

created in a single step.

The structure can be transformed into a variety of catalysts that are highly effective at driving 'asymmetric syntheses': reactions that favour the synthesis of one chiral form of a product over another. These types of catalyst are sought in pharmaceutical manufacturing, because mirror-image variations of a structure often have different biological effects.

The authors hope that the architecture of these molecules will also allow chemists to create catalysts that can trigger new reactions. *Angew. Chem. Int. Edn* <https://doi.org/gc5th3> (2018)

MATERIALS

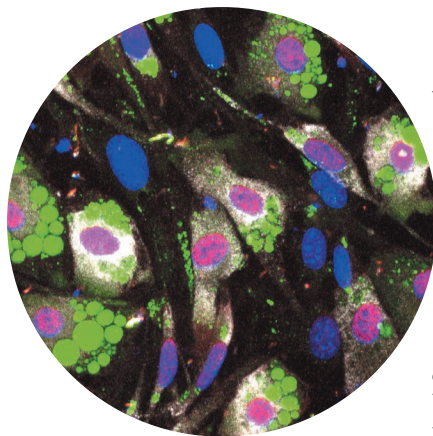
Squid-like system for invisibility

Squid skin has inspired a device that can be made invisible to infrared cameras and adapted to changing conditions.

A squid's skin contains coloured cells, some of which expand and contract, changing the animal's appearance. To mimic this quick-change camouflage, Alon Gorodetsky and his colleagues at the University of California, Irvine, deposited dots of aluminium on a stretchy polymer. When the team expanded a dot, it reflected more infrared light — which is invisible to the human eye but can be felt as heat — than in its contracted state.

The authors created a reflector shaped like a squid's silhouette and placed it on a warm surface. When expanded, the device reflected more heat than its surroundings, making it visible to an infrared camera. But in its resting state, the reflector blended into the thermal background and became invisible in the infrared.

Versions of the material could be used to provide infrared camouflage and to make clothing that keeps the wearer at a comfortable temperature, the authors say. *Science* 359, 1495–1500 (2018)



PHYSIOLOGY

Disrupted daily cycles pile on fat

Disruptions in circadian rhythms have long been linked to weight gain. New results trace that link to changes in hormone-production patterns.

Hormones called glucocorticoids stimulate the production of mature fat cells (pictured, in white). In humans, glucocorticoid levels naturally rise in the morning and fall in the evening, but stress can also elevate them.

To study how glucocorticoid levels relate to weight gain, Mary Teruel at Stanford University in California and her colleagues injected mice with glucocorticoids at varying times of day, but fed all mice the same amount of food. Mice given the hormone late in their wakeful phase gained weight. But mice injected just after they'd woken up — when their glucocorticoid levels were already naturally high — did not.

The results suggest that high glucocorticoid levels at unusual times of day could contribute to weight gain. This could help to explain why stress and disrupted sleep cycles are linked to increases in weight. *Cell Metab.* 27, 854–868 (2018)

NEUROSCIENCE

Maternal brain circuit identified

Mother mice instinctively retrieve pups that wander from the nest. Now, that behaviour has been pinpointed to a specific brain circuit.

Previous research suggested that brain regions called the medial preoptic area (MPOA) and the ventral tegmental area (VTA) are important for maternal behaviours in rodents, but the precise pathways involved were not well understood. Scrutinizing the MPOA, Dayu Lin and her colleagues at the New York University School of Medicine found a select group of neurons that are particularly active during pup retrieval.

When the team stimulated these neurons in both mother mice and females that had never given birth, the animals hurried to fetch wandering pups. But when the neurons were chemically suppressed, mice were slower to retrieve wayward youngsters.

The MPOA neurons seem to drive pup retrieval by sending signals to the VTA. When the team blocked activity in the latter region, stimulation of MPOA cells failed to trigger pup retrieval. *Neuron* 98, 192–207 (2018)

ENGINEERING

The maths of a swelling sponge

A kitchen sponge wicks water upwards by filling microscopic holes that quickly tear themselves apart.

Sponges are often made from plant cellulose, a porous material also used to manufacture paper. A team led by Ho-Young Kim at Seoul National University used a scanning electron microscope to observe the pores in a sponge as it took up liquid.

The researchers found that the pores' walls are riddled with micrometre-scale holes that expand and coalesce on contact with water, effectively tearing bigger openings in the material. When the sponge dries, the micro-holes reform.

On the basis of these observations, the team derived a formula that predicts how quickly water rises in a sponge, including the slowing of absorption as the sponge becomes fully swollen. The

theory could be applied to absorbent materials in biomedical devices — and to bread, which also soaks up water at a rate described by the formula, the team found. *Sci. Adv.* 4, eaao7051 (2018)

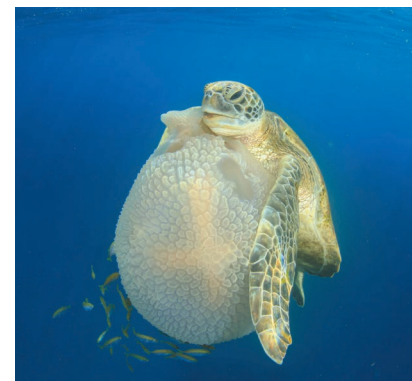
ANIMAL BEHAVIOUR

Sea turtles eat with their flippers

The flippers of sea turtles are superbly adapted for swimming, leading many scientists to assume that the appendages are not suited to other tasks. But Jessica Fujii at the Monterey Bay Aquarium in California and her colleagues have compiled evidence that turtles use their flippers to handle and eat their prey.

The team's review of published data, online images and videos turned up observations of three species of sea turtle — the green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and loggerhead (*Caretta caretta*) — using their flippers to hold jellyfish (pictured) and other creatures while consuming the edible parts. The team also documented sea turtles holding down prey such as scallops while tearing off smaller pieces.

Marine turtles might have been relying on their flippers at mealtimes since the animals first evolved some 120 million years ago, the authors say. *PeerJ* 6, e4565 (2018)



➔ NATURE.COM

For the latest research published by Nature visit:

www.nature.com/latestresearch