



Questions and Answers

Quick Look at Genetics

1. *Why are the genotypes named the way they are?*

- Genes are made up of unique sequences of the DNA building blocks “A-, C-, T-, and G bases” and these sequences can often be over 1000 bases long.
- In the case of the cattle **Leptin gene** sequence, there is one key location where a ‘C’ is present, yet in many cattle it was replaced with a ‘T’ due to a mutation:
 - This key location is referred to as a **Single Nucleotide Polymorphism** or a ‘**SNP**’ (pronounced “snip”).
 - Cattle scientists compared animals containing a ‘C’ or a ‘T’ in their Leptin genes, finding that ‘T’ genotypes had increased fat accumulation.
 - Since DNA has two strands attached together, **TT** means that both strands have a T allele, **CT** means that one strand has a T allele and the other has a C allele, and **CC** means that both strands have a C allele at the **Leptin SNP**.

2. *What do the results mean?*

- Using Leptin genotypes as an example, genotypes are reported as being ‘**Leptin CC**’, ‘**Leptin CT**’, or ‘**Leptin TT**’.
- Since **Leptin TT** is the **preferred** genotype, TT cattle will show improved carcass traits over CC cattle with CT cattle being somewhere in the middle

3. *Are the genes able to be passed on to the calves?*

- Cattle inherit one copy of a gene from the **dam** and one copy from the **sire**.
- This means that if you have a TT bull, the calves can only be either CT or TT since he is only able to pass down one T allele.

Leptin

1. *What is Leptin?*

- Leptin is a mammalian hormone with the primary function of decreasing appetite.

2. *What genotype of Leptin is preferred?*

- Leptin TT.

3. *What are the benefits of Leptin TT cattle?*

- Leptin TTs have an overall increased rate of fat accumulation compared to leptin CC.
- For Leptin TTs, this mainly results in:
 - Increased weaning weight
 - Increased cow productive life due to increased body condition score
 - Increased milk production
 - Increased 12th rib backfat
 - Impacts yield grade & marbling (quality grade)

PMCH

1. What is PMCH?

- PMCH (Pro-Melanin Concentrating Hormone) is a mammalian hormone that is involved in feed intake maintenance.

2. What genotype of PMCH is preferable?

- PMCH AA.

3. What are the benefits of PMCH AA cattle?

- PMCH AAs have an overall increased fat deposition compared to PMCH TT.
- For PMCH AAs, this mainly results in:
 - Increased tenderness
 - Increased marbling fat
 - Increased 12th rib backfat

CRH

1. What is CRH?

- CRH (Corticotrophin-Releasing Hormone) is a mammalian hormone that is involved in appetite control and stress response.

2. What genotype of CRH is preferred?

- CRH GG.

3. What are the benefits of CRH GG cattle?

- CRH GGs have an overall increased carcass yield compared to CRH CCs.
- For CRH GGs, this mainly results in:
 - Increased hot carcass weight
 - Increased rib eye area

IGF2

1. What is IGF2?

- IGF2 (Insulin-like Growth Factor 2) is a mammalian hormone that is involved in lean muscle growth.

2. What genotype of IGF2 is preferred?

- IGF2 CC.

3. What are the benefits of IGF2 CC cattle?

- IGF2 CCs have an overall increased lean growth compared to IGF2 TTs.
- For IGF2 CCs, this mainly results in:
 - Increased rib eye area