Honolulu and her colleagues used the Near-Infrared Coronagraphic Imager (NICI) to minimize the light of the glaring star and to spot the companion, which has a mass about 36 times that of Jupiter. Because the star is so young (around 12 million years old, compared with 4.5 billion for the Sun) the discovery helps to set constraints on our understanding of how brown dwarfs and planets formed.

DEVELOPMENTAL BIOLOGY

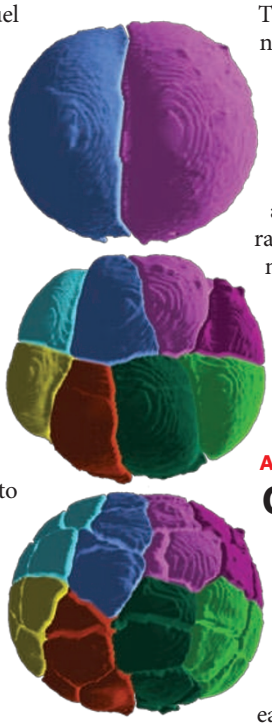
Live-action embryos

Science **329,** 967–971 (2010)

Time-lapse imaging has revealed new details about the zebrafish embryo as it undergoes its first ten cell-division cycles.

Nadine Peyriéras and Emmanuel Beaurepaire of the French National Centre for Scientific Research in Gif-sur-Yvette and Palaiseau, respectively, and their colleagues have developed a microscopy technique that visualizes protein tubules involved in cell division and cell boundaries in live embryos, with micrometre resolution. The method does not involve fluorescent dyes.

The team analysed three-dimensional images from six embryos and digitally reconstructed their growth (pictured). The authors were able to track the position and lineage of each cell and found, for example, that the cell-cycle duration was longer for cells deeper in the embryo, leading to a wave-like pattern of embryo development.



SCIENCE/AAAS

CANCER BIOLOGY

Muscling in on cancer

Cell **142,** 531–543 (2010)

Massive muscle wasting affects most patients with cancer, and is often implicated in deaths from the disease. It is thought that myostatin, a protein that inhibits muscle growth, and other molecules in the same biochemical pathway regulate this process, called muscle cachexia.

H.Q. Han at Amgen Research in Thousand Oaks, California, and his team tested whether a molecule that interferes with a receptor for myostatin could prevent muscle cachexia in mice. Mice with cancer that were given the compound showed a complete reversal in muscle loss, as well as prolonged survival.

For a longer story on this research, see go.nature.com/FKmBQu

NEURODEGENERATION

Cell respiration ruin

Neuron doi:10.1016/j.neuron.2010.07.019 (2010)

In some inherited forms of the neurodegenerative disease amyotrophic lateral sclerosis (ALS), the culprit is a mutated gene that encodes the enzyme SOD1. What hasn't been clear is how this molecule causes motor neurons in the brain and spinal cord to die.

Don Cleveland at the University of California, San Diego, and his colleagues show that a misfolded version of SOD1 binds to a protein channel in the outer membrane of mitochondria, the cell's energy-generating organelles. This protein, VDAC1, regulates the movement of ions and other molecules across the mitochondrial membrane.

The team isolated VDAC1 from normal rats and showed that mutated SOD1 binds to it, lowering VDAC1's electrical conductance, which indicates a hampered flow of ions through the channel. In addition, mitochondria from rats engineered to carry a human mutant *SOD1* gene took up less ADP, a molecule needed for cellular respiration. Such impairments, the authors suggest, lead to neuronal damage.

ASTRONOMY

Oldest rock

Nature Geosci. doi:10.1038/ngeo941 (2010)

The Solar System just got a little older. New information from a chondritic meteorite — a rocky artefact from the Solar System's earliest days — puts the age of the Solar System at about 4.5682 billion years, between 0.3 million and 1.9 million years older than previous estimates.

Audrey Bouvier and Meenakshi Wadhwa of Arizona State University in Tempe determined this age after measuring the ratios of different lead and magnesium isotopes inside the ancient rock. This also allowed them to estimate the initial abundance of an iron isotope often found in such meteorites. Because this iron probably formed within an ageing giant star, which then exploded as a supernova, the finding gives credence to the theory that a nearby supernova helped to trigger the formation of our Solar System.

For a longer story on this research, see go.nature.com/woXqM8

JOURNAL CLUB

Richard E. Zeebe
University of Hawaii, Honolulu

A physicist and biogeochemist gets a kick out of the problem of Brownian motion and diffusion.

The movement of a particle in a gas or fluid, known as Brownian motion, exhibits two different regimes: the ballistic and the diffusive. For illustration, imagine a drunken sailor staggering back to his ship. While taking a few rapid steps, his instantaneous velocity may be quite high (ballistic regime), but his average 'random walk' velocity may be rather low (diffusive regime). If we were to monitor the sailor with a coarse-resolution Global Positioning System device, we would conclude that he is walking leisurely towards the docks, but we wouldn't be able to detect his rapid motions on much shorter timescales.

Until recently, a similar problem applied to observing a Brownian particle's instantaneous velocity. Now, Mark Raizen and his colleagues at the University of Texas at Austin have followed the ballistic motion of micrometre-sized particles on microsecond timescales, using lasers (T. Li *et al. Science* **328,** 1673–1675; 2010). Their results not only confirm the equipartition theorem, but may also be critical to observing certain quantum effects.

My interest in the story is more practical. I am currently using molecular dynamics to calculate ionic diffusion coefficients. It was a great pleasure to see that the underlying theory and the new experimental results agree flawlessly.

In response to the authors' observation, the media stated that Einstein had been wrong because he had predicted such an observation to be impossible. He wasn't. As a German-speaker, I have been able to read the early landmark papers in physics, often originally in German. They include Einstein's 1907 paper on Brownian motion. He stated that observing the instantaneous velocity of ultra-microscopic particles is impossible. He didn't rule out the possibility of studying microscopic particles — as Li *et al.* have done.

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