

## ATTACHMENT 1

### **ANKC's PROGRAM FOR DNA PROFILING AND GENETIC TESTING FOR HEREDITARY DISEASES**

At its May, 2004 meeting, ANKC adopted an exciting and far-reaching DNA testing initiative designed to improve the status of breeding stock by pedigree assurance and to develop a major attack on hereditary diseases across many breeds. A new registration category will be introduced so that by the year 2008 all breeding stock must have Stud Book registration, which will require:

- \* positive identification;
- \* DNA typing (profiling) to provide parentage testing;
- \* genetic status determined for hereditary disease, where specified.

Features of the program are: -

**Stage I, effective January 1, 2006: -**

- \* recommend DNA typing for
  - frequently used stud dogs and frequently used brood bitches in all breeds
  - donor sires of extended semen for AI
  - parents of multiple sire litters
- \* in conjunction with Breed Councils/Clubs, promote breed programs for DNA typing and hereditary disease testing
- \* introduce a voluntary Stud Book registration category for those animals
  - eligible for the Main Register
  - positively identified
  - DNA typed and parentage checked
  - where there is a DNA test available, cleared or given acceptable status for an hereditary disease known to be a problem in the breed
- \* subject to approvals, provide for exceptions, eg.
  - accept DNA type of current breeding stock where their parentage testing is not possible
  - accept use of current stored semen.

**Stage II, effective January 1, 2008: -**

- all parents required to be Stud Book registered for litters to be eligible for registration.

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### **Implementation of the program**

Genetic Technologies Limited (GTG), Melbourne, through its Genetic Science Services Division (GSS), has been appointed as the testing laboratory. GTG has a unique patent position and is able to offer DNA tests for parentage testing and for a range of canine hereditary diseases. The cost of GTG's genetic testing for hereditary diseases will be favourable compared to overseas testing, and as blood samples are not required for standard tests there will be a significant cost saving.

DNA collection is via a simple, non-invasive buccal swab, with a combination of trained volunteers (collectors) and veterinarians to give national coverage using skilled personnel only. DNA collection will be at shows, special collection days and in conjunction with microchipping days to minimise logistics and achieve pricing discounts. Positive identification by microchip or tattoo is required to avoid risk of error.

GTG will use internationally accepted DNA microsatellite markers for DNA typing, and genetic disease tests will be checked out and endorsed by ANKC before release. DNA typing results will be recorded at GTG where computerised parentage checking will be done, and will be noted on the registration certificate. Certificates will be issued for hereditary diseases test results. For Stud Book registered dogs, disease status will be shown on the Registration Certificate and listed on the proposed hereditary diseases test result web-site. Other results may remain confidential at the option of the owner.

### **What are the expected benefits?**

#### **(a) DNA typing**

As a pure-breed organisation, ANKC, its Member Bodies and breeders have a prime duty of care in relation to pedigree authenticity. DNA typing of breeding stock for pedigree assurance and parentage testing is valuable for:

- the sanctity of the purebred register and protection of ANKC and Member Bodies from incompetence or fraud
- ensuring breeding stock are as purported
- protection of breeders from litigation relating to false documentation
- protection of prospective puppy buyers against incompetent or rogue breeders
- enhancing the status of pure-bred dogs
- lifting the status of breeding stock by Stud Book registration, a term well known to the public, allowing responsible breeders to promote their kennels accordingly to compete better against unregistered breeders and cross-bred dogs.

Probably most errors of parentage are due to unknown accidental second matings. There have been many instances of questionable paternity over the years, mainly indicated by genetic impossibilities of coat colour or texture, eg the black Labrador puppy from two yellow parents, or the short coat from long-coated parents in various breeds. In general we do not know of the rest, including use of an alternate sire where a particular sire is over-booked for stud service. Time and DNA typing will show the extent of parentage errors.

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It is worth noting that in Australia the Greyhound Racing Association and pure-bred horse associations already have mandatory DNA typing programs for parentage testing. It is also informative to look at the relevant experience of the American Kennel Club which reported spending over \$US 500,000 in a parentage audit commencing in 1998. This survey revealed a staggering parentage error of 10% in American litters. AKC introduced a limited DNA typing program and in two years reduced parentage errors from 10% to 4%, with over 600,000 DNA tests on record.

The DNA typing program introduced by ANKC will be at a cost of around \$60 per dog to the owner. Whereas the cost burden of DNA typing of the 90% or so of puppies going to pet homes does not appear justified in general, it is important for all concerned that at least breeding stock is DNA typed and checked for parentage. Co-ordination of DNA swab collection can also allow quantity discounts to be achieved.

### **(b) DNA Testing for Genetic Diseases**

Genetic testing for hereditary disease status is by far the most effective method of prevention of those diseases, with potential for elimination of the causative genes without necessarily culling of current breeding stock. There are genetic tests for approximately 50 canine hereditary diseases across various breeds at present, but few Australian dogs are being tested because of the deterrents of cost and inconvenience of overseas testing and general absence of organised programs.

There is synergy between DNA typing and genetic testing for hereditary diseases. Where both parents have clear status for a particular hereditary disease then the offspring can be classed as clear without the need for disease testing (see example on [www.adcb.au.com](http://www.adcb.au.com)), provided the parentage is accurate – verified by DNA typing. Importantly then for many diseases only one generation will need the more expensive disease test. This combination of tests is a really significant innovation with a double-barrelled benefit. It has been shown already that such “pedigree clearance programs” within the breed are effective in disease prevention. It is especially important initially to encourage participation of frequently used stud dogs and bitches even though retired – allowing many descendants to be cleared simply by DNA typing.

The convenience and lower cost of testing via GTG, combined with the prospect of “pedigree clearance” of offspring should encourage breeders and Breed Councils/ Clubs to be active in using these tests to the great benefit in reduction of hereditary diseases within their breeds. DNA typing and disease testing is also available to breeders wanting to provide such evidence for puppy buyers and to promote the image of their kennel. GTG will store all DNA collected, for future reference and convenience of owners.

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### **Role of the Breed Councils/Clubs**

Breed Councils/Breed Clubs, as guardians of their breeds, have a key role in developing program details in: -

- recommending hereditary diseases for which testing should be conducted
- recommending acceptable status for those diseases for Stud Book registration and a timetable for change where necessary
- assisting in implementation of the program at breed level.

### **The Future**

The DNA typing program and Stud Book registration will give pedigree assurance for all breeding stock for the first time. With release of the canine genome imminent, there is an expected surge in identification of the genes causing many canine diseases. ANKC's double-barrelled program of DNA testing will put us in a great position to quickly test stored DNA and move with certainty to prevent further recurrence of these diseases.

**ANKC Canine Health Committee**

## **Genetic Science Service (GSS)**

A division of Genetic Technologies Limited

**PO Box 115, Fitzroy, VIC 3065**

**[www.geneticscienceservices.com](http://www.geneticscienceservices.com)**

### **About ACPAP**

The Australian Canine Pedigree Assurance Programme – ACPAP – is a programme developed to bring pedigree assurance to your canine pedigree. This programme, developed through Genetic Science Services (GSS), has strong alliances with the ANKC and leading canine vets and breeders.

The programme uses your dog's microchip or tattoo number as the means of identification. A simple non-invasive buccal (cheek) swab, collected by a vet or collection officer, allows us to establish your dog's unique DNA profile.

- Individual DNA Typing
- Pedigree Evaluation
- Parentage Confirmation
- Disease Testing

The profile allows our animal loving scientists to assess disease, obtain the dog's unique DNA profile or determine parentage. This programme is endorsed and evaluated by the ANKC. This guarantees that ACPAP is accurate, reliable, safe, secure and relevant to Australian pedigrees.

**All results are ANKC certified and treated with the strictest confidentiality.**

### **About GSS**

Genetic Science Services (GSS) is a wholly owned subsidiary of Genetic Technologies Limited (GTG). GSS is the animal genetics division of GTG and is committed towards assisting numerous associations in providing better management of their animals. GTG through its molecular genetics division has over 15 years experience in commercial genotyping. This experience assures that quality management procedures to its canine DNA tests as it does to the other genetic tests conducted within our NATA accredited laboratory.

GTG owns broad patents, mostly granted in the 1990s, relating to the use of information present in non-coding DNA in all species. The strength of these patents allows GTG and its subsidiaries to offer a number of genetic tests only available overseas.

GTG has and continues to build a valuable international patent portfolio based on intellectual property from pioneering research, which it conducted at the beginning of the genetics revolution.

With our passionate staff and state of the art laboratory facilities we are able to deliver a service with a fast turnaround time.

**PHONE** (03) 8412 7077

**EMAIL** [canine@genotype.com.au](mailto:canine@genotype.com.au)