

Genomics in the Classroom

What are genomics?

Genomics is the study of genes and their function. Genomic evaluations use production, health, fertility and type traits to calculate an animal's genomic value.

Who uses genomics?

Dairy farmers can use genomics to improve the genetics and profitability of their herd.

How do you test the animals?

- Tissue sample
- Blood sample
- Hair sample



Hair sample collection.

Why do we use them?

- To improve our herd's genetics
- Culling decisions
- Breeding/mating decisions
- Parent identification
- Purchasing genomic animals

What is the difference between genomics and genetics?

Genetics focuses on one single gene's function and composition and its role in inheritance, and genomics takes into account all genes and their relationships with one another and the environment.

So, what's the big deal?

By genomic testing all of the calves in the herd and utilizing the genomic data, farmers can make important culling decisions on their farms. By differentiating between top quality animals and lower genomic animals early in life, the farmer can cull the lower genomic animals and reduce heifer rearing and replacement costs. This saves the farm from investing in heifers that won't be worth the cost in the long run. Also, getting rid of the bottom animals will improve the genetics in the herd over time.

Below is a table of some of the traits that a genomic evaluation looks at. Listed are the acronym for the trait the goal and the importance of looking specifically at certain traits.

Acronym	Trait	Goal	Purpose
PTAM	Milk	Positive	Increase pounds of milk produced by each cow.
PTAP	Protein	Positive	Can be selected to increase the protein percentage in the milk, or the total pounds of protein produced by the cow.
PTAF	Fat	Positive	Can be selected to increase the fat percentage in the milk, or the total pounds of fat produced by the cow.
PTAT	Type	Positive	Combines body and udder conformation.
SCC	Somatic Cell Count	Negative	Indicative of udder health, as higher SCC indicates infection in mammary tissues.
DPR	Daughter Pregnancy Rate	Positive	Represents the ease of getting offspring pregnant.
EFI	Fertility Index	Positive	Represents overall inherited fertility traits.
PL	Productive Life	Positive	Indicates health traits, represents expected life in herd.
NM	Net Merit	Above 250	One composite index of important traits in dairy cattle.
TPI	Total Production Index	Above 2000	One composite index of important traits in dairy cattle, used by the Holstein association.