Virology

Pigs duck out of the influenza mix

J. Virol. **77,** 6988–6994 (2003)

In the twentieth century there were four worldwide influenza outbreaks, the most notorious being the 1918 pandemic, which killed an estimated 25 million people. Domesticated animals, notably poultry, are widely regarded as the source of that outbreak — and of any future ones. These animals carry a host of influenza viruses that, with relatively simple changes in their genetic sequence, can jump to humans. Genetic studies have suggested that another animal, the lead candidate being pigs, is needed as a 'mixing vessel' in which different bird flu viruses can recombine to produce a strain that infects humans.

But K. S. Li *et al.* suggest that pigs may not be necessary after all. Sampling the poultry markets of southern China, the authors found that one strain of bird flu, H9N2, can be passed back and forth between chickens and ducks. The strains seen in ducks had recombined twice and sometimes three times. And some ducks contained H9N2 viruses closely related to the H5N1 strain, which killed six people in Hong Kong in 1997 before it was eradicated by culling all of the territory's chickens.

The authors warn that two-way viral transmission between domesticated ducks and chickens, which are often housed in close proximity, could produce influenza viruses with pandemic potential. **Tom Clarke**

Acoustics

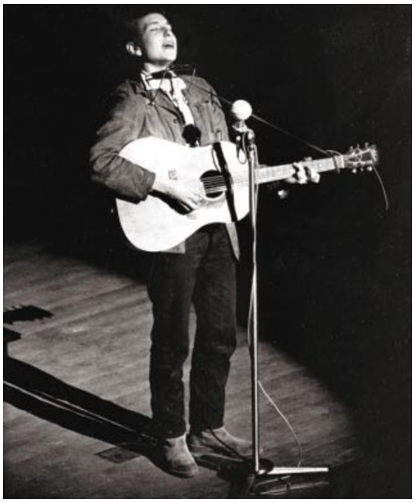
Guitar feedback tamed

J. Acoust. Soc. Am. **113,** 3188–3196 (2003)

Acoustic guitarists need no longer suffer from the feedback blues, thanks to a smart device developed by Steve Griffin and colleagues. The acoustic guitar is notoriously hard to amplify: its resonance tends to excite the unseemly howl of feedback. The problem can be mitigated by deadening the guitar body, but at the cost of ruining the sound of the unamplified instrument.

Griffin *et al.* have introduced active control of feedback by gluing two piezoelectric plates, just 0.25 mm thick, to the front plate of a guitar, below the bridge. The plates, which leave the unamplified tone untouched, are hooked up to the pick-up, the transducer that converts sound waves into an electrical signal for amplification. This control system, which could be powered by a small battery, kicks in only when the guitar is amplified. The piezoelectric plates vibrate, damping down the most problematic vibrational modes of the guitar body, as well as altering the wave shape of these modes to reduce their coupling to the pick-up.

This active control system allows the guitar to be amplified to a level that is 7 decibels louder before feedback sets in. In a crowded pub, that could mean the difference between being heard and not. **Philip Ball**



AP

Gene regulation

RNA switches

Cell **113,** 577–586 (2003)

Gene expression is commonly regulated by interactions between proteins and genes. Proteins can, for example, sense the levels of cellular metabolites and bind to the genes that regulate these levels, turning the production of the encoded enzymes on or off. But some metabolites can bind directly to messenger RNAs — the intermediate step between genes and enzymes. The RNA regions to which the metabolites bind are called riboswitches, and they too can control enzyme production.

Maumita Mandal and colleagues have now identified a new class of bacterial riboswitches that selectively recognize guanine, a purine base found in DNA and RNA. This type of riboswitch is encoded in at least five locations in the bacterial genome. These regions represent 17 genes that are involved in purine synthesis and transport. This and other research suggests that riboswitches contribute to gene regulation in bacteria, and help to regulate metabolism in living systems.

Some believe that riboswitches are derivatives of an ancient genetic control system that monitored metabolic and environmental signals long before proteins evolved. Guanine itself may be a relic of this primordial RNA world. So the identification of guanine as a riboswitch trigger is consistent with the authors' theory that metabolite-sensing RNAs might have originated very early in evolution. **Helen R. Pilcher**

Particle physics

Brief lives

Phys. Rev. Lett. **90,** 203402 (2003)

The orthopositronium-lifetime puzzle is solved. So say R. S. Vallery and colleagues, who have measured how long this unstable particle survives, with unprecedented accuracy.

Orthopositronium is made of an electron and an anti-electron, or 'positron', bound together in matching spin states. Matter and antimatter annihilate each other, and so after a brief period of time — mere nanoseconds — the electron and positron disappear in a puff of γ-rays.

How long orthopositronium lives is predicted by quantum electrodynamics (QED), but previous measurements of its lifetime differed from the theoretical value by at least 0.1%. That might not sound like much. But QED is the most thoroughly tested theory in physics, and agreement between theory and experiment to more than a dozen decimal places is typical. In this context, 0.1% is not good enough.

To create orthopositronium, Vallery *et al.* fired a beam of positrons into a special nanoporous silica film, held in a vacuum cavity to protect against environmental influences. Their lifetime measurement is within 0.018% of the predicted value, and with more data should soon bring it to within 0.010%. **Alison Wright**

Parasitology

In the bag

Proc. Natl Acad. Sci. USA
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An insect parasite evades detection by cloaking itself in its host's skin. The host is fooled into thinking that the parasite is part of its own body, leaving the intruder to devour its meal in peace.

Jeyaraney Kathirithamby and colleagues have found this macabre camouflage in a group of insects called twisted-wing parasites, which belong to the order Strepsiptera. A strepsipteran larva punches a hole through its host's tough outer skeleton. Then it pushes into the tissue layer beneath, creating a pocket that closes behind it to form a bag, inside which the larva feeds and develops. The grub is at first less than 0.1 mm long, but it grows to fill its host's body. Females spend their entire lives here, pumping out new larvae. In mating, males fly around looking for the small part of a female's body that protrudes from her host's abdomen.

Cloaking themselves in host skin might be why the 596 species of Strepsiptera can infect a wide variety of hosts. For example, in one group, males target ants, but females develop inside grasshoppers. Most parasites are much more specialized. **John Whitfield**