DNA Testing for Laboratory Animals

Applications:

- Accelerated Backcrossing
- Estimation of Transgene Copy Number NEW
- Carrier Status in Transgenics and Knockouts
- Strain Characterization and Differentiation
- Estimation of Genetic Variation
- Parentage Verification

The DNA testing services offered by Therion International, LLC can dramatically enhance your ability to genetically monitor and characterize laboratory animals. Therion provides a full range of DNA-based tests including DNA profile analysis, DNA amplification, Southern blot and slot blot testing. Depicted on this fact sheet are examples of results produced from several studies concerning the genetics of laboratory animal strains and colonies.

Accelerated Backcrossing

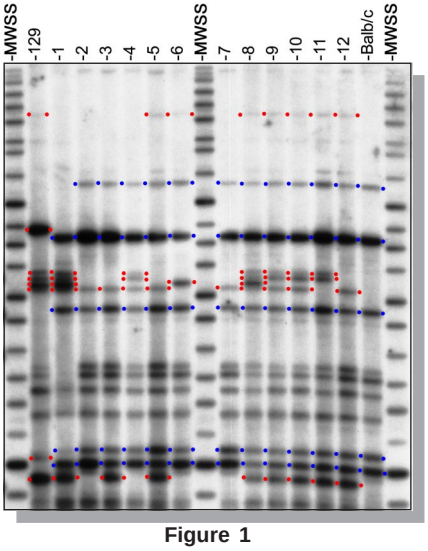


Figure 1

Therion's DNA profile test for marker-assisted Accelerated Backcrossing uses our proprietary multi-locus DNA probes (the OPT™-series) to detect variable DNA sequences among inbred mouse strains. The results from this test can be used for the directed selection of individuals/breeders with preferred genetic backgrounds. By breeding selectively rather than randomly an investigator can significantly decrease the number of backcross generations needed to produce a 95-99% congenic strain. Figure 1 shows the results for 12 transgenic mice from the N2 generation of a 129 (donor) x Balb/C (recipient) backcross. By choosing to breed only those individuals with the lowest percentage of residual donor genetic markers (red dots) the desired research model can be produced faster than expected from random breeding. This in turn saves valuable research time and lowers breeding, facility and personnel costs.

Estimation of Transgene Copy Number - Predicting Expression Level! NEW

This pioneering technology allows investigators to predict expression levels of transgenes in young founder animals and prior to actual expression and/or phenotyping. With this knowledge projected non-expressing founders can be culled prior to breeding, thereby substantially reducing costs and work load. Figure 2 shows the analysis of four founders from a given transgenic line. Quantified amounts of DNA from each founder were processed in a Southern blot assay which was hybridized with DNA probes for both the transgene and an endogenous single copy gene. Optical density measurements were taken on all resulting bands and estimates of copy numbers were computed by comparison of transgene bands (blue dots) to both in-lane (blue arrows) and external (red arrows) endogenous controls. Note the varying intensities of the transgene bands. To date Therion has tested well over 100 transgenic models. In 80% of these cases the mice that ultimately reached a required threshold level of expression were those individuals whose copy numbers estimates were among the three highest values. In the remaining cases ultimately none of the founders expressed the transgene.

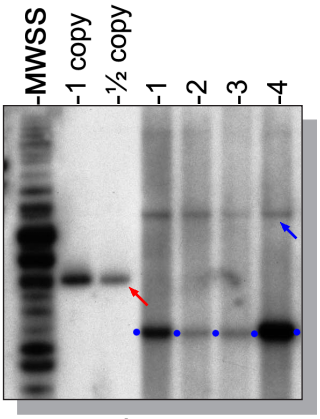


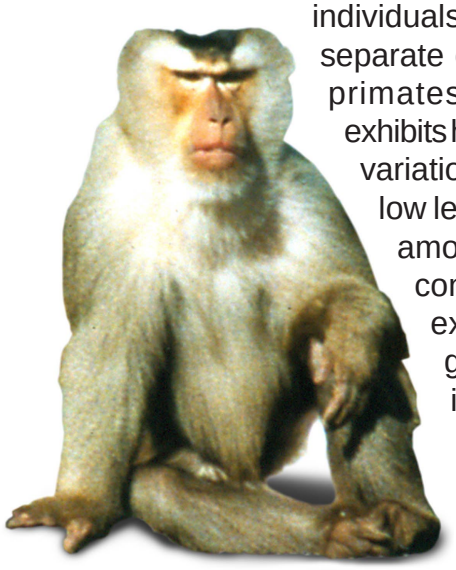
Figure 2

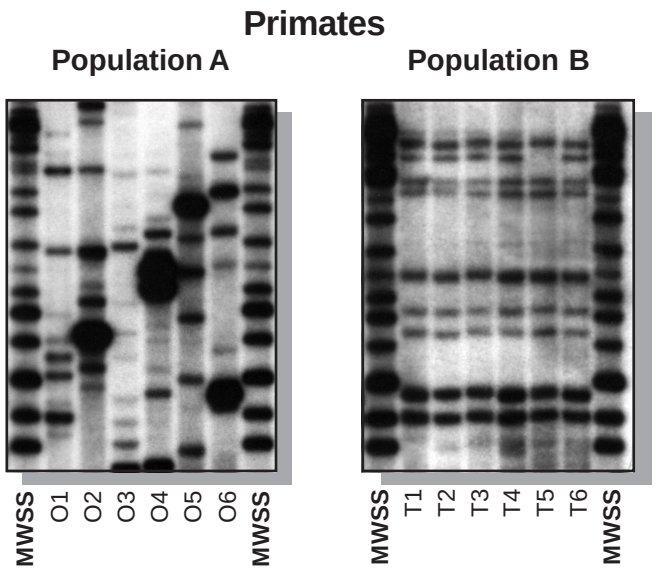
Transgenic Monitoring for Carrier Status

Therion offers a comprehensive set of DNA-based tests to facilitate the periodic monitoring of both transgenic and knockout strains of laboratory animals. These tests include DNA amplification, Southern blot and slot blot assays. Our ability to transfer and implement existing protocols will relieve your laboratory of the tedious task of genetic monitoring. Our scientists also have the expertise to enhance existing assays and/or develop new assays to meet your specifications. Our prices and turn-around times for these services are extremely competitive!

Estimation of Genetic Variation

To ensure the long-term reproductive success of captive-bred populations of animals used for biomedical research it is essential to routinely monitor levels of genetic variation. Pictured at right are two sets of DNA profiles (probe OPT™-05) generated from individuals belonging to two separate captive colonies of primates. Population A exhibits high levels of genetic variation (as indicated by a low level of band sharing among individuals). In contrast, population B exhibits a low level of genetic variation (as indicated by high levels of band sharing among individuals). Note the nearly identical DNA profile banding patterns among individuals of population B. DNA profile results can be used to generate estimates of heterozygosity, genetic distance and relatedness.





Specimen Requirements

(Please call before shipping **any** samples)

Specimen Type	Volume	Container	Shipping Instructions
Tissue (tails)	1.0 cm	1.5 ml microcentrifuge tube containing 70% ethanol	Overnight on ice packs
Whole Blood	5-10 ml	EDTA Purple Top Vacutainer™	Store in refrigeration Ship blood overnight on ice packs

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