ECOLOGY

Hunt for pathogen's home

Ecol. Lett. doi:10.1111/j.1461-0248.2010.01513.x (2010)

Many pathogens reside in 'reservoir' hosts before breaking out and causing infections. Predicting which hosts make good reservoirs could aid disease control. James Cronin and his team at the University of North Carolina at Chapel Hill propose that certain physiological traits can indicate whether a potential host will be a good reservoir — namely short-lived tissue with high nutrient levels, a high metabolic rate and poor defence mechanisms.

The authors tested their predictions on six wild grass species and the pathogen barley yellow dwarf virus, which is transmitted by aphids. They found that the probability of the virus being transmitted between the grass and the aphids and a grass's ability to support a large aphid population are mainly affected by these physiological traits.

MOLECULAR EVOLUTION

Sperm-making origins

PLoS Genet. **6,** e1001022 (2010)

A gene similar to one in humans linked to sperm production has been found in representative organisms from each of the major animal lineages. This suggests that some components of sperm production have been conserved for at least 600 million years and that sperm generation in animals has a common origin.

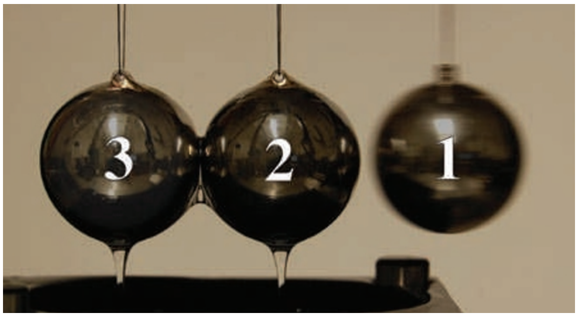
Eugene Xu and his colleagues at Northwestern University in Chicago, Illinois, analysed DNA sequences in animals ranging from mice to snails, and found a gene very similar to *BOULE*, a human reproductive gene. A closer look at mice, chickens and sea urchins revealed that the gene was expressed mainly in the testis. Deleting the gene in mice resulted in sterility only in males, which was due to a lack of sperm in the testes.

PHYSICS

Sticky balls

Phys. Rev. Lett. **105,** 034501 (2010)

The popular desktop toy Newton's cradle consists of a row of suspended metallic spheres. When the sphere at one end is pulled back and released, it strikes the row, causing the sphere at the other end to fly up with a similar velocity.



Christine Hrenya and her colleagues at the University of Colorado at Boulder wanted to study collisions in liquid, and so dipped the balls of a three-sphere system similar to a Newton's cradle into oil (pictured). The authors, like others before them, could not reproduce the characteristic cradle motion. Models revealed why: the narrow fluid bridge between the balls caused them to stick together after they collided, hindering the transfer of momentum. Reducing the volume of the fluid bridge restored the cradle action.

The team says the findings could be applicable to more complex systems involving wet particles, such as mixing during pharmaceutical processing.

AM. PHYS. SOC.

NEUROSCIENCE

Brain breathing

Science doi:10.1126/science.1190721 (2010)

Long thought simply to provide support to neurons, star-shaped brain cells called astrocytes may also be important in regulating breathing.

Alexander Gourine at University College London, Sergey Kasparov at the University of Bristol, UK, and their colleagues engineered rats in which they could control and monitor astrocyte activity. They found that astrocytes can sense pH changes in the blood, which result from changes in carbon dioxide levels.

On detecting these pH shifts, the astrocytes release the small molecule ATP. The team thinks that this ATP stimulates respiratory neurons to enhance breathing.

For a longer story on this research, see go.nature.com/lEAa2C

PARTICLE PHYSICS

Arctic antimatter

Phys. Rev. Lett. **105,** 013003 (2010)

A cloud of antiprotons has been cooled to the coldest temperature yet, paving the way for a fundamental test of the symmetry of matter and antimatter, say Jeffrey Hangst of Aarhus University in Denmark and his colleagues.

They cooled about 4,000 antiprotons to 9 kelvin using an evaporative technique previously used on neutral atoms. By 'tipping' an electromagnetic trap, the hottest antiprotons from an initial batch of 45,000 escaped, leaving behind the colder bunch. The team's next step will be to combine the cooled antiprotons with antielectrons and make a batch of anti-hydrogen atoms cold enough to be trapped and measured — to see if their properties mirror those of hydrogen.

JOURNAL CLUB

François Fuks
Free University of Brussels

A cancer biologist marvels at how key gene regulators are still revealing hidden talents.

What a difference time makes! It does not seem long since I learned, as a university student and as if it was a closed topic, that the regulation of fruitflies' 'homeotic' genes — which control developmental patterns — is carried out by the Polycomb group of proteins. However, over the past couple of years, thanks to the booming field of epigenetics, these proteins have been given a new lease of life in research labs. They are proving to be multifaceted and dynamic in a range of cellular activities, including cancer progression.

In this light, work by Danny Reinberg at the New York University School of Medicine and his team captured my attention (G. Li *et al. Genes Dev.* **24,** 368–380; 2010). The group addressed one of the burning questions in the field: how exactly does the Polycomb-repressive complex 2 (PRC2), which comprises these Polycomb proteins, recognize and home in on the genes that it regulates? The authors show that the protein encoded by the gene *Jarid2*, which is also important for development, forms a key component of the PRC2 complex and is involved in its recruitment to target DNA sequences. A slew of recent studies from other groups report similar observations.

The jury is still out on the precise mechanism by which JARID2 aids in the recruitment of PRC2 to its target genes. It is already evident that *Jarid2* is only one piece of an elaborate puzzle, and we can expect many exciting discoveries of the remaining pieces. Clearly, Polycomb proteins, which have been well studied since they were discovered more than 50 years ago, are still yielding new insight into gene regulation and other cell activities — and are thus a formidable force to be reckoned with, in both biology and medicine.

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