



## Australian science stories

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### **Aussie of the Year prevents cancer**

University of Queensland (UQ)'s Professor Ian Frazer and Dr Jian Zhou (now deceased) discovered a vaccine to tackle prevent cervical cancer, which kills approximately 270,000 women each year, worldwide.

The vaccine is now available in Australia and the US.

### **Salmonella alert for home fish tanks**

Aquaria may harbour dangerous bacteria responsible for causing gastroenteritis in children and adults, according to NSW Department of Primary Industries (DPI) researchers. Although rare, in some cases the gastroenteritis was severe enough to cause hospitalisation.

A study led by DPI microbiologists Steven Djordjevic and Renee Levings found that ornamental fish and their tanks are a reservoir for a type of Salmonella bacteria which is resistant to seven antibiotics.

### **Restoring agriculture to Aceh after the tsunami**

A team from the NSW Department of Primary Industries working in Aceh, Indonesia, has found the success or failure of crops affected by last December's tsunami is directly related to the length of time fields were immersed in salt water. They are testing soil to 1 m so local farmers can plan where to plant.

### **Plants an untapped resource for stem cell research:**

Plants share many similar stem cell traits to humans and can be used to unlock secrets useful for human stem cell research, according to University of Melbourne biology experts.

### **Marathon jellyfish**

Research conducted in waters off Weipa has taken scientists a step closer to understanding the secret lives of deadly box jellyfish.

"Unlike most jellyfish, box jellies are able to move independent of water currents and wave action," Mr Gordon said. "But until now we've had little information on where they go within a day."

### **Aussies revolutionise rocket science**

A UQ team was the first in the world to successfully launch a scramjet (supersonic combustion jet) in 2002. Since then the "Hyshot" team at UQ has held 3 more experimental launches in the Australian desert, in conjunction with national and international partners.

### **We know why men are from Mars & women from Venus**

Scientists from UQ's Institute for Molecular Bioscience led a team that found why males produce sperm and females produce eggs – answering one of the great questions of biology.

### **Brain connects left and right**

UQ's Queensland Brain Institute-led team has identified a molecule that plays a key role in establishing the major nerve connections between each side of the adult brain.

### **Scientist junks DNA orthodoxy**

Professor John Mattick from UQ is challenging the dogma of so-called "junk DNA". He says it actually constitutes a hidden regulatory system that directs our development, and explains why we are so much more complex than worms, which have almost as many genes.

### **Coral research unlocks threats of global warming**

UQ's Professor Ove Hoegh-Guldberg is a world leader in coral reef research, including on threats to the world's most spectacular reefs from global warming. Ove heads a UQ research station on a Great Barrier Reef island.

### **Deciphering whale love songs**

UQ's Dr Mike Noad has spent years eavesdropping on and recording the haunting songs of humpback whales. He believes they are the soundtrack for a fascinating whale courting ritual.

### **Crocodiles' prehistoric secrets unearthed**

Dr Steve Salisbury of UQ led a team that described the oldest ancestors of today's crocodiles, alligators and gharials.

### **Secrets of the Ice-Age cave – how did the aborigines survive?**

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Animal bones from the Kitikina Cave on the Franklin River, Tasmania, may hold the secret to the survival of Australia's Tasmanian Aborigines during the last Great Ice Age 20,000 years ago.

La Trobe University post-doctoral archaeology researcher Jillian Garvey is analysing animal bones and other material excavated from the cave to find out how human beings lived there at the height of the last Ice Age.

### **Who killed Australia's giant marsupials?**

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And here's a new Ice Age proposition, based on field excavations and expert archaeological dating of material found in a set of dunes at Lake Menindee, on the Darling River in NSW.

This evidence suggests it may not have been prehistoric humans responsible for the extinction of Australia's giant marsupials 50,000 years ago, but that ageless culprit, the weather.

### **Bad news for body-builders - the myth about creatine**

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Scientists from the Muscle Cell Research Group at La Trobe's Department of Zoology discovered recently that the short-lived improvements athletes seem to achieve in muscle mass and performance after ingesting creatine is not a consequence of the substance itself – but of increased water drawn into the muscles to balance the creatine intake.

The research is likely to generate significant interest in the US where creatine is reportedly the most commonly used performance enhancing drug.

### **State-of-the-art spectrometer for Antarctic**

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A state of the art imaging spectrometer being developed at La Trobe will be installed at the Mawson Antarctic Base in the summer of 2006-07 to provide better data about winds and temperatures 100 -300 kilometres above the earth's surface.

### **Scientists develop a condom for weeds**

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Australian scientists are working on a world-first method for achieving contraception in plants.

### **'Killing us softly' – the price of weeds**

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The cost to Australia's economy from weeds is an estimated \$4 billion annually and the cost in the degradation of our native bushland environment is inestimable.

Of the more than 28 000 plant species introduced into Australia, over 2 500 have become naturalised. Of those species 'gone bush' in recent decades, 65% came from urban gardens and parks.

### **Artificial breeding for sharks - action taken to save grey nurse shark**

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NSW Government researchers have helped develop an artificial shark uterus to help save the grey nurse. It suffers from a condition known as intra-uterine cannibalism, which basically means that when the pups hatch out of their eggs, they eat each other while still inside the mother's uterus.

### **Virtual sheep management a reality**

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Farmers can manage sheep from an office hundreds of kilometres from the flock as a result of on-farm trials of off-the-shelf technology. The NSW Department of Primary Industries and the Australian Sheep Industry CRC (Sheep CRC) said e-sheep® will give the industry the power to boost production and cut costs through more efficient flock management.

### **Beef industry to save half a million tonnes of greenhouse gas emissions**

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The Australian beef herd is on track to produce about 3% or half a million tonnes less methane over the next 25 years, according to the NSW Department of Primary Industries (DPI). DPI Livestock researcher Andrew Alford says the reduction achieved in individual herds in this period could be as high as 16%, if individual cattle producers make a concerted effort to breed cattle with improved feed efficiency.

### **New technology targets pesticide-resistant insects**

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Australian and UK scientists have developed a technique to effectively control the 'super pests' that are highly resistant to pesticides used on important food and fibre crops worldwide.

The technique, patented by the NSW Department of Primary Industries and Rothamsted Research (UK), has proved effective against key insect pests that have evolved resistance to pesticides used in many agricultural industries, including horticulture and field crops.

### **Koala genome virus**

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University of Queensland researchers have made a startling discovery that may explain why the koala is susceptible to certain infections and cancers.

Researchers found the koala genome is currently being invaded by a virus called koala retrovirus (KoRV). Their findings were published recently in Nature.

### **Australian wins Fields Medal**

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Terry Tao has made spectacular breakthroughs in an extraordinarily wide variety of very difficult problems. He was presented with the Fields Medal at the recent International Congress of Mathematicians.



## More Australian science stories

### Good chrome, bad chrome – what happens down below? Melbourne/Hamburg

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A team of Australian and German scientists is investigating how to clean up chromium in the soil – it's widely used in chrome plating, wood preservation, and leather tanning.

### Antifreeze grass

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Victorian scientists have discovered antifreeze genes in a unique grass from Antarctica. The findings have major implications for improving frost tolerance in crop and pasture species that underpin the world's agriculture industries.

### Mistletoe: bad for gum trees, good for animals (Charles Sturt University)

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A twenty year experiment has started, to determine the impact of parasitic mistletoe on biodiversity.

### Stem cell hubs in north and south links Victoria and California

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The Melbourne-based Australian Stem Cell Centre and Monash University has forged a historic agreement with the University of California San Diego (UCSD) in what is a major commitment towards stem cell research in the world.

### Tender lamb 'meating' consumer needs

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Australia's iconic lamb roast could soon be more tender thanks to new research being undertaken by Victorian scientists. They've identified 80 structural muscle proteins that influence meat tenderness and lamb eating quality.

### Biosecurity, pests and disease links Manitoba and Melbourne

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Victorian scientists are to collaborate with their Canadian counterparts in biosecurity research, diagnostics, and pest and disease management.

### Wallabies: our disappearing Y chromosome, premature babies and milk

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Australia and the US National Institutes of Health are collaborating in a multi-million dollar effort to sequence Skippy's genome.

They've chosen the Tammar wallaby to represent kangaroo-kind. The Tammar wallaby is a small kangaroo which can do some clever things that humans can't. For example:

- A one day old joey (baby wallaby) weighs less than half a gram. It's roughly the equivalent of a 40 day old human embryo. But even with immature lungs it can breathe unassisted.
- The baby's development is driven by its mother's milk. Each teat in the pouch can produce a different formula. If a joey gets the wrong milk it dies or grows up deformed. So dairy farmers are supporting research into wallaby, seal and echidna milk to see what they can learn about bioactive compounds in dairy milk.
- Researchers have also discovered a novel antimicrobial protein in wallaby milk.

### Hay fever relief

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Relief may be close for the more than two million Australians who suffer from seasonal allergies to the pollen of perennial ryegrass.

In an innovative use of biotechnology, a new ryegrass with significantly reduced levels of pollen allergens that cause the sneezing and itchy eyes of hay fever has been developed by Melbourne researchers.

### What is climate change doing to Australian wildlife?

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Melbourne researchers are using plants and animals to measure climate change. Some of the reported changes are:

1. The genetic make-up of the *Drosophila* (small fly) has changed. The change is equivalent to a latitude shift of four degrees.

2. Pairings of the Sleepy Lizard are occurring earlier due to warmer, drier winters.

3. The distribution of the Greyheaded and Black Flying Foxes has shifted polewards.

4. Seven species of birds are migrating to the Snowy Mountains at least one month earlier than normal.

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### **New cosmic object found**

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16 February 2006

A team from the UK, USA, Australia, Italy and Canada have found a new kind of cosmic object using the Parkes telescope.

[www.atnf.csiro.au/news/press/rrats.html](http://www.atnf.csiro.au/news/press/rrats.html)

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### **Cheap Aussie telescope captures world's biggest solar flare**

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16 September 2005

Australian scientists using a radio telescope kit costing just over A \$200, have managed to accurately measure the size of the largest X-ray flare ever seen from our Sun - something that a sensitive US satellite was unable to do.

[www.csiro.au/csiro/content/standard/psfg,..html](http://www.csiro.au/csiro/content/standard/psfg,..html)

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### **Star near the Southern Cross is 'ringing**

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22 December 2005

Australian and European astronomers used telescopes in Australia and Chile as a 'stellar stethoscope' to 'listen' to a star near the Southern Cross that is ringing like a bell.

[www.aao.gov.au/press/cen\\_a\\_bedding\\_221205.html](http://www.aao.gov.au/press/cen_a_bedding_221205.html)

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### **Australian bioactives in milk**

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The Australian dairy industry is turning the good things in milk into new, high value bioactive products. Some bioactives already on the market are:

- Lactoferrin, a minor component of the whey protein in milk, boosts immune capacity in the digestive tract – lactoferrin is included in baby foods and some yoghurts.
- Travelan - colostrum product which improves strength and endurance in athletes and improves immune strength against stomach ailments.
- Recaldent - casein phosphopeptide – used in chewing gum and dental products world wide to repair decayed teeth enamel.

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### **Malaria**

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A drug that costs just 12 cents a dose may provide a dramatic reduction in the number of deaths due to malaria.

Researchers led by Dr Louis Schofield at Melbourne's Walter and Eliza Hall Institute of Medical Research (WEHI) are about to start testing long-established anti-malarial drug Fansidar as an immune system protector. It's just one of several approaches to combating the disease, which infects 10 percent of the world's population and kills 2-3 million people a year, being investigated by Melbourne researchers.

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### **Diabetes**

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A weekly nasal insulin spray is being tested by Melbourne scientists as a weapon to prevent the development of type 1 diabetes.

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### **VivaGel**

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A Melbourne-based company, Starpharma, has developed a unique microbicidal gel that is being tested as a preventative against HIV and genital herpes in women.

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### **Deadly fungus under investigation**

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A fungus that is infectious at the human body temperature of 37 °C but harmless at 25°C is being investigated by a Howard Hughes Biomedical Research Scholar at the University of Melbourne.

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### **Aussies explain why dying star sent mixed messages**

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4 May 2006

Australian astronomers have explained why a dying star sent out mixed signals about its identity.

[www.aao.gov.au/press/sn2001ig\\_040506.html](http://www.aao.gov.au/press/sn2001ig_040506.html)

The following stories covered in a recent Nature Biotechnology supplement on Australasian biotechnology.

Details at:

<http://www.nature.com/nbt/advertorial/australia/2006/index.html>

- Deadly cone shells fight pain
- More deadly reptiles
- Transgenic quolls?
- Dipstick test for clean water
- Vaccine for deadly new diseases
- Bird-scaring grasses
- Omega 3 from kiwifruit
- Better cartilage repair
- The basmati gene
- Leaner sheep
- Better grass, less farts
- Blackcurrants improve memory loss
- Healthier wheat
- City turns waste to compost
- In the war against pollutants, know thine allies
- New ways to fight sexually transmitted diseases
- Reducing brain injury
- Arthritis cured... in mice
- A plastic that melts in your mouth...and ear, and spine, and brain
- Pigs help treat Huntington's disease and deafness.

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