

Tenderness

Three SNPs:

- **CAPN316**: Developed by U.S. Meat Animal Research Center (MARC). First released in 2003
- **CAPN4751**: Developed by MARC. Released in 2005
- **UoG-CAST1**: Developed by University of Guelph (Ontario, Canada). Released in 2005.



Calpastatin and Calpain Are Both Important.

- **Calpain**: Enzyme that weakens muscle fibers during the post-mortem aging process.
- **Calpastatin**: Enzyme that regulates the activity of Calpain.

Markers	WBSF	Pct. of Total
CAPN316 and CAPN4751	-1.44 lb	63%
UoGCAST	-0.83 lb	37%
Total	-2.27 lb	



Tenderness Scores

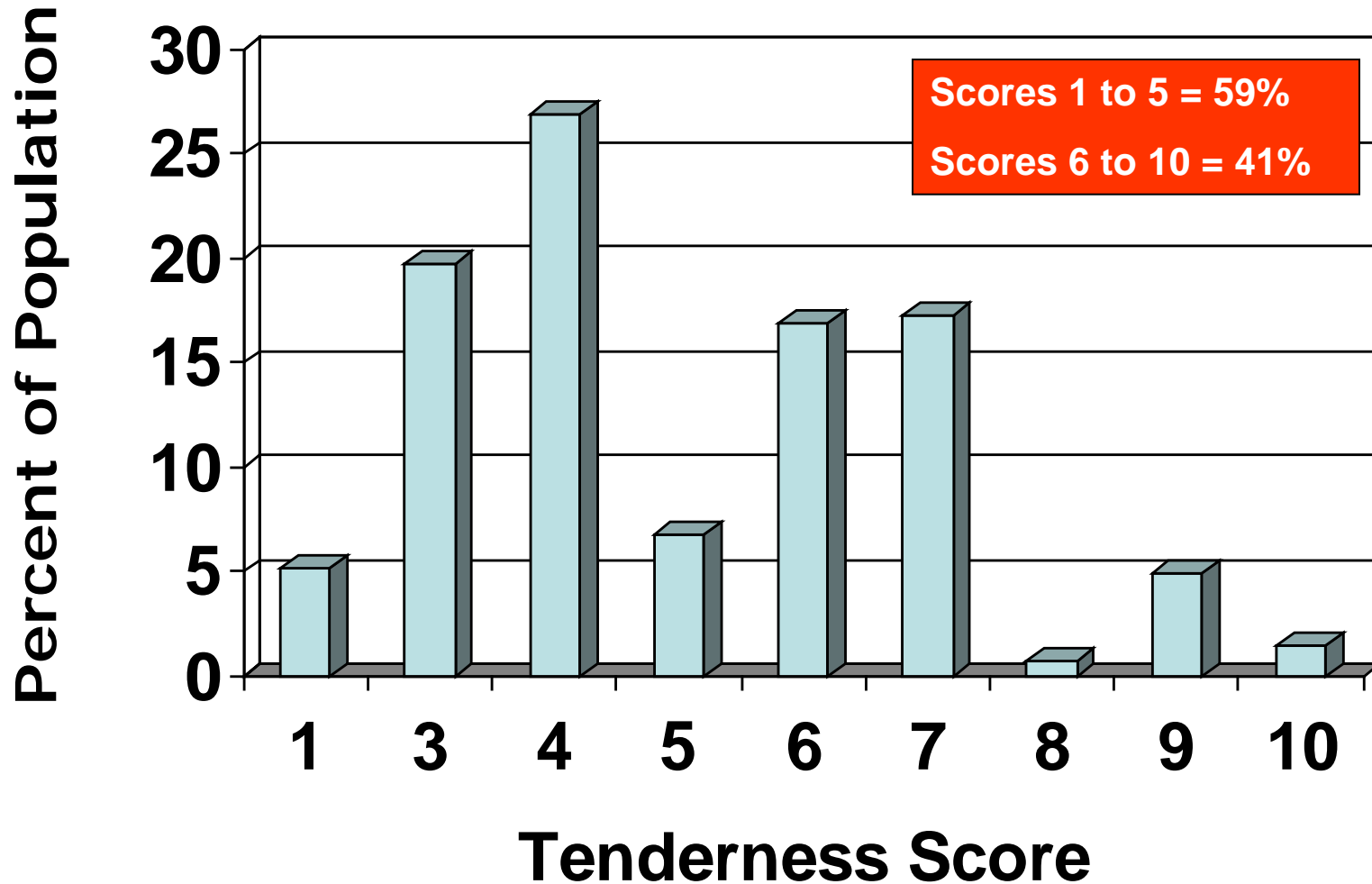
Score	Genotype			WBSF Effect
	UoG-CAST1	CAPN316	CAPN4751	
10	CC	CC	CC	-2.27
9	CC	CG	CC	-1.95
8	CG	CC	CC	-1.85
7	CC	GG	CC	-1.63
7	CC	CC	CT	-1.55
7	CC	CG	CT	-1.55
7	CG	CG	CC	-1.53
7	GG	CC	CC	-1.44
6	CC	GG	CT	-1.23
6	CG	GG	CC	-1.21
5	CG	CC	CT	-1.13
5	CG	CG	CT	-1.13
5	GG	CG	CC	-1.11
4	CC	CC	TT	-0.83
4	CC	CG	TT	-0.83
4	CC	GG	TT	-0.83
4	CG	GG	CT	-0.81
4	GG	GG	CC	-0.79
4	GG	CC	CT	-0.72
4	GG	CG	CT	-0.72
3	CG	CC	TT	-0.42
3	CG	CG	TT	-0.42
3	CG	GG	TT	-0.42
3	GG	GG	CT	-0.40
1	GG	CC	TT	0.00
1	GG	CG	TT	0.00
1	GG	GG	TT	0.00

Genotypes in the shaded areas are rare. The assigned score is based on the best estimate of the tenderness value of this genotype given the information available today. The score for this genotype is subject to change as more information is obtained.



Nothing improves confidence like inside information.

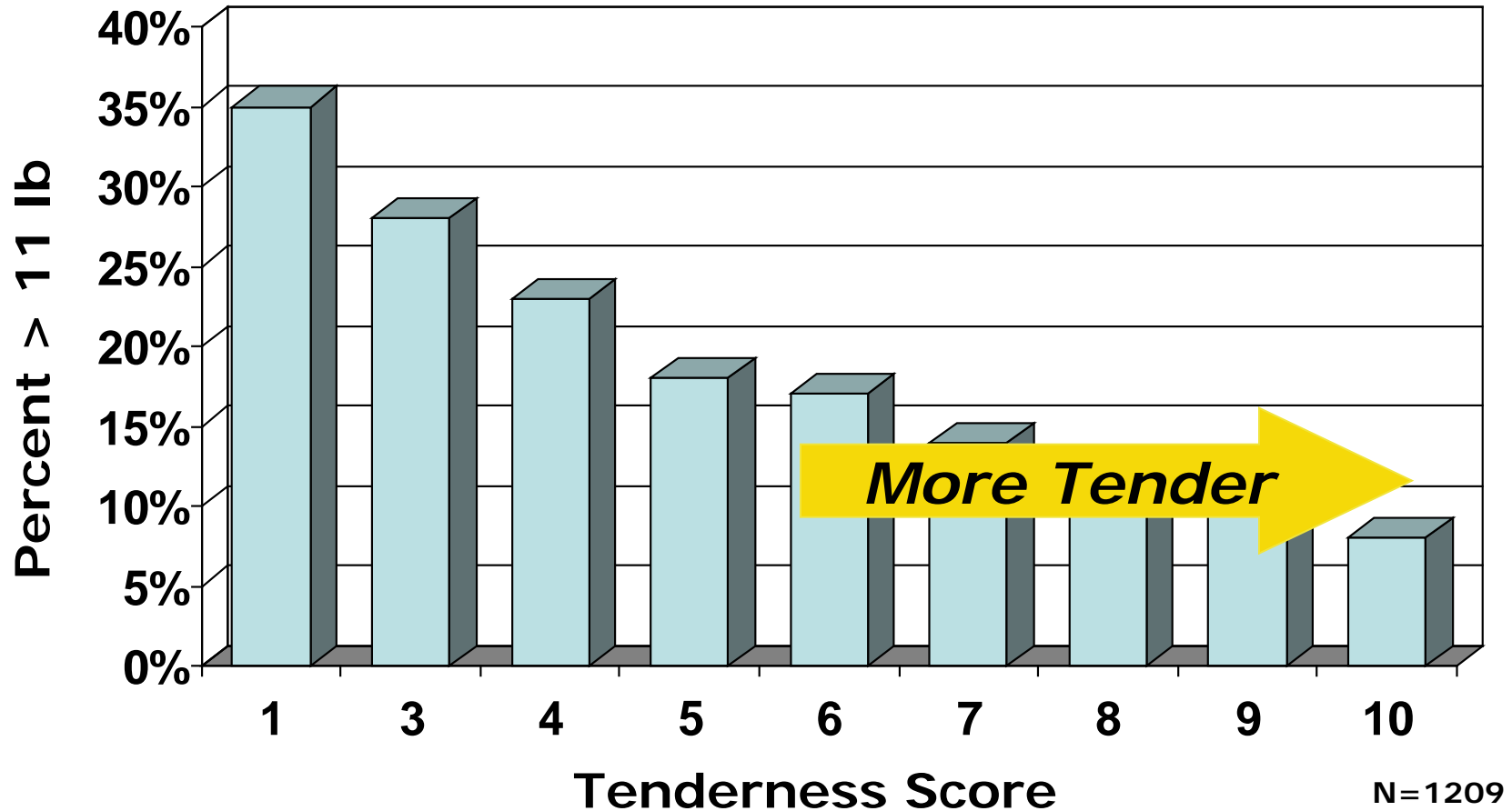
Tenderness Score Distribution



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Percent > 11 Pounds WBSF

When Population average = 9 lb



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Igenity Tenderness

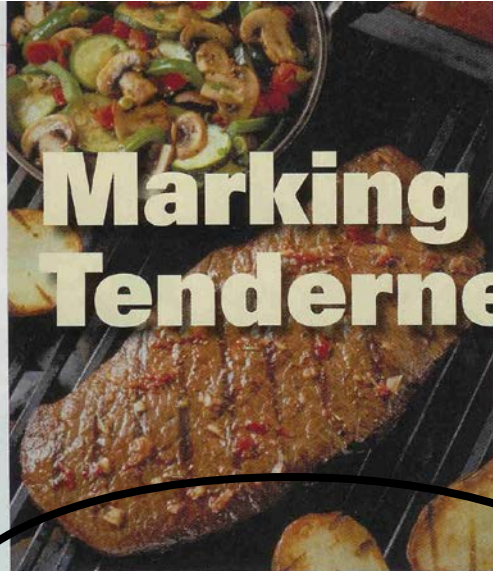
Allele Frequencies by Breed

		UoG CAST1 (%)		CALP 316 (%)		CALP 4751 (%)	
Breed	No.	C	G	C	G	C	T
Char. X Ang.	339	79	21	23	77	46	54
Red Angus	307	74	26	23	77	47	53
Brangus	219	79	21	18	82	55	45
Brahman	344	43	57	1	99	8	92

From NBCEC Validation, 2005



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Marking Tenderness

Leading geneticists announce “full confidence” in DNA testing for tenderness traits – and they say it’s high time free enterprise runs with the science.

By **Chris Peck**
Senior Editor

Meat tenderness is an interesting trait. It's one that beef producers can't select for by simply looking at an animal. And, it can't be measured until after the animal has contributed to the next generation.

To adjust for the struggle of finding and producing animals that produce tender meat, we've tried every trick in the book – from slicing, dicing and pounding to poking, smoking and soaking. And, the long-held practice of dry-aging beef until it fell off the bone just doesn't work in today's warp-speed meat business.

Therefore, tough beef product, even when it accounts for only a small portion of our whole-muscle beef, remains a costly and contentious issue for everyone involved in putting meat on the table. Yet, tenderness has been identified among the most important character-

istics in a consumer's checklist when choosing their beef cuts.

Even as much as consumers seem to value tender beef though, the marketplace hasn't found a way to blaze a trail to the tenderness money-pot. Promises of just-around-the-corner, high-tech solutions to the toughness dilemma – especially DNA marker-assisted selection – have fallen short of most beef producers' expectations.

Research into the use of genetic markers nonetheless has matured to the point where several companies now offer commercial genotyping services for marbling and tenderness.

Gene jocks gone wild?

Enter today's gene jockeys – particularly the scientists with the National Beef

Cattle Evaluation Consortium (NBCEC). Faced with the growing commercialization of marker-assisted selection, and wanting to assure the technology gets used for the greater good, they collectively decided the prudent way to advance the technology was to field test it.

NBCEC scientists Dick Owens and John Pollak, both of Cornell University, spearheaded the recently finished series of validations of DNA markers that influence tenderness. And, they say it's high time their DNA tenderness validations were made public to a large audience of American beef producers.

In fact, they are now ready to stand on a stump and proclaim – with a high degree of confidence – that genetic markers associated with increased tenderness have been discovered and validated, and their effects seem to be fairly consistent.

NBCEC's tenderness validations didn't come easy and followed the results of numerous scientists who did the marker discovery work. It involved two DNA companies, utilizing association data from five cattle breeds, DNA resources from the National Cattlemen's Beef Association carcass merit project, as well as

an additional data set from a large U.S. cattle ranch.

But, before the gene jockeys break out the pom-poms, they say it's important to emphasize that their validation work should be viewed as an “independent



John Pollak

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