Sciencewatch

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Wasp venom targets cancer

If you have an aversion to wasps, it might help to know that the venom from one of them, *Polybia paulista*, offers new hope for cancer treatment. Natália Bueno Leite of São Paolo State University in Brazil and colleagues have found that a peptide in the venom, Polybia-MP1, targets cancer cells selectively while leaving normal ones alone. It acts specifically on an atypical lipid composition in cancer-cell membranes, making holes, which kill the cell. These holes form in seconds, and the general strategy of going after cancer cells based on this difference in lipid structure could form the basis for a completely new class of anticancer drugs.

Further reading

N Bueno Leite *et al.* 2015 *Biophys. J.* **109** 936.

Attila Fodemesi/Shutterstock

Venom from Polybia paulista *could offer new hope for cancer treatment.*

Disappearing circuits

Carbon atoms deposited on graphene via focussed electron-beam-induced deposition (FEBD), making patterns that change with time, enable the creation of circuits that do something one day and something else the next. Songkil Kim of the Georgia Institute of Technology in Atlanta and colleagues were trying initially to clean hydrocarbons from graphene surfaces, when they realised that amorphous carbon created where the beam struck acted as a dopant, making n-type graphene on an initially p-type surface and forming a p–n junction. The patterns that are made change over a timescale of tens of hours. Carbon atoms can also be "frozen" in place by using a laser to turn them into graphite – yet another form of carbon. Potential applications include security, allowing a circuit or data to disappear after a while, or timing the release of pharmaceuticals in medicine.

Further reading

S Kim *et al.* 2015 *Nanoscale* **7** 14946.

Gravity-induced decoherence

In quantum mechanics, you can put an object into a superposition of states for "here" and "there", but we never seem to see those. And we say that there is decoherence, but what causes it? This has been a topic of much debate since the beginning of quantum mechanics. Now, Igor Pikovksi of the University of Vienna and colleagues offer an idea based on time dilation due to general relativity. The amplitudes for "here" and "there" will, in general, evolve in time at different rates, due the local variations in the gravitational field. Put in the numbers close to Earth, and perhaps surprisingly, the effect is not small, and varies with the square root of the number of particles in an object and inversely with both the temperature and the distance between "here" and "there". For a gram-scale object, and a distance of 1 μm vertically, one gets about a millisecond. The idea could be tested in the near-zero-gravity environment of space.

Further reading

I Pikovski *et al.* 2015 *Nature Phys.* **11** 668.

Cosmology by radio

Measurements of cosmological distance are of great importance, and any new ways of obtaining information other than via redshift analyses would be very welcome. Kiyoshi Wesely Masui and Kris Sigurdson of the University of British Columbia in Vancouver, Canada, have shown that "standard pings" – short broadband radio impulses such as fast radio bursts (FRBs) – could be used to study the 3D clustering of matter in the universe, even without redshift information, using their dispersion as they travel through plasma in space. Dispersion is an imperfect measure of distance, but it is used routinely for pulsars, and redshifts have their own sources of bias. They show that the distortions due to inhomogeneities are calculable, making this new approach promising, and it could be done using forthcoming wide-field radio telescopes.

Further reading

K W Masui and K Sigurdson 2015 *Phys. Rev. Lett.* **115** 121301.

Skintight invisibility cloak

Attempts to produce a Harry Potter-style invisibility cloak have been improving, but they have so far tended to be too bulky to really compare to clothing. Now, Xingjie Ni of the University of California in Berkely and colleagues have shown that they can be made a mere 80 nm thick – just a tenth of the wavelength of the light for which it works – using nano antennas (gold squares on an insulator) to make a metamaterial that bends light around whatever is to be concealed, rendering it invisible. The current device has to be tailored to the structure it hides and cannot conceal all wavelengths, but is a major step towards turning a storybook idea into reality.

Further reading

X Ni *et al.* 2015 *Science* **349** 1310.