Tenderness

What is it?

Tenderness is a complex trait influenced by muscle properties and the conditions that occur within the muscle after slaughter. Meat tenderness is a function of connective tissue, marbling or intramuscular fat and postmortem protein degradation; known as the calpain-calpastatin system.

How does it work?

The tenderness test looks at three main tenderness-related SNP markers **-** Calpain 316, Calpain 4751, and Calpastatin. These affect how muscle proteins break down after slaughter (post-mortem proteolysis). Calpain is an enzyme that weakens muscle fibres during the post-mortem aging process. While calpastatin is an enzyme that regulates the activity of calpain – where calpain is inhibited this reduces the breakdown of proteins into smaller polypeptides or amino acids.

How to interpret the results:

Calpain 316	**Calpain 4751**	**Calpastatin**
Reported genotypes: CC / CG / GG **Effect:** **CC** → Best for tenderness (favourable). **CG** → Intermediate. **GG** → Least tender (less proteolysis).	**Reported genotypes:** CC / CT / TT **Effect:** **CC** → Best for tenderness (favourable). **CT** → Intermediate. **TT** → Least tender.	**Reported genotypes:** CC / CG / GG **Effect:** **CC** → Best for tenderness. **CG** → Intermediate. **GG** → Toughest meat

- The more “C” alleles across these markers = more tender beef.
- Homozygous favourable genotypes (CC) at all 3 loci = highest tenderness potential.
- Homozygous non-favourable genotypes (GG or TT) = lowest tenderness potential.
- Heterozygotes (CG / CT) usually give a moderate tenderness outcome.

Note - Neogen translates the results of these three genetic markers into a 1 to 10 scale. A score of 1 is the least tender genotype, and a score of 10 is the most tender genotype.