avoid most battles.
- Aggression scales not only with body colour, but also with the extent of facial hair – a Mohawk-like ridge of fur on the eland's muzzle and forehead.
- The eland's knee click can be heard several hundred metres away. It is one of few known examples of non-vocal acoustic communication in mammals. They almost never vocalise.
- Their stout, spear-like horns do not play an apparent signalling role. Females also have horns and the animals use them for everything from defence to snapping tree branches.

Superb fairy wrens learn their neighbours' alarm calls.

Greg C Grace/Alamy

Bird speak

Learning a foreign tongue is all in a day's work for superb fairy wrens.

Superb fairy wrens *Malurus cyaneus* learn the vocalisations of other birds and use them to their advantage.

Many birds react to the alarm calls of other species, but only when they are similar to their own. Or so it was thought.

Robert Magrath, Benjamin Pitcher and Janet Gardner from Australian National University broadcast the warning calls of different birds to fairy wren populations around Canberra. The wrens did indeed flee for cover in response to the very similar-sounding vocalisation of scrubwrens – but only where they lived alongside them. Outside such areas, they didn't react – the call's similarity was irrelevant – but rather took flight after hearing the more familiar New Holland honeyeaters, whose 'scream' is totally different.

This proved that fairy wrens have learnt the language of certain neighbours, and don't simply react to a general sound. This skill not only expands the birds' acoustic alert system, but may help them to avoid false alarms. For example, the scrubwren's everyday contact call is only slightly different from its shrill warning whistle – fleeing in response to all high-pitched hollers would waste precious time and energy.

SOURCE: Royal Society, Bio. Sci., vol 276, pp769–74 LINK: www.austmus.gov.au/factsheets/superb_fairy_wren.htm