J.C. DAHLIG/BUREAU OF RECLAMATION

Dams hold back river water but let it loose from the skies

DAM-BUILDERS: be careful when you create a reservoir because bigger storms and flooding could be on the way. That's the warning from an analysis of more than 600 dams, many of which have brought more extreme rainfall.

The idea that large bodies of water might influence rainfall is not new. But until now, no one had studied the effect of large dams and their reservoirs.

Faisal Hossain of Tennessee Technological University in Cookeville and colleagues looked at the magnitude of the biggest storms near 633 of the world's largest dams before and after construction. They found that in many places the level of precipitation in the most extreme rainfall events grew by an average of 4 per cent per year after a dam was built, with the relationship especially strong in semi-arid regions. There was also an increase in the frequency of rainy days (*Natural Hazards Review*, DOI: 10.1061/(asce)nh.1527-6996.0000013).

The paper is the first to show a clear relationship between dams and heavy rainfall, says Johannes Feddema at the University of Kansas in Lawrence. Though the results were not consistent all over the world, that is to be expected, he says, since regional weather patterns and numerous other factors come into play.

To explore these effects, Hossain plans to use computer models to simulate dams in different scenarios. "Hopefully it will make the picture less blurry," he says.

DNA's guardian gene found in placozoans

A VITAL gene that defends us against cancer has been found in one of the simplest of animals – placozoans. The finding shows that *p53*, sometimes described as the "guardian of the genome", has been around for over 1 billion years.

Placozoans' millimetre-long bodies are just three cells thick and have no muscles, nervous system or organs. Yet they have a version of *p53* that is strikingly similar to ours, David Lane, of Cancer Research UK, reports in research to be published in *Cell Cycle*.

In humans, the protein it codes for, p53, detects and deals with damaged DNA that could trigger cancers. Faulty or inactive copies of the gene greatly increase the chances that a cell will become cancerous.

It is not clear whether *p53* has the same function in placozoans. There is evidence to suggest the gene originally controlled stem cells or immune response, and was only later co-opted to defend animals against rogue cells when they became large and long-lived.

However, human and placozoan versions of p53 share key features, including regions that allow it to attach to DNA and other proteins. This suggests it has interacted with a similar network of partner genes since the dawn of the animal kingdom.

Comets built our atmosphere...

WE MAY have comets to thank for our atmosphere – not volcanoes.

One theory for the origin of Earth's atmosphere is that gases bubbled up out of the mantle via volcanoes. Greg Holland of the University of Manchester, UK, and colleagues have other ideas, after collecting samples of the noble gas krypton beneath New Mexico.

They found the mantle was rich in heavy isotopes of krypton, while the atmosphere is rich in its lighter isotopes. As lighter isotopes escape into space faster than heavy ones, the atmosphere can only get "heavier". This means the mantle cannot have been the source of our atmosphere, says Holland.

Co-author Chris Ballentine, also at Manchester, says comets raining down on the early Earth could be the source of the isotopes. Comets at the edge of the solar system have noble gas signatures resembling our atmosphere (*Science*, DOI: 10.1126/science.1179518).

...but they're not so great for life

WE'RE lucky Earth resides in the Milky Way's suburbs. Intense comet bombardment near the galaxy's centre may make it tough for life to gain a foothold there.

Earth and the other planets of our solar system suffer occasional impacts when comets are disturbed from their orbits around the sun by the gravity of nearby stars and gas clouds.

The effect is stronger closer to the galaxy's centre, where stars and gas clouds are more tightly packed. More than twice as many comets are shaken loose to potentially hit planets at half our distance to the centre, according to simulations by Marco Masi of the University of Padua, Italy, and his colleagues (arxiv.org/abs/0911.5533).

Coconuts make the best hideouts

OCTOPUSES have been spotted carrying coconut shells to use as shelters in what is claimed to be the first example of tool use in invertebrates.

There is a growing record of tool use in animals, from orang-utan "musical instruments" to sponges used by dolphins to dislodge prey from sand. Now Julian Finn, at the Museum Victoria in Melbourne, Australia, has filmed four veined octopuses, *Amphioctopus marginatus*, picking up coconut shells for later use as hiding places.

The octopuses drape their bodies over the half shells, hollow-side up, leaving their arms dangling over the edges. They lift the shells by making their arms rigid, before tiptoeing away. When under threat, they flip the shells over themselves to hide (see video at newscientist.com/article/dn18281).

It is unclear whether they learn this behaviour through observation or have worked it out for themselves. Finn argues this qualifies as tool use because the shells are not permanent homes like those occupied by hermit crabs, but are carried around for future use (*Current Biology*, vol 19, p R1069). Alex Kacelnik of the University of Oxford disagrees, stating that tool use is defined as the use of non-attached objects on other objects.

ROGER STEENE

If that gene is from your dad, your risk of diabetes goes up

PONDERING whether a baby got mum or dad's eyes may seem like idle speculation, but knowing which parent certain genes came from can tell you about your risk of disease. Some variants are even two-faced, boosting the risk if they come from one parent but cutting it if they come from the other.

It is already known that the same gene variant can behave differently depending on which parent it came from, due to a process called imprinting – which determines which of a parent's genes are expressed in the child.

Now a team led by Kári Stefánsson at deCODE genetics in Reykjavik, Iceland, has looked at hundreds of thousands of single-letter DNA variations to examine how imprinting affects the risk of disease. For 38,000 Icelanders, his team determined whether these variations came from the mother or father, and looked for correlations with disease.

The researchers identified at least five variations whose correlation with a certain disease depended on whether the gene is maternal or paternal. An earlier study that didn't take parental influence into account found one variant on chromosome 11 raised the risk of breast cancer by 7 per cent. Stefánsson's study shows that it in fact ups the risk by 17 per cent if inherited from the father but protects against the disease if it comes from the mother.

The team also found disease-linked variants that other studies had missed. One of these boosts a person's risk of type 2 diabetes by 41 per cent, but only if they inherit it from the father (*Nature*, DOI: 10.1038/nature08625).

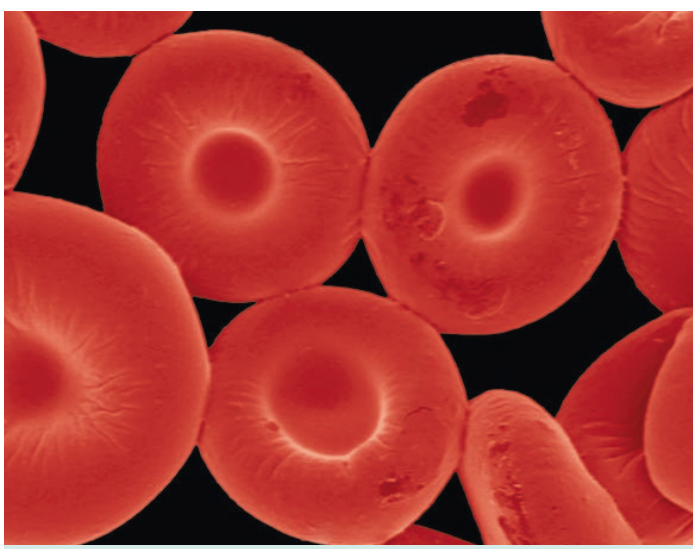
Why small people are more sensitive

WOMEN have a more sensitive touch than men, but not because of their gender. It's just that their fingers tend to be smaller.

"We now understand that this sex difference is not actually a 'sex effect', but rather an effect of finger size," says Daniel Goldreich of McMaster University in Toronto, Canada. His team measured the surface areas of index fingers in 100 students and then asked them to feel surfaces marked with progressively finer grooves.

When the grooves get too narrow for someone's sense of touch, the surface feels smooth. On average, men could detect grooves down to 1.59 millimetres wide, whereas women detected grooves at 1.41 millimetres. But what mattered was finger size, not gender. Spatial discrimination fell by 0.25 millimetres for every square-centimetre increase in finger area (*The Journal of Neuroscience*, DOI: 10.1523/jneurosci.3684-09.2009).

The team found that sweat pores become more densely packed as finger size decreases. They suspect that the skin's touch receptors, or Merkel cells, are also more tightly packed, which might explain why small fingers are more sensitive.



NISHIT DOSHI

Will the real red blood cells stand up?

YOU can't get blood from a stone, but it seems you can make imitation red blood cells from polymers.

Just like real red blood cells, these pretenders can squeeze through spaces much smaller than their own diameter, and absorb and release molecules to order, including oxygen. They could be used to disperse drugs evenly throughout the body or given to people who need a transfusion.

Real red blood cells owe their agility to their "biconcave" shape (see picture). So Samir Mitragotri of the University of California and his team added 7-micrometre-wide balls made of a polymer called PLGA to a solvent that causes the balls to collapse. They coated the resulting, tyre-shaped particles in a layer of protein, and dissolved away the polymer core, leaving behind soft biodegradable shells the size and shape of real red blood cells.

The particles soaked up the anti-clotting drug heparin and later released it when transported away from the heparin source. Particles coated in haemoglobin did the same with oxygen (*Proceedings of the National Academy of Sciences*, DOI: 10.1073_pnas.0907127106).

Building a dam brings more water than you'd expect

Dams divert water into rain clouds and storms

If you want dry weather don't build a dam