Science News

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Dr. Matt Bobrowsky
matt@msb-science.com
http://www.linkedin.com/in/mattbobrowsky

Life Science

New antibiotics discovered by sifting through the human microbiome

Most antibiotics in use today are based on natural molecules produced by bacteria — and given the rise of antibiotic resistance, there's an urgent need to find more of them. Unfortunately, using bacteria to produce new antibiotics is difficult. But now, researchers have a new method — using computational methods to identify which genes in a microbe's DNA ought to produce antibiotic compounds and then synthesizing those compounds themselves. They were able to discover two promising new antibiotics without having to culture a single bacterium.
https://www.sciencedaily.com/releases/2016/11/161116103642.htm

Environmental Science

Large forest die-offs can have effects that affect distant ecosystems

When trees die in one place, it can be good or bad for plants elsewhere, because changes in one place can shift the climate in another place. Forest loss is known to have a nearby cooling effect, because, without trees, the earth's surface is more reflective and absorbs less sunlight, and loss of vegetation also makes the air drier. These local effects of deforestation are well known. But a new study shows that major forest losses can alter global climate by shifting the path of large-scale atmospheric waves or by altering precipitation paths. Less forest cover can also change how much sunlight is absorbed in the northern versus the southern hemispheres, which can shift tropical rain bands and other climate features. People have thought about how forest loss matters for an ecosystem, and maybe for local temperatures, but they haven't thought about how that interacts with the global climate. Scientists are only starting to think about these larger-scale implications.
https://www.sciencedaily.com/releases/2016/11/161117205122.htm

Earth Science

Rip in crust drives undersea volcanism

Scientists analyzing a volcanic eruption at a mid-ocean ridge under the Pacific have come up with a somewhat different explanation for what initiated it. Much undersea volcanism is triggered mainly by upwelling magma that reaches a critical pressure and forces its way up. While that is often the case, a new study shows that the dominant force, at least in one case, was the seafloor itself — basically that it ripped itself open, allowing the lava to spill out. A ridge might get torn by what researchers call "plate pull" — the force exerted when the distant edge of seafloor descends, or *subducts*, under a continent, slowly lugging the rest behind it. Stress might also develop because eruptions build symmetrical chains of mountains on either side of the ridge axis, as lava spills down the sides. This might weaken the center through the sheer force of gravity, somewhat like what happens when one slices a hot dog lengthwise, and the two sides fall apart. The eruption took place on the East Pacific Rise, some 700 miles off Mexico.
https://www.sciencedaily.com/releases/2016/11/161114143656.htm

Climate Change

Skimpy sea ice linked to reindeer starvation on land

Unseasonable shrinking of sea ice could create another peril of climate change: increasing ice-overs that starve reindeer and threaten Siberian herders' way of life. The worst of these events in the memory of nomadic herders on Russia's Yamal peninsula destroyed 61,000 of their 275,000 reindeer in 2013, a blow to the herders' livelihood that will take years to recoup. Such events have grown more frequent and more severe in the northwest Russian Arctic, according to Bruce Forbes and other researchers at the University of Lapland in Finland. Reviewing weather data and interviewing herders suggests how such ice disasters occur. When variations in the currents of the North Atlantic bring unusual warmth all the way over to the Barents Sea, ice forming there and in the Kara Sea in autumn and winter can retreat instead of grow. This leaves open water to feed more moisture to storms blowing inland. Rain drenches snow, which freezes into a thick layer of ice, which starves the reindeer because they can't break

through to graze on forage under the snow. Watching sea ice might now give herders some warning of a looming threat to their herds. https://www.sciencenews.org/blog/science-ticker/skimpy-sea-ice-linked-reindeer-starvation-land

Here is a graph showing how current global sea ice levels compare to previous years'.
https://sites.google.com/site/arctischepinguin/home/sea-ice-extent-area/grf/nsidc_global_area_byyear_b.png
Also see **Science & Society** below.

Physical Science and Technology

New LEDs may offer a better way to clean water in remote areas

For the first time, researchers have created light-emitting diodes (LEDs) on lightweight flexible metal foil. These can be used for portable ultraviolet (UV) lights that soldiers and others can use to purify drinking water and sterilize medical equipment. The researchers designed the LEDs to shine in the high-energy "deep" end of the UV spectrum. The university will license the technology to industry for further development. Deep UV light is already used by the military, humanitarian organizations, and industry for applications ranging from detection of biological agents to curing plastics. The problem is that conventional deep-UV lamps are too heavy to easily carry around. Making UV LEDs on metal foil makes the technology portable and cheap...and good for making safe drinking water wherever it is needed.
https://www.sciencedaily.com/releases/2016/11/161115155318.htm

Astronomy

Distant star is roundest object ever observed in nature

Stars are not perfect spheres. Because they rotate, they become slightly flattened due to the "centrifugal force." The faster a star rotates, the more flattened the star becomes. The sun rotates with a period of 27 days and has a radius at the equator that is 10 km larger than at the poles; for the Earth this difference is 21 km. Researchers have now succeeded in measuring the *oblateness* (flatness) of a slowly rotating star with unprecedented precision. The researchers have determined the stellar oblateness using *asteroseismology* — the study of the vibrations or oscillations of stars. The technique was applied to a star 5000 light years away from our solar system and revealed that the difference between the equatorial radius and the polar

radius is only 3 kilometers -- a number that is astonishingly small compared to the star's average radius of 1.5 million kilometers; which means that the gas sphere is astonishingly round. The technique will next be applied to other stars to investigate how faster rotation and a stronger magnetic field can change a star's shape.
https://www.sciencedaily.com/releases/2016/11/161116143145.htm

Science & Society

Moral values influence level of climate change action

Researchers previously investigated the relationship between moral values and environmental attitudes. New work has now focused on how moral values correlate with willingness to make changes in behavior to help address climate change. The study shows that the moral values of compassion, fairness, and purity are correlated with willingness to make personal choices to reduce climate change's impact in the future. The moral values of compassion and fairness are popular with political liberals, while the moral value of purity is popular with conservatives. Researchers regard the correlation with views about compassion and fairness as easy to understand, because climate change is an environmental justice issue, and being willing to do something about climate change also requires that we care about future generations. Both of those things require compassion and a sense of fairness. But it's not as clear why purity would be important. It may be because within the religious community, leaders have been focusing on the ideas that we are stewards of Earth and that there's something impure about destroying natural systems. The finding that willingness to take action on climate change was related to moral values embraced by both liberals and conservatives suggests that it is too simplistic to use political ideology alone to predict support for climate change action. Thus, if climate change activists ignore moral diversity, they may be missing arguments that are important to people,.
https://www.sciencedaily.com/releases/2016/11/161116120147.htm

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