EQUINE PARENTAGE & ANIMAL GENETICS SERVICES CENTRE

Screening Test for Spider Lamb Syndrome

Spider lamb syndrome, or inherited chondrodysplasia, is a genetic disorder which occurs in Suffolk sheep. Affected lambs are born with long, spindly, bent legs, giving them the appearance of “spiders”, hence the name of the syndrome. As affected lambs have greatly reduced mobility and fitness, they usually die within the first year. The defect is caused by a recessive mutation in the fibroblast growth factor receptor 3 (FGFR3) gene, resulting in abnormal differentiation of cartilage to bone in affected sheep.

Hereditary chondrodysplasia was first described in the 1980s in North American Suffolk and Hampshire sheep. In 1984, Suffolk rams and ewes from the United States were imported into Australia and in 1987 a lamb with chondrodysplasia was identified. The affected lamb’s dam was a daughter of one of the original imported rams. The affected lamb’s sire was the other imported American ram. In 1992 progeny of the American-origin Suffolks in Australia were imported into New Zealand. Because of the concerns that SLS may have been introduced with this importation, a study was carried out which determined that the imported Suffolk rams carried the gene for SLS.

The DNA based test to identify carriers of the SLS gene.
Inherited chondrodysplasia occurs only in sheep carrying two copies of the affected gene for SLS (homozygous SS) while carrier animals (heterozygous NS) and noncarrier (homozygous NN) animals show no signs of the condition. As the condition is inherited as a simple autosomal recessive, affected animals must have two carrier parents. The gene can spread among flocks by the use of carrier rams. The point mutation in the gene responsible for SLS has been identified and a relatively straight forward test developed for the identification of sheep carrying one or two copies of the defective gene.

DNA for SLS testing is derived from fresh whole blood (EDTA) samples. Once the DNA is extracted a process called PCR is used which produces millions of copies of the FGFR3 region DNA , in both carrier and non carrier animals. An enzyme which can cut DNA at a specific point is then used to digest the copies produced by PCR. The size of the fragments produced differs between normal (N) DNA and the abnormal (S) DNA. The fragments are separated into size bands on an agarose gel, stained and the bands visualised under UV light.

Normal sheep have a single band of DNA of 132 base pairs in size, indicating they have two copies of the normal gene (NN). Carrier animals have two bands of DNA, one at 132 base pairs in size and one at 115 base pairs in size, indicating that they have one copy of the normal gene plus one of the abnormal gene, and so are heterozygous (NS). Affected sheep have a single band of DNA at the 115 base pair position, indicating that they have two copies of the abnormal gene and are homozygous (SS)

The Equine Parentage & Animal Genetics Services Centre (EPAGSC) at Massey University has negotiated an agreement with Livestock Molecular Research and Development at the University of Illinois, which will allow this Centre to provide under license, the screening test for Spider Lamb Syndrome (SLS) in Suffolk sheep in New Zealand.

All enquiries regarding this service should be directed to

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Charges (GST inclusive) **PER SHEEP** are as follows

$30 per sheep

Payment in the form of a cheque or money order **MUST** be sent with the EDTA blood tube samples. Receipts for GST purposes will be provided with a written report of results. Please make all cheques out to **MASSEY UNIVERSITY.**

Results should normally be available to breeders within 10 working days from the time of receipt of samples.