Research highlights

MOLECULAR MÖBIUS STRIP MADE FROM CARBON TWISTS

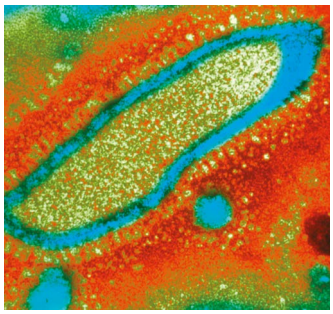
Chemists have created the first carbon molecule that twists to form a 'Möbius strip' — a belt-shaped structure that attaches to itself in such a way that if a tiny creature could walk along the surface, it would end up on the opposite face.

Kenichiro Itami at Nagoya University in Japan and his collaborators started with a ribbon of carbon, hydrogen and bromine atoms, that had oxygen-containing groups attached along its edges. The geometry of those groups forced the ribbon both to twist slightly along its length and to bend and form a loop.

By tailoring the length of the ribbon, the researchers were able to make its ends twist by 180° relative to each other before they joined, to form a Möbius strip. The team subsequently removed the bromine, leaving behind a chain of hexagonal structures each containing six carbon atoms.

Although the structure has the unusual twist, it is made of the same building blocks as carbon nanotubes and flat graphene sheets — two intensively studied forms also built of carbon hexagons.

Nature Synth. https://doi.org/hvsm (2022).



COMMON VIRUS HAS A STARKLY DIVIDED DEATH TOLL

More than 100,000 young children died from a common respiratory virus in 2019 — and nearly all of those deaths occurred in low- and middle-income countries.

Respiratory syncytial virus (RSV, pictured), which can cause pneumonia and respiratory inflammation called bronchiolitis, infects most kids before the age of three. It is known to be a leading global killer of children, but there have been few data available on how many children have died of RSV outside hospitals.

To understand the virus's true toll, Harish Nair at the University of Edinburgh, UK, and his colleagues analysed data from almost 500 studies, including information on deaths in the community. The researchers estimated that 101,400 children under the age of 5 died of RSV in 2019. Infants less than 6 months old accounted for almost half of those deaths, and more than 97% of all deaths were in low- and middle-income countries.

The authors say that their results could inform the roll-out of RSV vaccinations and a manufactured antibody to prevent RSV infection, both of which are now being tested in clinical trials.

Lancet https://doi.org/gp6nmh (2022)

PET SHOPS CRAWL WITH WILD-CAUGHT SPIDERS

Scientists are unravelling a tangled trade web: the online arachnid market.

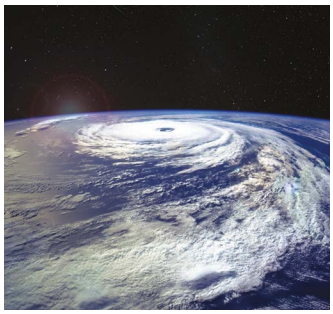
More than 1,200 species of arachnid — a group that includes spiders and scorpions — have been or are currently sold on the Internet, but fewer than 300 of those are listed in records of wildlife trading.

The impact of this trade has been unclear. To investigate, Alice Hughes at the University of Hong Kong and her colleagues analysed the websites of arachnid dealers around the world. They compared the species offered with those listed in a database that catalogues international trade in endangered species, and another that documents the US wildlife trade.

Focusing on spiders (pictured, *Poecilotheria ornata*), scorpions and whip scorpions, the researchers found that less than 2% of the species sold were regulated by an international trade agreement. Roughly two-thirds of individuals from all traded species were wild-caught. Without proper regulation, harvesting can become unsustainable and harm wild populations, the team says.

Better monitoring is needed to prevent some arachnids from scuttling towards endangerment or extinction.

Commun. Biol. **5**, 448 (2022)



EXTREME STORMS TO GET EVEN BIGGER AS WORLD WARMS

Global warming will make extreme storms not only stronger, but also larger.

With increasing air temperatures, the atmosphere can hold more water vapour, leading to exceptionally large amounts of rain. The resulting extreme storms cause most of the floods in the mid-latitudes, the regions just north and south of the tropics.

Panxi Dai at Zhejiang University in Hangzhou, China, and Ji Nie at Peking University in Beijing analysed climate models that simulate storms and rainfall up to the end of this century. They found that storms in the mid-latitudes will grow physically larger by 2.6% for every degree Celsius that the planet warms.

This means that more land is likely to be drenched by heavy rains. In the mid-latitudes, extreme storms will dump around 6% more rain for each degree of warming. Local officials need to prepare for the higher risk of floods and storm damage, the scientists say.

J. Geophys. Res. Lett. **49**, e2022GL099007 (2022).

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