

RESEARCH HIGHLIGHTS

Selections from the scientific literature

MATERIALS

Energy stored inside an aerogel

Researchers have created a promising 3D energy-storage device using a porous aerogel. These 'supercapacitors' could offer much higher power densities than conventional structures.

Mahiar Hamedi at the KTH Royal Institute of Technology in Stockholm and his colleagues coated the foamy interior of an aerogel with carbon nanotubes to create an electrode. They covered this with an insulating plastic, followed by another nanotube electrode layer. This formed a supercapacitor that showed stable charging and discharging over 400 cycles, and maintained its performance when the aerogel was compressed by up to 75%.

Aerogels have the largest internal surface area of any synthetic material, so such components could store large amounts of power in a range of electronic devices.

Nature Commun. 6, 7259 (2015)

CELL BIOLOGY

Why human eggs are error-prone

The cellular machinery for separating chromosomes is unusually unstable in human eggs. This makes the eggs prone to having abnormal numbers of chromosomes, which can result in pregnancy loss and genetic disorders.

When cells divide to make eggs or sperm, chromosome pairs separate owing to spindle-shaped cellular machinery. Melina Schuh at the MRC Laboratory of Molecular Biology in Cambridge, UK, and her colleagues observed this process in more than



SANJIT DAS/PANOS

AGRICULTURE

The cost of native and GM cotton crops

Native cotton in India can generate similar profits to genetically modified (GM) cotton when both are grown without irrigation.

Carla Romeu-Dalmau, Liam Dolan and their colleagues at the University of Oxford, UK, compared the economic impact of growing native Asiatic cotton (*Gossypium arboreum* L.) with that of growing American Bt cotton (Bt *Gossypium hirsutum*), which has been engineered to contain bacterial genes that make the crop resistant to insect pests. They found that farmers in the Indian state of Maharashtra spent more money to produce Bt cotton than native cotton, even though

Bt cotton generates higher yields.

The authors also looked at farming Bt cotton under different conditions, and found that the GM cotton grown under rain-fed conditions has similar economic benefits to the same cotton grown using irrigation. Although Bt cotton gives higher yields with irrigation than without, growing it under these conditions costs more and eats into profits.

Farmers should bear in mind a range of factors, including expenses and water availability, when choosing which crop to plant, the authors suggest.

Nature Plants 1, 15072 (2015)

100 live egg cells from women undergoing fertility treatments. They found that the chromosome segregation period was unusually long, lasting about 16 hours. In many egg cells, the spindles were unstable, causing the chromosomes to lag behind during separation, and increasing the risk that they would not reach the correct side of the spindle before the cells divided.

Science 348, 1143–1147 (2015)

CLIMATE CHANGE

Hot storms bring big rainfall swings

As temperatures rise, heavy rainfall during storms becomes even heavier, whereas lighter bursts grow less intense. This could bring storms that are more unpredictable and destructive as the climate warms.

Conrad Wasko and Ashish Sharma at the University of

New South Wales in Sydney, Australia, analysed high-resolution rainfall data from 79 locations across Australia from 1955 to 2005. They found that, at all latitudes, Australian rainfall patterns became less uniform as temperatures rose, and the authors predicted a 5–20% increase in the peak water flow rate during floods at temperatures 5 °C warmer than today.

A warmer climate could lead to short-term floods that