Double the Muscle: Cattle Genetics

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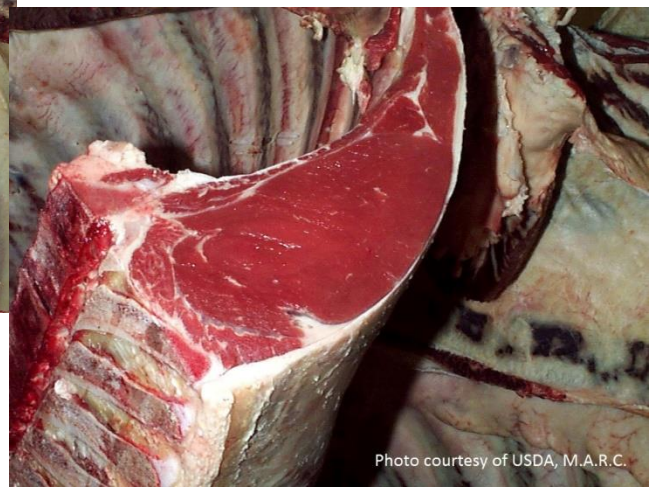
Compare meat cuts from three cattle



Notice any differences?

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Key Vocabulary Review

After mating occurs, reproductive cells called gametes come together to form a zygote.

gamete: a mature male or female reproductive cell (sperm /pollen or egg/ ovum); contains half the total number of chromosomes in a cell; contributes one allele per gene pair to the zygote

segregation: during gamete formation, occurs when the paired alleles separate

Cells contain chromosomes.

haploid cell: cell containing one set of chromosomes (the gamete)

diploid cell: cell containing two sets of chromosomes (the zygote)

somatic cell: diploid cells that are specialized and make up the body of a multicellular organism

Chromosomes contain genes which determine an organism's traits.

autosome: chromosome that does not determine an organism's sex

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Key Vocabulary Review

Genes determine traits and are made up of alleles.

allele: an alternative version of a gene

dominant allele: whenever this allele is present, the dominant trait is expressed

recessive allele: two copies of this allele must present for the recessive trait to be expressed

When describing the alleles combination of a gene, the gene is…

heterozygous: a gene pair made up of two different alleles

homozygous: a gene pair made up of two identical alleles

Organisms can be defined in terms of their genes or their outward appearance.

genotype: the allele combinations making up an organism

phenotype: the physical appearance of an organism determined by the genotype

We may be able to predict the genotype or phenotype of an organism.

Punnett square: a visual depiction of all the possible ways the alleles from two parents could combine

Genetic differences are responsible for this trait.

Homozygous normal muscle,
DD

Heterozygous normal muscle,
Dd

Homozygous double-muscle,
dd

The **Double Muscle trait** is a **recessive genetic mutation** which inactivates a gene that produces **myostatin**, a negative regulator of skeletal muscle growth. Cattle with the mutation are born with higher muscle mass.

Differences are due to….

hyperplasia: the enlargement of an organ or tissue caused by an increase in the reproduction of its cells

hypertrophy: an enlargement of an organ or tissue caused by an increase in the size of individual cells within the organ or tissue

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Sample Punnett Square

		Coin 1 (male gametes)	
		Heads (D)	Tails (d)
Coin 2 (female gametes)	Heads (D)		
	Tails (d)		

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