RESEARCH HIGHLIGHTS

Selections from the scientific literature

ASTRONOMY

Carbon monoxide in large-star disks

Stars twice as massive as the Sun can feature carbon-monoxide-rich gas disks around them, contrary to the expectation that ultraviolet radiation would have stripped away the gas.

Meredith Hughes at Wesleyan University in Middletown, Connecticut, and her colleagues used the Atacama Large Millimeter/submillimeter Array in northern Chile to probe the regions around 24 young star systems, only about 5 million to 10 million years old. They chose stars surrounded by a disk of dust debris — resembling a scaled-up version of the Solar System's Kuiper belt. This leftover material could form new planets, including gas giants. Surprisingly, three of the larger stars in the sample had strong carbon monoxide emissions.
Astrophys. J. 828, **25 (2016)**

CANCER

'Perfect storm' of cancer risk

The ability of an organ's stem cells to generate new tissue over time — the cells' generative capacity — determines how prone that organ is to cancer.

Scientists have debated the relative importance of factors that contribute to an organ's cancer risk, including 'intrinsic' factors such as the number of stem-cell divisions and 'extrinsic' factors that cause tissue and DNA damage. To compare these factors, Richard Gilbertson at the CRUK Cambridge Institute, UK, Arzu Onar-Thomas at St Jude Children's Research Hospital in Memphis, Tennessee, and their colleagues studied stem cells called Prom1$^+$ cells with varying levels of generative capacity in different organs in mice of various ages. The authors introduced key cancer-causing mutations into the cells, then looked for tumour growth in the organs.

The team found that cancer risk correlated closely with the generative capacity of the Prom1$^+$ cells. In liver tissue, cancer mutations alone did not cause cancer — tissue injury significantly increased cancer susceptibility. The authors propose that several factors contribute to a 'perfect storm' of tumour growth: mutated stem cells and extrinsic factors that trigger cell proliferation.
Cell **http://doi.org/bp73 (2016)**

MENNA JONES

DISEASE ECOLOGY

Rapid evolution of cancer resistance

Tasmanian devils have developed a degree of genetic resistance to a virulent contagious facial cancer in just four to six generations.

Andrew Storfer at Washington State University in Pullman and his colleagues sequenced about one-sixth of the genome for 294 devils (*Sarcophilus harrisii*) from 3 wild populations. The authors used samples collected both before and after the groups first encountered the facial cancer.

The team found five genes spread across two regions of the genome that showed strong signs of selection, including a large number of single-DNA-base changes, throughout the devil populations. Two of the genes, *CD146* and *THY1*, are known to help the immune system to recognize foreign cells in other animals.
Nature Commun. 7, **12684 (2016)**

CLIMATE-CHANGE ECOLOGY

Trees flourish on the happy edge

As the climate warms, sugar maples expanding their populations uphill could outrun their insect predators and flourish on the 'happy edge' of their range.

Morgane Urli and her colleagues at the University of Sherbrooke in Quebec, Canada, transplanted two-year-old sugar maples (*Acer saccharum*) uphill to sites just at, and beyond, their current elevation range limit. Some were given protection from herbivores. Of seedlings without protection, more than 75% at the range edge and beyond survived, compared with just 30% at the centre of the current range. The difference narrowed markedly in protected plants, suggesting that the increased survival was largely due to 'enemy release' at and beyond the current range.

Previously, the team showed that seed predation beyond elevation range limits is very

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