



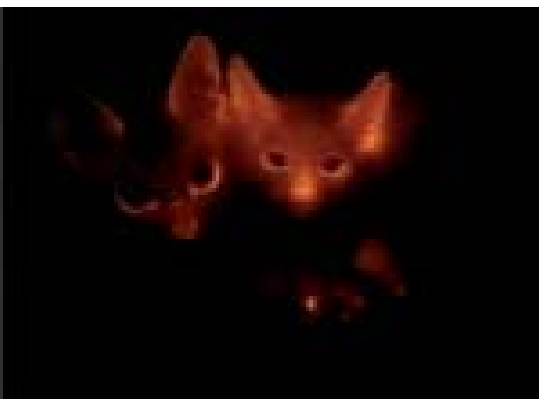
In this issue • combating salinity • genetic benefits • bioremediation - the enormous potential



Pigs are not just good eating

Scientists at Living Cell Technologies (LCT) in New Zealand are busy preparing Rocky the pig for a porcine islet transplantation of his pancreas tissue into eight patients with type 1 diabetes at Auckland's Middlemore Hospital. LCT hope Rocky's islets will make insulin in each of the recipients.

It will be the second such trial for LCT, which is conducting another at Moscow's Sklifosovsky Institute. The results of this trial could have a significant effect on the xenotransplantation debate in Australia, as the xenotransplantation moratorium is due to be re-considered in 2009.



Welcome to the 5th edition of bio bits, an informal biotech newsletter designed to let you know about some of the new Biotech projects taking place in the Northern Territory, Australia and around the world.

United Nations commission the Northern Territory Government

The department was recently commissioned by the United Nations to provide input into a paper for an international publication called the *Convention of Biological Diversity (CBD) Business.2010* newsletter. The paper is entitled *Biodiscovery in Australia's Northern Territory: Attracting Research and Business Investment*, and was published in the January issue of the *CBD Business.2010* newsletter.

This article will provide international exposure to the opportunities present in the Territory within this exciting and cutting edge field of biotechnology and is available for download from the department's website - www.nt.gov.au/business/services.

Northern Territory Government supports massive expansion

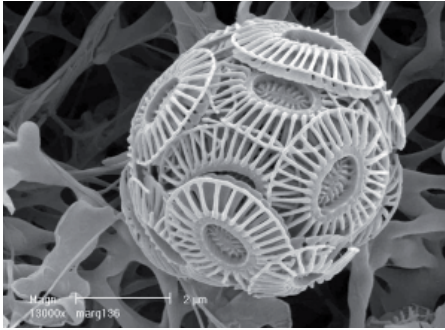
The Northern Territory Government has recently given Menzies School of Health Research a \$5.5 million building grant. When combined with \$5 million of federal funding also granted to the school, Menzies can now expand its research facilities at its Royal Darwin Hospital site and could double in size.

Biotechnology news around the world

Animals that glow: In December 2007, scientists in South Korea announced they had cloned cats using genetically manipulated skin cells from the mother cat which expressed fluorescent proteins. The result was kittens that glow in the dark when exposed to ultraviolet beams.

In January 2008, Chinese scientists took the technology one step further and announced a similarly cloned and genetically modified pig had given birth to piglets, two of which contained the glow-in-the-dark proteins expressed from the altered genes.

The birth of these piglets proves that the original cloned pig is fertile and able to pass on modified genes to its offspring. The ability to manipulate genes in a cloned animal such as a cat or pig is significant and could lead to the development of many treatments for genetic diseases.



DNA for dummies: part 4

Your DNA contains four different base sugars called nucleotides. Sequences of three nucleotides can create codes which the cell can interpret as an amino acid, or a start or stop signal. A DNA sequence can then tell the cell which amino acids to build into a chain, in which order to put them and how many in order to create a protein.

A sequence of DNA which contains a start signal, a stop signal and the code for a functional protein is known as a gene. Only 3 per cent of the DNA within each human cell has this function, the function of most of the rest termed “junk” has still to be deciphered....

Bioremediation: natural mechanisms for self-renewal

Bioremediation is the use of living organisms such as bacteria, fungi, green plants or their enzymes to clean up contaminated soil or water.

Although naturally occurring bioremediation has been used for centuries, interest in microbial biodegradation of pollutants has grown in recent years as sustainable methods for cleaning contaminated environments have grown more and more popular.

The potential for microbial bioremediation to tackle a huge range of different contamination problems is enormous. It's estimated that only 0.5 per cent of two to three billion microbial species have been identified and microbes themselves comprise ~ 60 per cent of the world's biomass and generate at least half of the oxygen we breathe.

Bio jargon: what it all means...

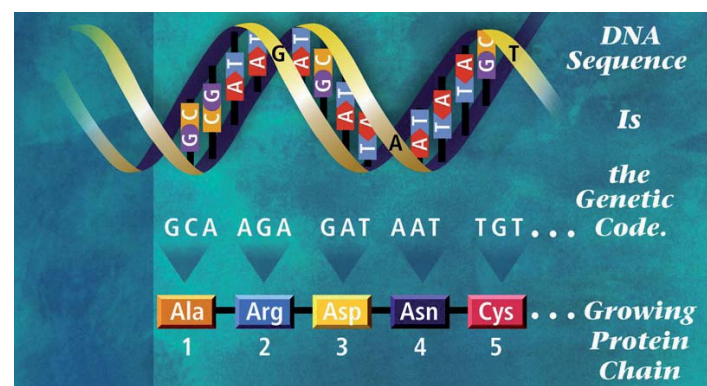
Enzymes: are proteins that catalyze (i.e. accelerate) chemical reactions. In enzymatic reactions, the molecules at the beginning of the process are called substrates, which the enzyme then converts into different molecules, the products. Almost all processes in a biological cell need enzymes in order to occur at significant rates.

Xenotransplantation: is the transplantation of living cells, tissues or organs from one species to another such as from pigs to humans. The biggest challenge of this is immune rejection. Nearly all mammalian cells have markers which enable another animals immune system to recognise them as foreign. Some companies are currently developing animals that produce human markers to try and lessen the chance of rejection.

Other biotechnology news from around Australia

Salt of the earth: changes in our climate are likely to increase salinity within the soils of our wheat growing regions. Durum wheat varieties which generally require less fertiliser than bread and barley varieties and which have the potential for bigger profits are less tolerant of high sodium levels.

Researchers investigating this problem at the CSIRO Plant Industry in Canberra have identified a sodium-tolerance gene in English moss that can promise to provide durum growers with genetic insurance against salinity, and which could see durum wheat plantings expand into mildly salinised regions of southern NSW, Victoria, SA and WA.



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Look out for our next edition of *bio bits* coming soon!

- DNA for Dummies: the next installment
- More bio news from around Australia and the world