

ON THE RECORD

“We are Earth scientists. We are not part of a vast conspiracy to perpetrate a hoax, nor are we crowd-following herd animals.”

Oceanographer David Archer of the University of Chicago refutes conservative US columnist Robert Novak's claim that scientists are hyping global warming.

“To sell the Yucca Mountain project to our children through the use of a cartoon character is an irresponsible and desperate act.”

Congressman Jon Porter (Republican, Nevada) calls on the government to dismiss ‘Yucca Mountain Johnny’, a cartoon mascot promoting the plan for a nuclear-waste dump in Nevada.

Sources: *RealClimate.org*, *Las Vegas Review-Journal*

SCORECARD

Artificial sweetener
Researchers at the US National Cancer Institute find that aspartame, a known carcinogen in rats, does not increase the risk of cancer in people.

Christ's buoyancy
An oceanographer at the University of Florida suggests that Jesus managed to walk on water because the Sea of Galilee was frozen.

NUMBER CRUNCH

Health workers are one of the most important factors affecting infant mortality, according to figures from the World Health Organization.

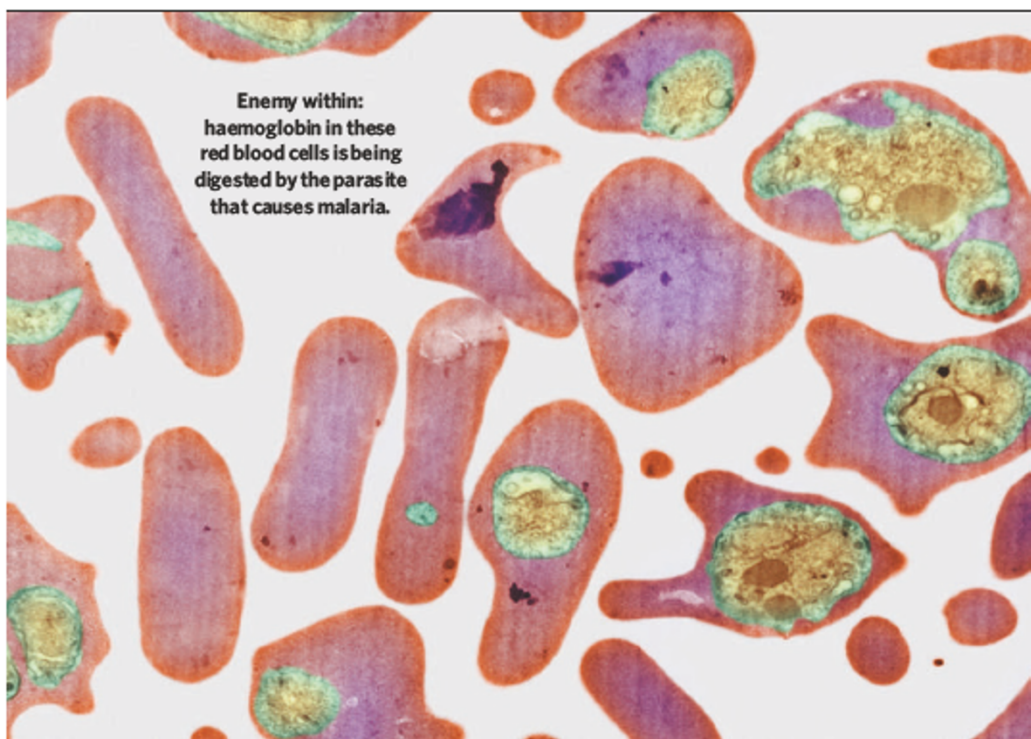
0.28 is the number of physicians per 1,000 citizens in Nigeria.

19.7% is the chance that a Nigerian child will die before the age of five.

2.3 is the number of physicians per 1,000 citizens in Britain.

0.6% is the chance that a British child will die before the age of five.

Source: *WHO The World Health Report 2006*.



Malaria breakthrough raises spectre of drug resistance

The ‘miracle’ malaria drug artemisinin is a step closer to being produced plentifully and cheaply. Synthetic chemists have put plant genes into yeast to make it churn out large amounts of the precursor artemisinic acid. The discovery brings hope to areas such as sub-Saharan Africa, where those who need the drug most can ill afford it.

Researchers have praised the work and are excited that it may soon be possible to get artemisinin to the 300 million to 500 million people infected with malaria each year. But many are also concerned that this will trigger the emergence of resistance to the drug, thus destroying our most effective weapon against the disease.

Artemisinin is extracted from the leaves of *Artemisia annua*, or sweet wormwood, and has been used for more than 2,000 years by the Chinese as a herbal medicine called *qinghaosu*. The parasite that causes malaria has become at least partly resistant to every other treatment tried so far. Artemisinin is still effective, but it is costly and scarce.

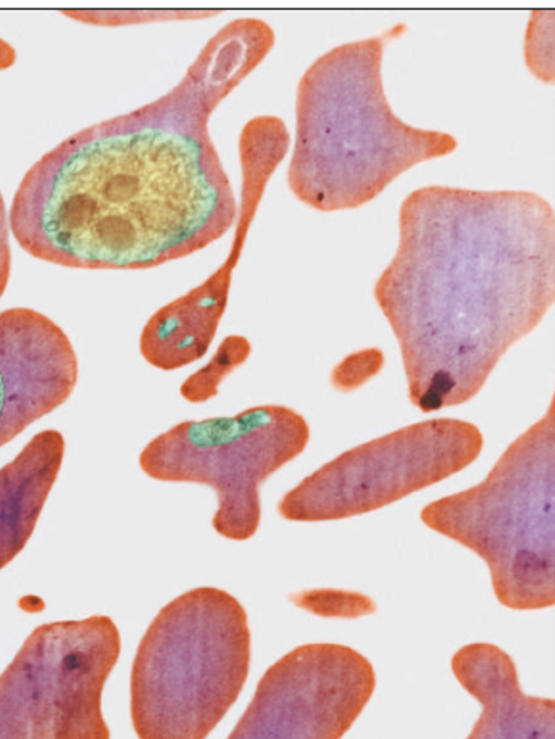
“This drug is such an important thing for malaria,” says David Warhurst, an expert in

protozoan chemotherapy at the London School of Hygiene and Tropical Medicine. “It is the basis of all the new treatments that are going ahead.”

Jay Keasling at the University of California, Berkeley, and his colleagues tweaked a pathway and used three plant genes to persuade yeast (*Saccharomyces cerevisiae*) to produce and secrete large amounts of artemisinic acid, which is just a few chemical steps away from artemisinin. The researchers, whose paper starts on page 940 of this issue, hope that once the process is scaled up it will allow artemisinin to be made industrially. A course of artemisinin currently costs US\$2.40; cutting the cost to 10% of that should make it affordable for most sufferers.

Work towards industrial production has already been started by the non-profit pharmaceutical company Institute for OneWorld Health, based in San Francisco, California, in partnership with Amyris Biotechnologies and with the help of \$42.6 million from the Bill and Melinda Gates Foundation. “We’re focusing on producing a known pharmaceutical so that it reaches the people who need it most,” says Jack Newman, co-

“Artemisinin is the basis of all the new treatments that are going ahead.”



LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE/SPFL

founder of Amyris, based in Emeryville, California. But he is hopeful that the work will lead to industrial production of other plant-based drugs in a similar way.

The prospect of plentiful artemisinin is encouraging, but if the parasite becomes resistant, increased drug production will be worthless. "The loss of artemisinin could spell disaster for malaria sufferers," warns Chris Hentschel, head of the non-profit Medicines for Malaria Venture, based in Geneva.

There is no consensus on how likely resistance is, but some think the risk is high. Artemisinin works by disabling a calcium pump in the malaria parasite, and last year researchers reported that the mutation of a single amino acid was sufficient to confer resistance (A.-C. Uhleman *et al. Nature Struct. Mol. Biol.* 12, 628–629; 2005). When another team gave low doses of artemisinin to parasites taken from patients in French Guiana, some mutated, becoming highly resistant to the drug (R. Jambou *et al. Lancet* 366, 1960–1963; 2005).

The main way to stop resistance arising is to always give the drug in combination with others. In January, the World Health Organization (WHO) made a plea to pharmaceutical companies to end the marketing and sale of single-drug artemisinin medicines. But as other malaria drugs grow increasingly ineffective, many feel that resistance to artemisinin is inevitable.

"We hope it won't happen," says Warhurst. "But looking for new drugs is important." ■

Narelle Towie

Two telescopes join hunt for ET

The search for extraterrestrial intelligence (SETI) will ramp up in coming months as two dedicated facilities come online — one to look, the other to listen.

A team led by physicist Paul Horowitz of Harvard University will begin scanning the skies this week for flashes of light from alien civilizations. Most SETI searches have been at radio wavelengths, but theorists surmise that extraterrestrials might also shine laser beacons visible from a few thousand light years away.

This will be the first optical SETI project to scan the entire sky, or at least all that can be seen from the Oak Ridge Observatory in Harvard, Massachusetts, where a 180-centimetre telescope has been installed. The \$50,000 instrument was paid for by the Planetary Society, a grassroots group of space enthusiasts, and will record flashes briefer than a nanosecond. No known natural process causes such flashes. The all-sky search requires 200 nights of clear viewing, and is expected to take several years.

Meanwhile, at the Hat Creek Radio Observatory in northern California, the first ten dishes of the privately funded Allen Telescope Array are due to be demonstrated later this month, says Peter Backus, observing programmes manager at the SETI Institute in Mountain View, California. With money from Microsoft alumni Paul Allen and Nathan Myhrvold, the institute, working with Berkeley, is building an array of 350 six-metre radio dishes dedicated to SETI. The entire array will eavesdrop on nearly a million stars for hints of intelligence.

Managers hope to have 42 antennas working by July. The first scan will be of a narrow swathe of the Milky Way's centre. ■
Tony Reichhardt

LGARY



See the future: how the Allen array might look.