

BIOPHYSICS

Cells ride on stress waves

As cells migrate — during processes such as development and wound healing — they transmit forces from their leading edge, creating a stress wave that propagates through the mass of expanding tissue.

Xavier Trepat at the Institute for Bioengineering of Catalonia in Barcelona, Spain, and his colleagues measured the inter- and intracellular mechanical forces in a monolayer of canine epithelial cells as the cells spread out on a substrate. As the leading front commenced migration, forces were generated that were transmitted backward from cell to cell through intercellular junctions as the cells moved forward. A slow mechanical wave propagated through the cells, building up gradients of stress that helped to direct the migration.

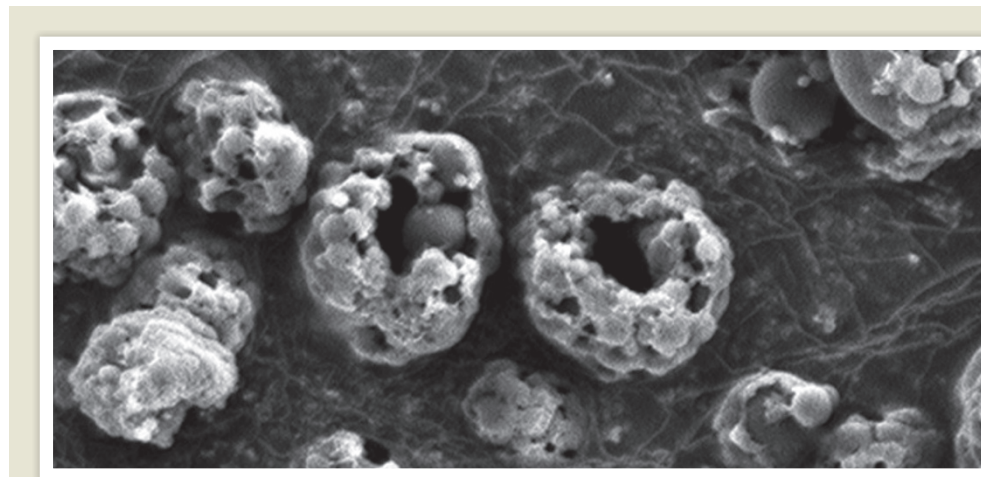
Nature Phys. <http://dx.doi.org/10.1038/nphys2355> (2012)

ASTROPHYSICS

Planet gas vanishes

A powerful explosion on a distant star seems to have triggered partial evaporation of the atmosphere of a closely orbiting planet.

Alain Lecavelier des Etangs of the Paris Institute of Astrophysics and his colleagues used data from the Hubble Space Telescope to examine the atmosphere of the hot, Jupiter-like exoplanet HD 189733b on two occasions. The telescope failed to detect the planet's atmosphere in April 2010, but in September 2011 it revealed an abundance of hydrogen gas rushing away from the planet. Only hours before the 2011 observations,



DRUG DELIVERY

Nanoparticles home in to clear clots

Nanoparticles that mimic platelets by rushing towards blood-vessel obstructions could deliver clot-busting drugs for use in stroke treatment.

Blocked blood vessels experience higher shear forces than do healthy vessels, causing platelets to stick to vessel walls near the blockage. Donald Ingber at Harvard University in Boston, Massachusetts, and his team created nanoparticle aggregates (pictured) that break up into their component parts under high shear forces, and swarm the blood clot area. The nanoparticles are coated with tissue plasminogen activator (tPA), which dissolves

blood clots. More than 80% of mice with clots blocking the lungs' main arteries survived after being treated with the drug-coated nanoparticles — whereas all untreated animals died within an hour.

The nanoparticles reduce by 100-fold the amount of tPA needed to dissolve a clot compared with injection of the protein into the blood. Delivery using the particles also reduces the chances of tPA causing bleeding elsewhere in the body.

Science <http://dx.doi.org/10.1126/science.1217815> (2012)

NASA's Swift satellite had detected a large X-ray flare on the parent star. Energy from this flare could have prompted evaporation of the hydrogen atoms, the authors suggest.

Astron. Astrophys. <http://dx.doi.org/10.1051/0004-6361/201219363> (2012)

ANIMAL BEHAVIOUR

Sex changes but not personality

Many traits such as body colour are expressed differently between the sexes to maximize the benefits for each sex. However, this does not seem to be true for animal personality

— at least not in the case of a hermaphroditic reef fish.

Dennis Spranger of the University of Tübingen, Germany, and his team induced the dominant females in 25 social groups of the reef fish, *Paraperis cylindrica* (pictured), to change sex by removing the only male from each group. The team found that the more active and aggressive females became the more active and aggressive males.

Although aggressive behaviour is beneficial for territorial males, it is probably detrimental to the future reproductive success of females, the authors say. They

conclude that such constraints make it difficult for selection to produce a behaviour that is optimal for both sexes — which could explain why variation in behaviour between the sexes has been maintained.

Ecol. Lett. <http://dx.doi.org/10.1111/j.1461-0248.2012.01819.x> (2012)

