

Science Focus

Past, with flying colours

The lab cooking up
ALIEN ATMOSPHERES ON EARTH

Can rewilding
FIX CLIMATE CHANGE?

The fight against
SLEEPING BEAUTY SYNDROME

TECHNICOLOUR DINOSAURS

The new discoveries shedding light
on their mysterious lives



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IN THIS ISSUE

Chernobyl

How wildlife and tourism flourished after the disaster

CBD oil

Mythbusting the latest health fad

Masculinity

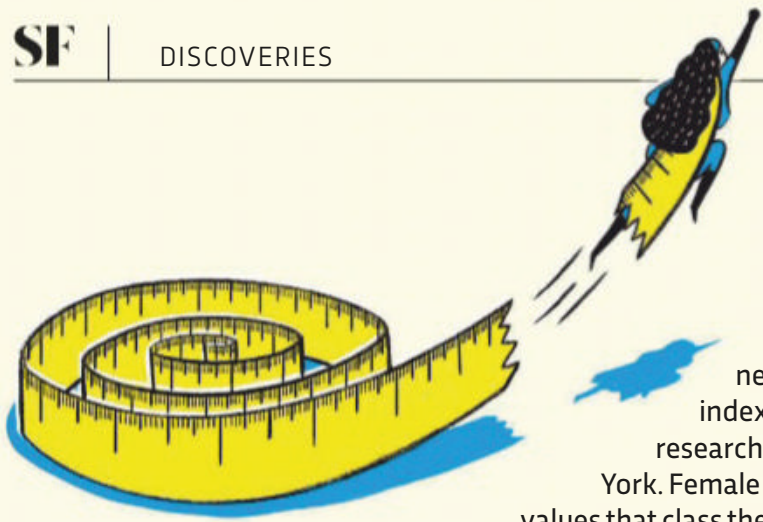
The scientist who wants to redefine it

Diet

Why eggs are definitely good for you

3D printing

Human organs created from scratch



SUPERHEROES HAVE UNHEALTHY BMIS

Comic book characters such as Thor and Black Widow may have exaggerated body shapes, but neither has a healthy body mass index (BMI), according to a new study by researchers at Binghamton University, New York. Female superheroes' usually have BMI values that class them as close to underweight, while

their male counterparts' values tend to be classified as obese. The researchers gathered BMI data for 3,752 Marvel Comics characters and noted their hyper-masculine features (such as higher than average shoulder-to-waist ratios) or hyper-feminine features (including lower than average hip-to-waist ratios).

One of the study's authors, Laura Johnsen, said the characters' forms are exaggerated reflections of the markers that "signal youth, health and fertility in real humans."

PLANETARY SCIENCE

The formation of the Moon brought water to Earth

The cataclysmic collision that created the Moon also brought water to the Earth, allowing life to develop, according to a study by a team of planetologists at the University of Münster, Germany.

The Moon was created 4.4 billion years ago when the Earth collided with a Mars-sized body named Theia. While much of the resulting debris thrown up by the impact coalesced to form our Moon, some of it fell back to Earth and became part of the mantle, the thick rocky layer between the crust and core. The team, led by Dr Gerrit Budde, made the discovery by investigating the composition of the metal molybdenum found in the Earth's mantle.

The composition of molybdenum isotopes (atoms of the element with the same chemical properties but different numbers of neutrons) is noticeably different in the water-rich carbonaceous, or carbon-containing, material that originated from the outer Solar System and the dry non-carbon-containing material that originated from the inner Solar System. Before the collision with Theia, which originated in the outer Solar System, the Earth was composed of non-carbon-containing material.

"The molybdenum isotopes allow us to clearly distinguish carbonaceous and non-carbonaceous material, and as such represent a 'genetic fingerprint' of material from the outer and inner Solar System," said Budde.

Since the composition of the molybdenum isotopes found in Earth's mantle lies somewhere in between that of carbon-containing and non-carbon-containing material, the team deduced that the mantle must contain large amounts of material from the outer Solar System. The amount



of material brought by the collision with Theia would not only account for the molybdenum, but also for all of the water found on Earth, they say.

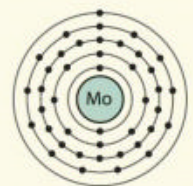
"Our approach is unique because, for the first time, it allows us to associate the origin of water on Earth with the formation of the Moon. To put it simply, without the Moon there probably would be no life on Earth," said Thorsten Kleine, professor of planetology at the University of Münster.

Crash debris: Earth's Moon and its water appear to originate from an astronomical collision that occurred aeons ago



6,400

The estimated diameter, in kilometres, of the astronomical body called Theia that collided with Earth 4.4 billion years ago.



42

The number of protons in a molybdenum nucleus



71%

The amount of Earth's surface covered by water