RESEARCH HIGHLIGHTS

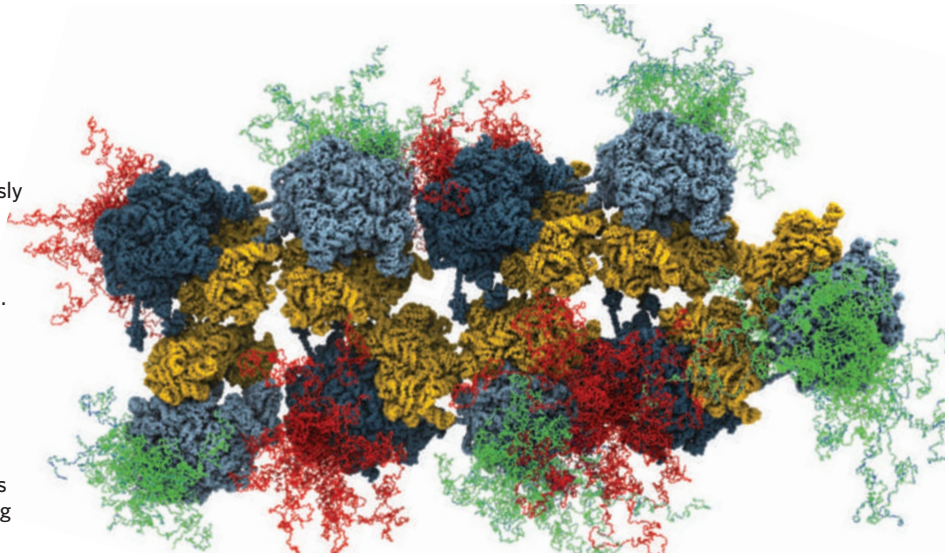
Industrial complex

Cell **136,** 261–271 (2009)

The three-dimensional structure of the polysome has been elucidated in bacteria.

Polysomes are clusters of ribosomes, the cell's protein factories. The ribosomes that make up a polysome (pictured) simultaneously read the same message, so many proteins can be made at the same time. On each ribosome the newly made protein emerges through a specialized polypeptide exit tunnel.

Ulrich Hartl and Wolfgang Baumeister at the Max Planck Institute of Biochemistry in Martinsried, Germany, and their colleagues used cryoelectron tomography to show that the ribosomes sit in either a staggered or a helical arrangement so that the exit tunnels are distant from each other. They suggest this minimizes the chance of new proteins sticking to each other.



ELSEVIER

MATERIALS SCIENCE

Graphene gets a fresh look

Phys. Rev. Lett. **102,** 026802 (2009)

The properties of graphene are tricky to understand from first principles because the material's carbon-sheet structure generates unusually strong forces between electrons. But Joaquín Drut of Ohio State University in Columbus and Timo Lähde of the University of Washington in Seattle believe they have made headway using the tools of lattice QCD, a theory from high-energy physics.

These tools allowed them to treat graphene's electrostatic interactions accurately, and, crucially, to predict that a graphene sheet should become insulating when it is not resting on another material. They hope experimentalists will soon demonstrate the insulating effect, which may have consequences for graphene-based electronics.

PHYSIOLOGY

Fake fingerprints

Science doi:10.1126/science.1166467 (2009)

Fingerprints may be important for assessing fine textures, in addition to their known role in making gripping objects easier by increasing friction.

Georges Debrégeas and his colleagues at the École Normale Supérieure in Paris made a fake fingertip and tested it with and without a print. They covered a sensor with either a smooth or ridged cap and measured pressure variations as it scanned an uneven surface. The sensor represented a nerve ending, the cap the skin.

In the experiment, ridged 'skin' amplified certain vibrations 100 times more than smooth 'skin'. The team calculated that a human fingerprint would amplify vibrations at 200–300 hertz — a range that spans those frequencies to which nerve fibres that respond to fine-texture perception are most sensitive.

SCIENCE/AAAS

MICROBIOLOGY

Community assistance

Proc. Natl Acad. Sci. USA doi:10.1073/pnas.0809533106 (2009)

A pathogen that can cause gum disease in humans uses signals from another species to bolster its defences, find Matthew Ramsey and Marvin Whiteley of the University of Texas in Austin.

They report that hydrogen peroxide secreted by *Streptococcus* bacteria stimulated *Aggregatibacter actinomycetemcomitans* to make more of a protein called ApiA, via a protein that acts as a sensor, OxyR. ApiA increases *A. actinomycetemcomitans*'s binding to a human protein called factor H, shielding this bacterial species from attack by the human immune system.

CHEMICAL BIOLOGY

Casting iron

Nature Chem. Biol. doi:10.1038/nchembio.145 (2009)

Bacteria use two biosynthetic pathways to create iron-scavenging molecules, called siderophores, that are essential to their proliferation. Most siderophore research has focused on one of these — the nonribosomal peptide synthetase (NRPS)-dependent pathway — whereas the other, the NRPS-independent siderophore (NIS) pathway, has been largely ignored.

James Naismith of the University of St Andrews in Scotland and his colleagues are the first to solve a NIS enzyme's structure: that of AcsD, which occurs in the plant pathogen *Pectobacterium chrysanthemi*.

The structure reveals that AcsD catalyses reactions between ATP, citric acid and an amino acid, L-serine, making a probable precursor to the siderophore. The authors hope their work will help in the design of inhibitors of siderophore-making enzymes from human pathogens.

ATMOSPHERIC PHYSICS

Particulate power

Geophys. Res. Lett. doi:10.1029/2008GL036350 (2009)

Aerosols emanating from vehicles and industrial plants reflect sunlight and have been linked to a cooling trend from the 1950s to the 1970s. A team led by Rolf Philipona of the Swiss federal agency MeteoSwiss has now quantified the reverse trend — warming caused by solar radiation shining through cleaner skies, which has occurred since the early 1980s.

They measured short-wave radiation,