



# Scrapie Genetic Test

## Disclaimer

Lincoln University and the Lincoln University Gene-Marker Laboratory cannot be held responsible for the outcome of any decisions made by breeders in the breeding of sheep using this DNA-typing technology. The genetic information supplied to breeders may only be used by them on the assumption that they assume responsibility for any loss, damage or consequence resulting directly or indirectly from the use of that information. The liability of Lincoln University and the Lincoln University Gene-Marker Laboratory is limited to the re-testing of individual sheep where an error has been made at some stage of the DNA testing process.

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Want to find out more?

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## The Lincoln University Scrapie Genetics Test

Scrapie is a fatal, degenerative disease affecting the central nervous system of sheep and goats. The causative agent is believed to be a prion protein. NEW ZEALAND DOES NOT HAVE SCRAPIE.

Most other sheep-producing nations have scrapie. In these countries it has been established that the scrapie agent can persist for some years in the environment and that it is resistant to most disinfectants. In sheep it is suspected that a significant route of transmission is the ingestion of placental material from infected ewes at lambing. There is no cure and no treatment for scrapie.

Genetic susceptibility to scrapie appears to be influenced by variation in the prion gene (*PRNP*). In sheep, variation in the *PRNP* gene has been identified at a number of codons, but polymorphism at some codons is rare and only three codons (136, 154 and 171) have a reported linkage with the incidence of scrapie. The association between ovine *PRNP* polymorphism at codons 136, 154 and 171 and scrapie susceptibility, makes it possible to identify whether sheep are resistant or susceptible to scrapie by genotyping the *PRNP* gene.

Based on variation at these three codons, a number of different scrapie-related alleles in sheep have been identified. The table right shows the genotypes identified in sheep and their resistance or susceptibility to scrapie as defined by the United Kingdom National Scrapie Plan (NSE).

## Genotypes Table

Genotype	Degree of resistance	Type
ARR/ARR	Most resistant to scrapie.	1
ARR/AHQ	Resistant to scrapie, but will need careful selection when used for further breeding.	2
ARR/ARH		
ARR/ARQ		
ARQ/ARH	Have little resistance to scrapie.	3
ARQ/AHQ		
AHQ/AHQ		
ARH/ARH		
AHQ/ARH		
ARQ/ARQ	Susceptible to scrapie and should not be used for breeding. Exceptions to this rule exist.	4
ARR/VRQ		
AHQ/VRQ	Highly susceptible to scrapie and should not be used for breeding.	5
ARH/VRQ		
ARQ/VRQ		
VRQ/VRQ		

The European Union (EU) requires the introduction of genotype-based breeding programmes on a compulsory basis for sheep flocks of “high genetic merit” (EU Commission Decision 2003/100/EC). In this context, “high genetic merit” has been defined as “all purebred breeding flocks and, in addition, any other flock that produces and sells homebred rams for breeding”.

This compulsory ram genotyping scheme means that NZ breeders wanting to sell genetics into the UK and Europe will have to have it DNA typed.

## Getting Your Sheep Tested

If breeders and farmers contact the testing laboratory at the numbers listed then we will send out special cards for collecting small blood samples, along with instructions on how to easily and safely collect blood from sheep. Only when these cards are returned to us will typing be undertaken.

## Testing Cost

A separate schedule of prices is available on request. Discounts apply for multiple tests carried out in a calendar year (Jan 1 – Dec 31) and for testing done in concert with other gene tests provided by the Lincoln University Gene-Marker Laboratory.