Myostatin (MTSN)

What is it?

Myostatin (MSTN) is a naturally occurring regulator produced in muscle cells that influences the production a protein to control muscle development. Myostatin acts like a “brake pedal” on muscle growth.

When the gene functions correctly, muscle growth is controlled, resulting in normal-sized animals; when mutations (or physical breaks) occur in the myostatin gene, muscle growth accelerates, leading to a condition called double muscling.

While myostatin mutations can positively affect carcass weight, fat distribution, and conformation, the impact varies depending on whether animals carry one or two copies of the mutation. Double muscled animals typically have increased retail beef yield with less fat/marbling, but some mutations are also associated with increased calving difficulty.

There are 9 variants of the Myostatin gene mutation that vary in their effects:

- Three (3) non-disruptive variants, F94L, S105C and D182N have been reported to cause improve muscling and have been associated with more tender meat but have no associated effect on calving difficultly, fertility or longevity.
- Six (6) disruptive myostatin variants, nt821(del11), E226X, Q204X, C313Y, E291X, and E274X (nt419) are associated with ‘loss of function’ in the gene leading to double muscling and can result in higher levels of calving difficulty, reduced fertility and longevity, and may also have heavier birth weights.

How does it work?

Inherited as a recessive trait — an animal must have two copies of a mutation to fully express double muscling. Cattle inherit one copy of each myostatin mutation from each parent.

How to interpret the results:

For each myostatin gene mutation, every animal can either be:

- Non-carrier/Unaffected (2 working copies) = normal muscling
- Carrier (Heterozygous - 1 working copy, 1 mutated copy) = intermediate muscling
- Affected (Homozygous - 2 mutated copies) = double muscling