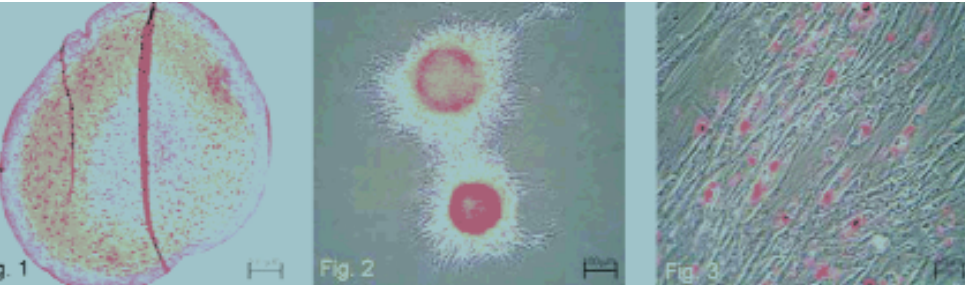


### Canine Myocardinal Repair

Researchers recently conducted a study where stem cells in the hearts of dogs were activated to repair tissue damaged by a heart attack. The team were able to use two specific growth factors to activate the cells and make them move from the area of the surviving myocardium to the area of the infarct and regenerate locally. The loss of function was substituted by a recovery of function which correlated completely with the magnitude of myocardial regeneration.

### Study sheds light on tendon’s inability to adequately repair.

A HBLB-FUNDED collaborative project between the University of Liverpool, the Wellcome Trust Centre for Cell-Matrix Research and the Royal Veterinary College has investigated to what extent intrinsic tendon progenitor cells contribute to the repair process, or whether extrinsic cells from surrounding tissues or the bone marrow may be required to effect repair. The study showed that equine tendons in vitro contain only a weak stem cell-like progenitor population whereas it is possible to differentiate bone marrow derived equine MSCs into chondrogenic, osteogenic and adipogenic lineages. Histological analyses of bone marrow derived MSC cultures showed positive staining for chondrocytic expression (Fig.1), calcium (Fig.2) and staining showing a positive potential to undergo adipogenic differentiation (Fig.3). These data were confirmed by real-time PCR and biochemical analysis of relevant differentiation. The study concluded that bone marrow derived equine MSCs have a considerably better multilineage differentiation potential than equine tenocytes. The failure of equine tendon injuries to repair adequately may therefore be due to a lack of intrinsic progenitor cells which would be necessary to effect tissue healing.



### Equine Chondrocyte Culture

ARTICULAR CARTILAGE, like tendon, has a poor reparative ability and tissue-engineering strategies may well be able to provide methods to assist in cartilage repair in debilitating diseases such as osteoarthritis. Fundamental to such strategies is the ability to expand cell populations that are then capable of differentiating into a population with a chondrogenic phenotype. A Wellcome Trust-funded project, led by Professor Pete Clegg, has investigated whether chondrocytes from different zones have differing chondrogenic abilities, and whether such chondrogenic abilities could be positively affected by pre-treatment or hypoxic culture. At the 2006 Orthopaedic Research Society Annual Meeting in Chicago Professor Clegg presented his results and concluded that, for tissue engineering purposes, the zonal source of chondrocytes appears not to be important, especially if cells are expanded in media supplemented with FGF-2, and the cells are cultured under hypoxic conditions during chondrogenesis.



### Experimental Applications of Stem Cells

Professor Smith has recently utilised stem cells in the treatment of equine meniscal tears based on the publication of Murphy et al., 2003. This experimental procedure has also been conducted in Australia at the Werribee Equine Centre. If you have an experimental procedure that may benefit from stem cell therapy please do not hesitate to contact Vet Biotechnology to discuss your options.

< Injection of stem cells into lesion via ultrasound

### Research Update

Vet Biotechnology is continuing to fund research into other applications for stem cells such as bone, cartilage and muscle conditions. The future of this innovative technology is untapped and we will continue with development of future treatments.

In addition to the equine stem cell therapies, we are continuing to increase the suite of products with the ongoing “**Rattles**” Project. “Rattles” (*Rhodococcus equi*) still remains of major concern to the breeding industry with a large number of foals suffering the effects, a problem exacerbated by the current drought conditions. The ultimate aim of the project is the production of a diagnostic test and vaccine for the condition.

**Equine Gastric Ulcer Syndrome (EGUS)** is believed to effect up to 60-90% of horses in training. Vet Biotechnology is currently awaiting laboratory based Phase 1 trials into a “breath test” aimed at detection of gastric ulcers at the University of Adelaide’s Roseworthy Campus under the care of Veterinary Research Synergies. The eagerly awaited results could pave the way for Phase 2 trials in Australian stables. There is also the exciting potential that the breath test technology could be adapted for a broader diagnostic product range.

**References:**  
Murphy et al., “Stem Cell Therapy in a Caprine Model of Osteoarthritis”, Arthritis & Rheumatism, Vol. 48, No. 12, December 2003, pp 3464–3474.

The stem cell technology is protected by the international Patent Application PCT/GB2003/003894 titled “Pharmaceutical kits comprising mesenchymal stem cells”

The “Rattles” technology is protected by the international Patent Application PCT/AU01/00478 titled “Antigenic Peptide Fragments of VapA Protein and Uses Thereof.”

The Breath Test Technology is protected by the International patent Application PCT/AU02/01666 titled “Breath Test”.

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### Company Update

A message from the General Manager of Vet Biotechnology, Mr David Bridgland.

It is my pleasure to welcome you to the second edition **Vet News**.

Projects undertaken by the company continue to develop and I was thrilled to be at Cheltenham Park in Adelaide to see our first Australian stem cell winner, *Pinions*. The use of stem cells in equine tendon and ligament repair is the first company project to reach commercialisation.

*Pinions* has been followed by another seven individual winners including High Cee in the Group 2 Ajax Stakes at the 2007 Sydney Autumn Racing Carnival. The first Australian data of Vet Biotechnology’s stem cell services to be published appears in this edition of **Vet News**.

In the next logical step forward for this business unit, the 2007 Southern Hemisphere foaling season heralds the introduction of our umbilical cord stem cell storage service “Stembank”. This technology was validated during the 2006 season in conjunction with Arrowfield Stud, Coolmore Stud, Widden Stud in NSW, Eliza Park Stud and Swettenham Stud in Victoria, Eureka Thoroughbreds in Queensland and South Australia’s own Lindsay Park Stud. These stem cells can be stored for the life of the horse and will be used in Vet Biotechnology’s tendon and ligament therapies plus lie in readiness for a suite of other therapies as they are developed in the future.

It is an amazing phenomenon that these cells have so much potential, and their possible uses in bone, cartilage and muscle are under investigation right now.

Our aim is to provide you with news on our success stories along with factual information regarding our company’s progress and the industry as a whole. At all times we welcome your feedback.



**David Bridgland**  
General Manager

## Vet Biotechnology

ACN 105 577 017

### Introducing Jeremy Gask New Project Manager

Vet Biotechnology recently announced the appointment of former trainer Jeremy Gask as Project Manager.

Jeremy has been a consistent Top 5 Trainer in South Australia over the past 5 years before looking for a change of direction. He is also in the process of studying Science at Flinders University on a part time basis and joins the company at an exciting time.

Jeremy provides a valuable link to the racing industry through his background as a trainer, and a clear understanding of the challenges with regard to horse injury and recovery.

### Stem Cell Therapy Scores First Australian Racecourse Success



*Pinions* Winning at Cheltenham photograph courtesy of Jenny Barnes Photography

horse’s own bone marrow as a source of stem cells that are purified and expanded into vastly increased numbers in the laboratory. A veterinarian accredited by Vet Biotechnology implanted these cells directly into the injury site.

Lindsay Park’s Head Veterinarian Dr Campbell Baker said after the race “Considering the severity of the tendon injury in this case where the lesion extended across 75% of the tendon this is an outstanding result for the new therapy”.

*PINIONS* was the first Australian winner for the revolutionary new treatment and follows the successful return to racing of horses treated in Europe and the UK.

Vet Biotechnology General Manager David Bridgland commented, “The European results have shown that the therapy increases the chance of a horse returning to full work and competition. This Australian result certainly supports the effectiveness of the treatment and over the next few months we expect further ratification as more horses return to the racetrack”

Vet Biotechnology received valuable publicity with stories printed in The Age, Adelaide Advertiser, Fox Sports, Breeding and Racing, Racenet, Sportsman, Herald Sun, The Virtual Formguide and the Winning Post.

The race won by *PINIONS* carried total prize money of \$20,000 or \$13,400 to the winning connections.

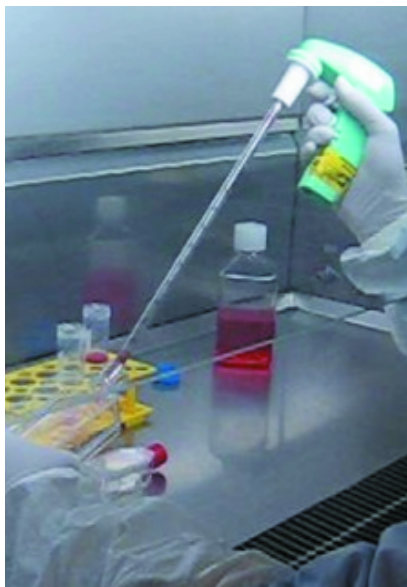




## A group of horses and jockeys are captured in a dynamic racing scene on a lush green track. The lead horse, a dark brown, is galloping towards the viewer, its jockey wearing a black and white checkered helmet and a yellow long-sleeved shirt. A green saddle cloth with the number '3' is visible. To the right, another horse is partially visible, ridden by a jockey in a red helmet and orange shirt. In the background, other horses and jockeys are visible, including one in a light blue helmet. The background is slightly blurred, showing a white fence and some greenery.

24 March 2007 provided Vet Biotechnology with its first post stem cell treated Group win when the Bart Cummings trained HIGH CEE saluted in the AJAX Stakes at Randwick. One of the most respected trainers in Australasia, "Bart" has been a great supporter of stem cell treatment through his veterinarian Dr Chris O'Sullivan at the Randwick Equine Centre and we congratulate the connections on a terrific result. We will be following his future with interest.

July 2007 sees the introduction of the “Stembank” equine umbilical cord service.



Information evenings for thoroughbred breeders detailing the launch of Stembank cord service will be held **immediately following the Veterinarian Accreditation Courses on the dates published.** (see below right for dates).

The adult Stem Cells to be stored are the body's repair mechanism for damaged or diseased tissues and have the ability to form tendon, ligament, bone, muscle and cartilage. A great source of these cells is the umbilical cord that can be collected painlessly following the normal foaling process. Following isolation and expansion, these cells can be stored for the life of the horse and be used in the to treat future injury or illness.

Collection and storage of Stem Cells from the umbilical cord was validated in conjunction with Arrowfield, Coolmore, Widden, Eureka, Eliza Park, Swettenham and Lindsay Park Studs in the 2006 foaling season with outstanding results.

This new process negates the need for a surgical procedure on the mature horse and allows the Stem Cells to be stored for future use representing a significant step forward for the breeding industry.

**"Selling a yearling with nature's own puncture kit will be a fantastic marketing advantage for breeders and a great incentive for buyers".**  
Mike Becker, President Thoroughbred Breeders Australia.

Results of the stem cell treatments are highly promising worldwide showing greater recovery and resilience rates than other therapies. The number of treatments is accelerating and we are eagerly await the return of further follow-up groups to the racetrack. Statistically, as the number of horses returning to the racetrack increases, the accuracy of the follow-up data will also increase.

The results of the first Australian treatments are nothing short of staggering with 80% of horses treated able to return to full workload following the rehabilitation. Of the first Australian follow-up group of 20 horses post rehab only one has re-injured in the stem cell treated section of tendon. Again, as the numbers returning from therapy increase re-injury rates will clarify.

Early European data reveals that 75% of NH horses have returned to the track within a year of treatment compared to the 30% that might have been anticipated to return within 18 months using traditional therapeutic protocols. In order to increase the information that can be obtained from analysis of the results VetCell has recently introduced a new sample submission form that will provide more precise detail of the extent of the injury at the time of bone marrow aspiration.

The table below gives an overview of the current statistics in Australia.

		Follow-up group			
Use	Total number treated	Number of horses post-rehab	Related re-injuries**	Return to Competition post rehab	Return to full work without re-injury post rehab *
Racing & Pacing	57	20	1	13 (65%)	16 (80%)
Others	4	1	0	n/a	1 (100%)
Total	61	21	1	13 (61.9%)	17 (80.9%)

\* Horses racing or ready to compete (eg. Trials, galloping)  
\*\* Analysis of re-injuries will be expanded in the next Newsletter

### First Australian Follow-up Group Racecourse Results at 30/04/2007

Total number of starters	Number of starts	Number of wins	Total placing	Total Prizemoney	Average Prizemoney per start
13	81	16 (s/r 5.06)	28 (s/r 2.89)	\$359,675.00	\$4,440.43

## Upcoming Stem Cell Therapy Practical Training Courses

95 veterinarians have been accredited at our two previous training courses (2005 & 2006) which is indicative of the support given by the Australian Veterinary Fraternity.

The third and final in this series of training courses (including a “refresher” option for previously trained vets) for Veterinarians will be held on the following dates:

Sydney: Tuesday June 19, 2007  
Adelaide: Friday June 29, 2007

Melbourne: Thursday June 21, 2007  
Perth: Sunday July 1, 2007

(the Perth course will be held immediately preceding the 2007 Bane Fallon Memorial Lectures)

Veterinarians please note that these training courses will be the final opportunities in the foreseeable future to be accredited in tendon & ligament stem cell therapy.

Times and Venues to be advised. Please Contact Vet Biotechnology for an Enrolment Form.

Professor Roger Smith

New and exciting data on tendon tissue engineering have been recently presented at three separate international conferences, one in the UK and two in the USA. At the International Society of Ligament and Tendon, the results of a study on the use of mesenchymal stem cells in a rat model of anterior cruciate ligament reconstruction showed better tendon to bone healing with the stem cell group compared to controls. At the Orthopaedic Research Society in Chicago in March 2006, there were an increasing number of presentations evaluating mesenchymal stem cells for therapeutic use. Reflecting the large amount of work being done in this area, there were two excellent workshop sessions on 'Regenerative medicine in orthopaedic surgery' and 'Nanobiomaterials applications in orthopaedics' which reviewed the advancing technologies being used in conjunction with stem cells – in particular the use of nano-engineered fibres to help orientate cells within matrix. It is hoped that this work will gradually become applicable for augmenting the action of stem cells in cell-based clinical therapies and for increasing the number of applications. The combined Orthopaedic Research Society and American Academy of Orthopaedic Surgeons symposium focused on 'The use of stem cells in orthopaedic applications'. Three talks were given by human orthopaedic

surgeons who are involved in the early stages of clinical trials investigating the effectiveness of mesenchymal stem cells used for bone repair. In one FDA approved study of atrophic non-unions, stem cell treatment was found to be effective in all 7 cases – these cases were carefully selected to be ones that had been unresponsive to all other management. Discussion with the speaker after the session resulted in considerable surprise that we had done so much in the horse! Finally, at a special symposium held in Cambridge on 'Tendon and ligament remodelling and regeneration' an impressive group of international tendon scientists presented a summary of their work. Of most relevance to VetCell's MS-EQ service was the presentation given by Dr David Butler from Cincinnati. Dr Butler, who has performed many innovative approaches to tendon tissue engineering over the years, reviewed his in vitro and in vivo data on the effectiveness of the three commonly stated components of tissue engineering – scaffolds, growth factors, and mesenchymal stem cells. Interestingly each component resulted in improved outcomes over controls, but it was the combination of all three that resulted in a tissue almost identical functionally to normal tendon. However, ex vivo tissue engineering is still hampered by an inability to synthesise large enough grafts – certainly for the horse. It is interesting to speculate that the current VetCell technique, while providing solely a cell source, does gain benefits from the endogenous supply of the other two components – a vascularised scaffold (granulation tissue) and growth factors both from the bone marrow supernatant (in which the cells are suspended) and from the tendon itself.



### Marrow extraction