

RESEARCH HIGHLIGHTS

Selections from the scientific literature

DEVELOPMENT

Birds' mysterious missing penises

The development of chicken penises is cut short by signals that prompt cell death, a finding that could help to explain why 97% of bird species have little or no phallus despite reproducing by internal fertilization.

Researchers led by Martin Cohn at the University of Florida in Gainesville cut tiny windows into eggs to compare developing chickens, which lack phalluses, with ducks, whose penises can be half as long as their bodies.

Chicken embryos began to form penises, but these shrank midway through development. The researchers pinned the cause on elevated levels of a protein called Bmp4, which promotes cell death, at the tip of the organ.

The loss of penises may have been a by-product of the evolution of other features, such as beak shape, which are also influenced by Bmp proteins, the authors suggest. *Curr. Biol.* <http://dx.doi.org/10.1016/j.cub.2013.04.062> (2013)

For a longer story on this research, see go.nature.com/1mgn9w

ANIMAL BEHAVIOUR

Sea stars shed too-hot arms

Sea stars may use their arms to keep their central cores cool when high



temperatures threaten their survival.

Sylvain Pincebourde at the University of Tours, France, and his colleagues kept ochre sea stars (*Pisaster ochraceus*, pictured) under conditions that mimicked the sweltering temperatures to which the organisms can be exposed at low tides. Most sea stars died if their core temperatures exceeded 35°C. Individuals

that survived the heating generally had arms that were hotter than their cores,

possibly because the creatures reroute body fluids into their central cavities to cool down. When their cores warmed, sea stars shed arms — consistently losing the hottest one first. *J. Exp. Biol.* 216, 2183–2191 (2013)

CANCER BIOLOGY

Immunity let loose

Experimental therapies that unleash the immune system to fight cancer, by blocking

'checkpoint inhibitors', continue to show promise in early clinical trials.

Immune checkpoint inhibitors prevent autoimmunity, and can rein in the immune response against tumours. Antoni Ribas at the University of California, Los Angeles, and his colleagues tested lambrolizumab, a compound that blocks a checkpoint inhibitor called PD-1, in 135 people with advanced melanoma. Tumours shrank by at least 30% in 38% of the patients.



CLIMATE SCIENCE

Reindeer keep the ground cool

Reindeer herding practices and their effect on vegetation in northern Scandinavia may influence when snow melts in spring.

Tall, dense shrubs can hasten snow melt in the tundra. As more branches protrude over packed snow, less sunlight is reflected off the bright surface and more heat is absorbed by the ground.

A team led by Juval Cohen at the Finnish Meteorological Institute in Helsinki used satellite observations to examine the cover of vegetation

and snow in northern Scandinavia. In Finland, where reindeer typically graze on the tundra throughout the year, snow melt begins later. In inland Norway, where the pastures are left ungrazed during summer and vegetation is taller and more abundant, the snow melts earlier.

More intense reindeer grazing could delay snow melt and reduce ground heating during spring in the rapidly warming tundra, the authors suggest.

Remote Sens. Environ. 135, 107–117 (2013)