

MUSTAFA FAROUK

AgResearch Ruakura

Mustafa Farouk is a Senior Meat Scientist in the Food Assurance and Meat Quality Group of AgResearch Ltd and the Objective Science Leader of two programmes, 'Red Meat CombiFoods: End-to-End Management of Protein Value' and 'Value From Quality - Halal'. He graduated with a Masters and PhD in Food Science from Michigan State University, USA. Mustafa's research interest is in exploiting the functional properties of muscle proteins for gelation and texturisation purposes; non-traditional uses of meat proteins; Halal meat processing; quality of manufacturing beef; and adding value to red meats and co-products; he has numerous refereed journal articles and book chapters. Mustafa currently serves on the Halal Standard Technical Advisory Committee of the Ministry of Primary Industries and the World Halal Food Council.

Quality drives profitability: For meat it starts on the farm

A recent AgResearch survey (2009-2011) of the pH status of NZ cattle indicates our farmers are raising cattle now with ultimate pH more amenable to producing high quality and consistent meat products compared to a survey performed in the 1990s. This improvement enables New Zealand exporters to send chilled high-value cuts to discerning customers around the globe in order to capture the premium associated with chilled product compared to frozen.

In order to maximise profit from the whole carcass post farm gate, other ways of further differentiating the existing cuts, creating new ones and finding novel uses for lower value, down-stream cuts are continuously being developed through close cooperation between the meat industry and research scientists. These approaches to improving the quality, saleability and profitability of the whole carcass will be the focus of this presentation.

MONDAY 12 MAY



3.20pm

Room 2

QUALITY DRIVES PROFITABILITY: FOR MEAT IT STARTS FROM THE FARM

Dr Mustafa M. Farouk

Presentation at Beef + Lamb NZ AgInnovation Conference,
11th - 12th May, 2014, Manfeild Park, Feilding










CONTENTS

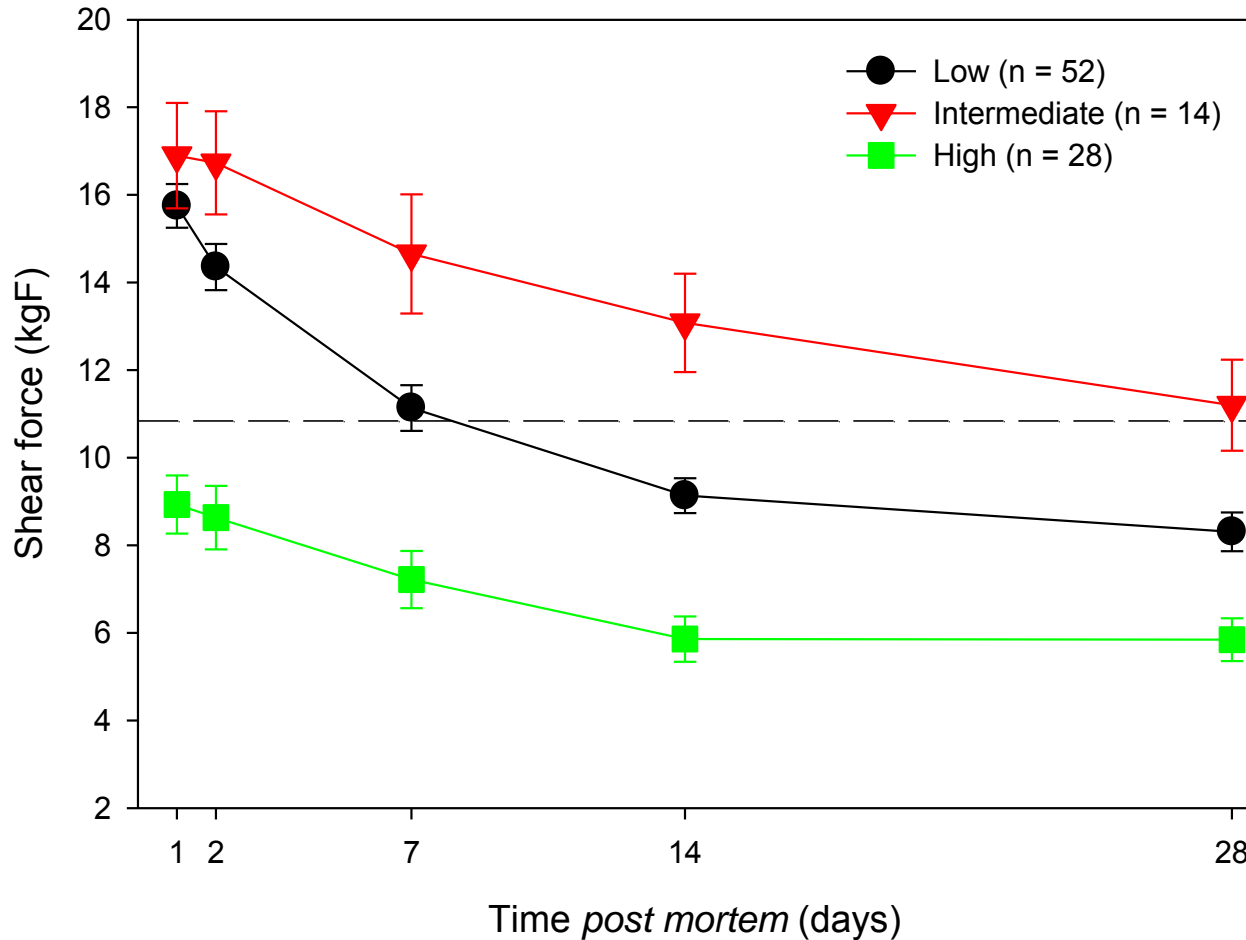
- Meat quality starts from the farm – the pH story
- Using meat quality cues to add value and increase profit
 - ✓ Chilled vs frozen
 - ✓ Table/manufacturing
 - ✓ Function/novelty
- Conclusion



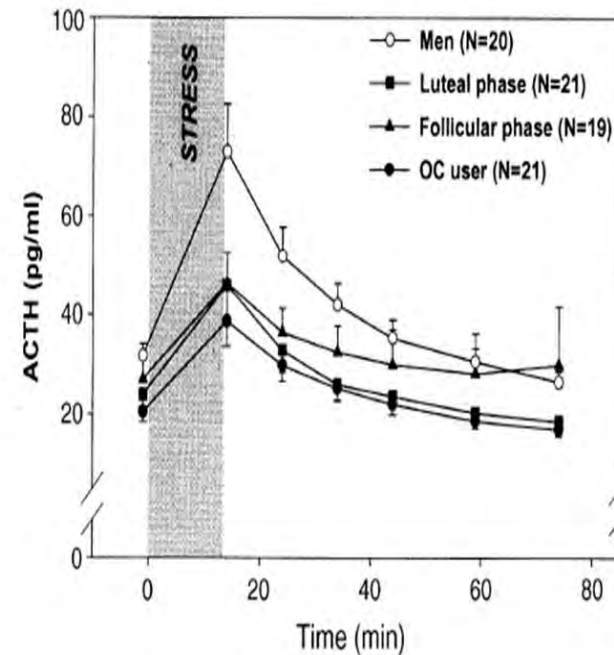
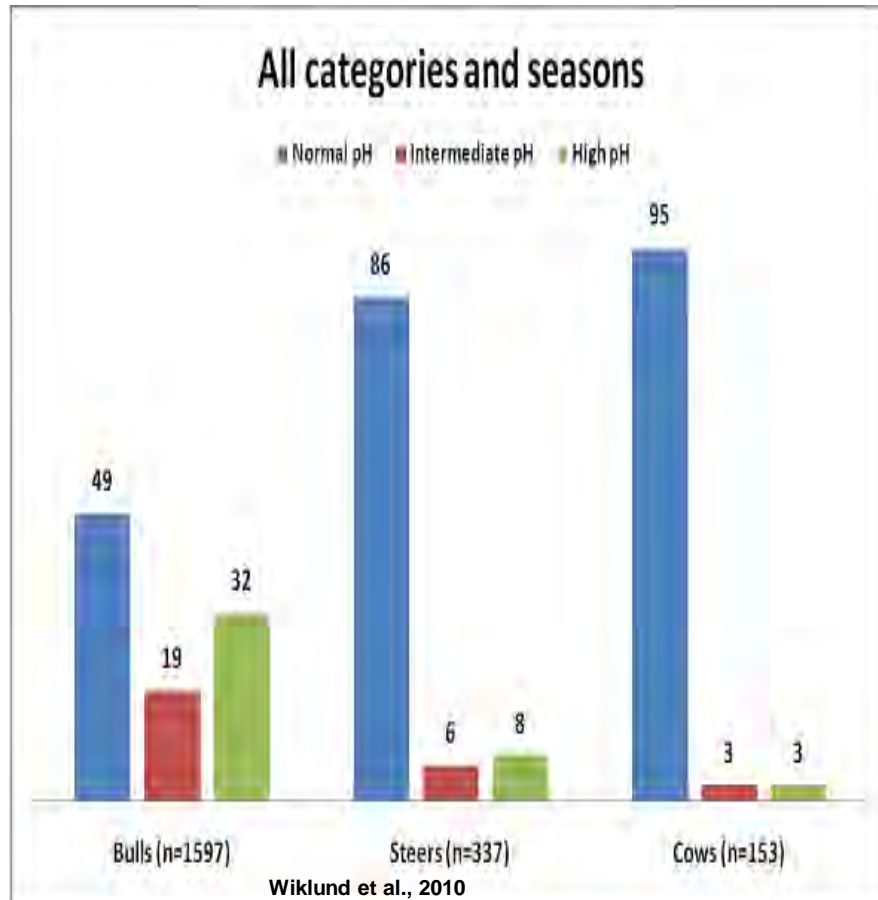
ULTIMATE pH AND MEAT QUALITY

pH _u Value	Quality	Colour
5.4 – 5.8 (Low pH)	Tender meat when aged, cherry red colour	5.5 
5.8 – 6.2 (intermediate pH)	Inconsistently tender	5.8 
		6.0 
		6.3 
>6.2 (high pH)	Dark purple Consistently tender High WHC Milder flavour	6.5 
		6.9 
		7.0 

ULTIMATE pH AND MEAT QUALITY



pH VARIABILITY IS CAUSED BY STRESS



Kudielka & Kirschbaum / *Biological Psychology* 69 (2005) 113–132

Mean (S.E.M.) ACTH (pg/ml) responses in men, women in the luteal phase, women in the follicular phase, and women using oral contraceptives (OC) before and after stress (TSST). The shaded area indicates the period of stress exposure

BULLS AND MEN HAVE PLENTY IN COMMON



Among others, both eventually become meat

USING MEAT QUALITY CUES TO ADD VALUE



PREFERENCE FOR CHILLED VS FROZEN

Restaurants

MEAT					
	High Quality	Tender	Juicy	Prep Variety	Flavor
Fresh	67%	62%	62%	61%	65%
Frozen	22%	24%	20%	34%	25%

POULTRY					
	High Quality	Tender	Juicy	Prep Variety	Flavor
Fresh	61%	61%	61%	62%	59%
Frozen	22%	29%	28%	33%	32%

SEAFOOD					
	High Quality	Tender	Juicy	Prep Variety	Flavor
Fresh	68%	54%	54%	70%	65%
Frozen	32%	29%	20%	46%	35%

Consumers

MEAT					
	High Quality	Tender	Juicy	Prep Variety	Flavor
Fresh	56%	52%	56%	60%	63%
Frozen	27%	20%	20%	36%	27%

Sealed Air Corporation
 Cryovac Food Packaging
 PO Box 484
 100 Rogers Bridge Road, Bldg. A
 Duncan, SC 29334-0484
 Tel: 800.845.3458
 Fax: 804.433.2154
 cryovac.mkt@sealedair.com
 www.cryovac.com



Food Packaging Systems

2007 survey

CHILLED VS FROZEN

Chilled meat attracts twice the price of frozen meat in NZ export markets

Meat should have a $\text{pH} \leq 5.8$ to be optimally exported chilled

BETTER FARMING IMPROVED THE pH STATUS OF NZ CATTLE CREATING OPPORTUNITIES TO ADD VALUE

	1994 ^a			2009		
	Mean pH _u	n	Proportion with pH _u below 5.8 (%)	Mean pH _u	n	Proportion with pH _u below 5.8 (%)
All beef	5.79	2969	68.9	5.83±0.45	2088	58.5
Bulls	6.16	766	29.0	5.97±0.46	1597	49.2
Steers	5.59	542	91.0	5.61±0.29	337	86.3
Cows	5.73	934	69.5	5.53±0.21	154	94.2

^aGraafhuis & Devine (1994)

TABLE AND MANUFACTURING QUALITY CUES

Common ways meat is differentiated



Breed



Diet



Chemical
Leanness

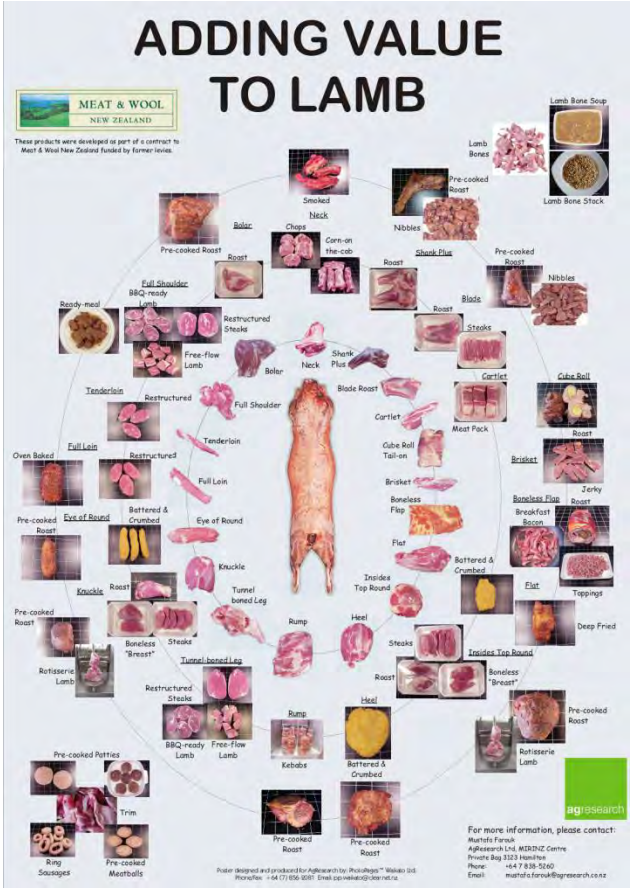
Cut attributes used to add value

- Physical
- Chemical
- Functional
- Sensory

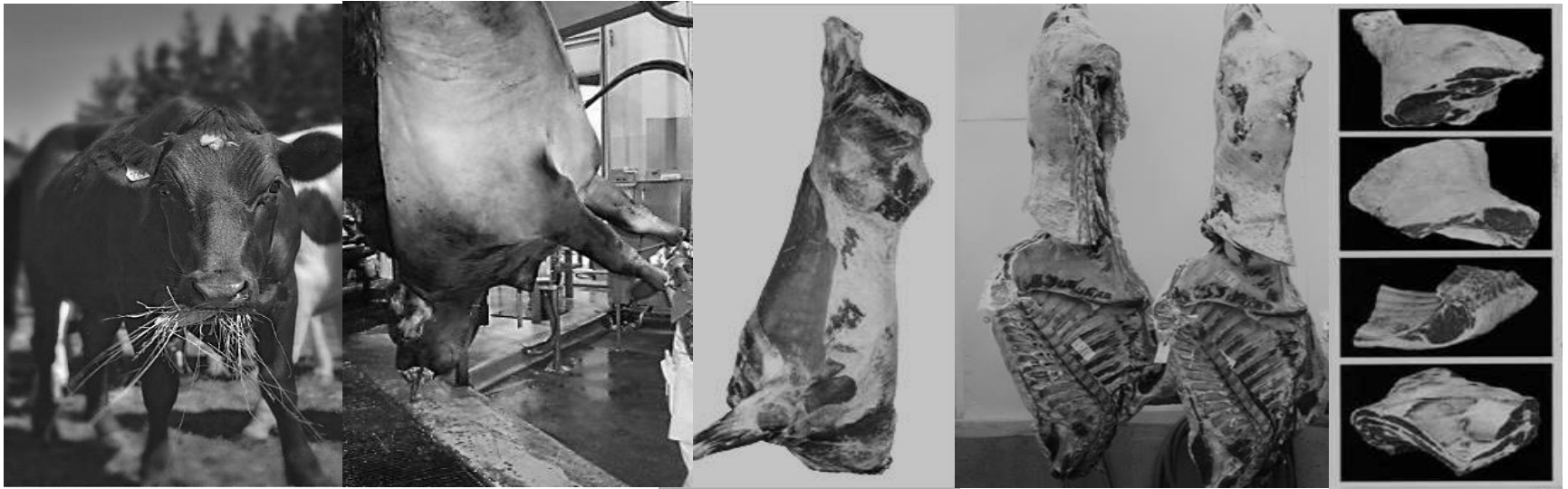
STRATEGY USED TO ADD VALUE

- **Further processing of traditional cuts into products for table use and for manufacturing purposes specific to markets**
- **Creating new cuts**
- **Further processing of new cuts into products for table use and for manufacturing purposes specific to markets**
- **Cost recovery**

TABLE AND MANUFACTURING VALUE ADDING OPPORTUNITIES



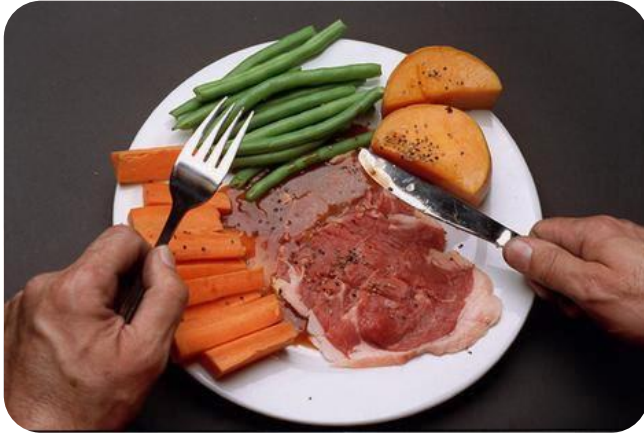
CURRENT MARKET PULL?



USING MEAT FUNCTIONALITY TO ADD VALUE



ARE THESE THE ONLY WAYS OF EATING MEAT?



AN ANALOGY WITH DAIRY PRODUCT FORMATS

¢ Fresh liquid milk



\$ Fresh cream



\$\$ Dry milk powder



\$\$\$ Bulk casein protein



\$\$\$ Functional whey proteins



Whole carcass, the most commoditised form of export



Cuts differentiated on physical and chemical basis and not on functionality



Meat powders and solids as food ingredients. Not functionally differentiated

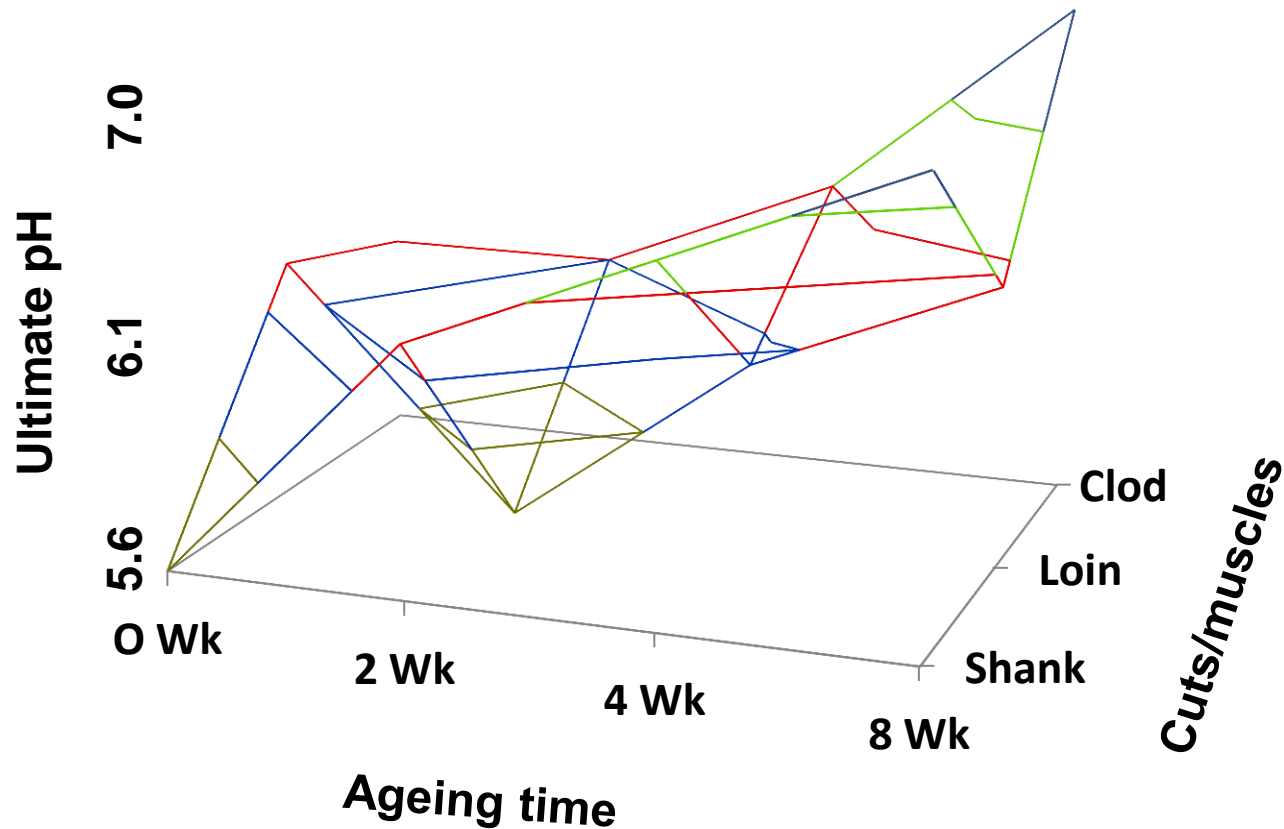


Ingredients



Functional ingredients/foods

USING FUNCTION TO ADD VALUE

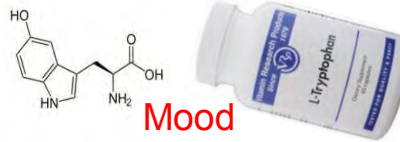


Effect of pH, ageing and muscle type on the concentration of **X** in meat

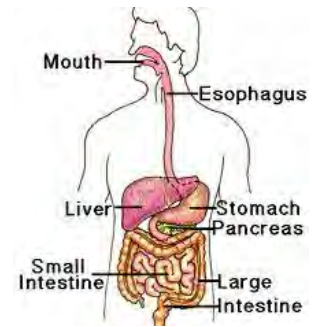
FUNCTIONAL MAPPING OF CARCASS



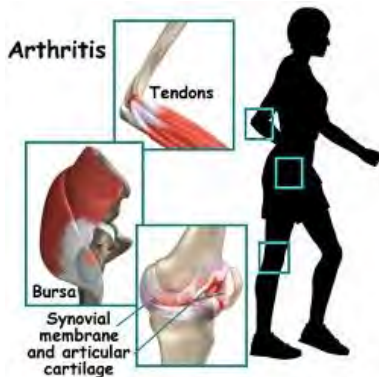
Taste



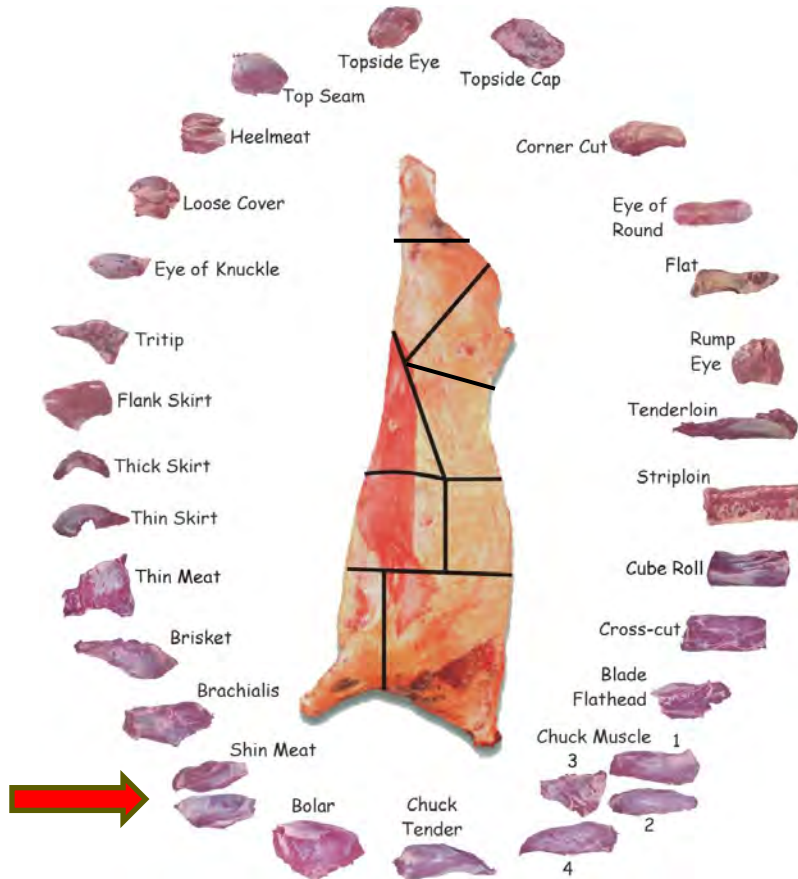
Mood



Digestion



Joint health



Blood pressure



Muscle strength

Extensors and flexors

Trade name: Shank meat



Added value uses

Free-flow beef for ready meals

Gelled beef

Imitation oxtail



USING CARCASS FUNCTIONAL MAPS IN ADDING VALUE

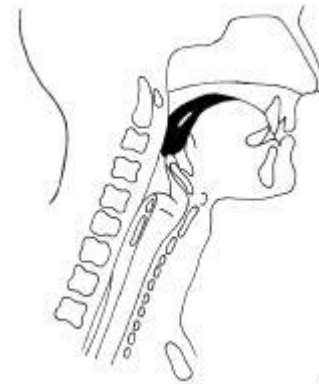
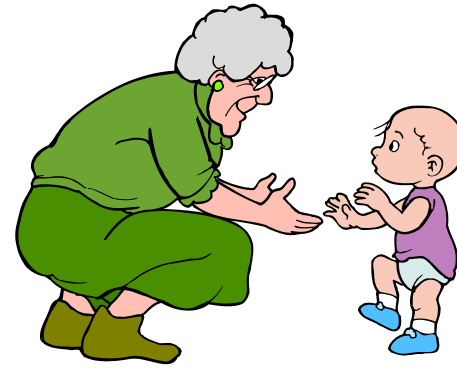
Shin/Shank meat



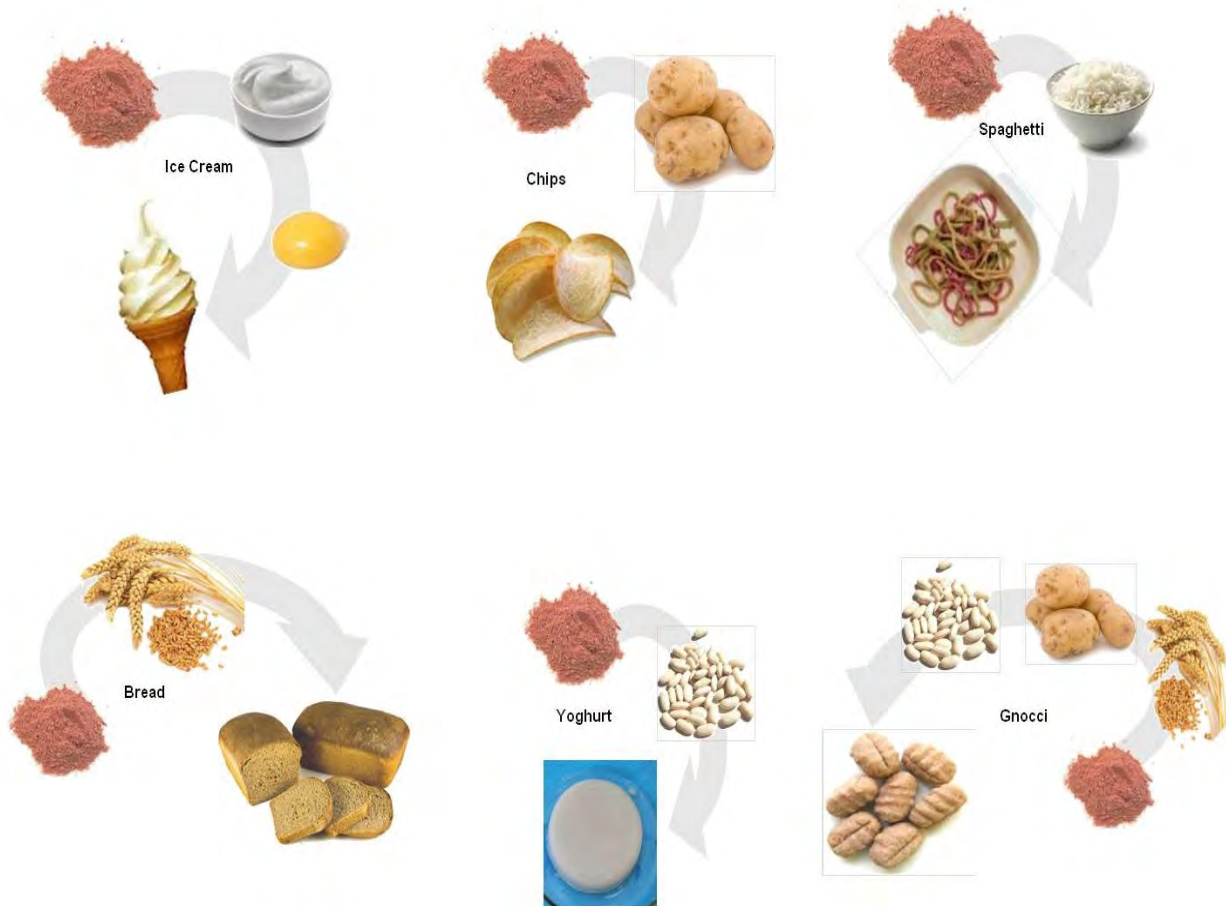
Gellied products

Joint health

Easy chew & swallow



FUNCTION & FAMILIARITY: A STRATEGY OF ADDING VALUE



The strategy?

Promote
meat-specific nutrients

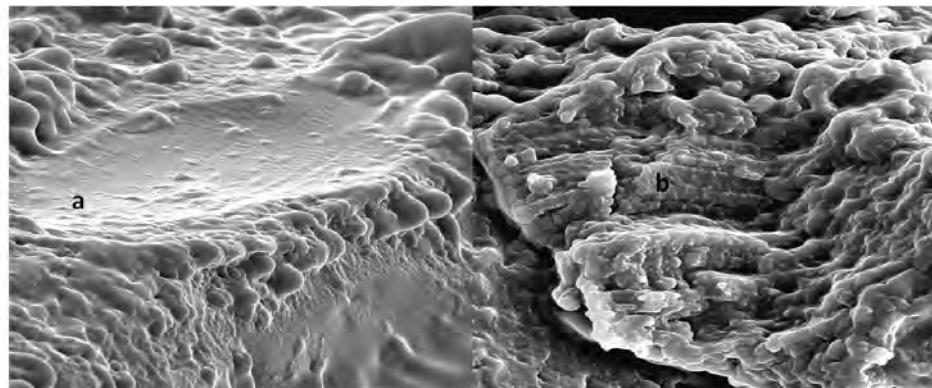
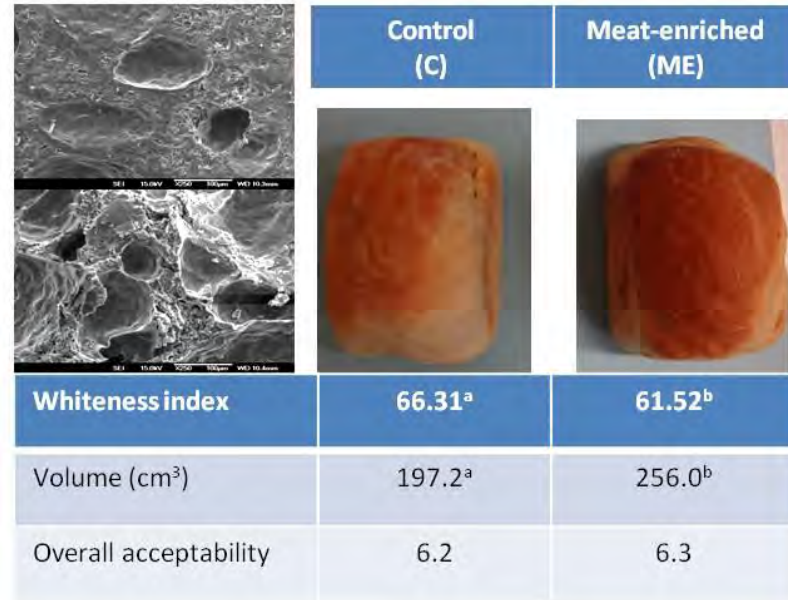
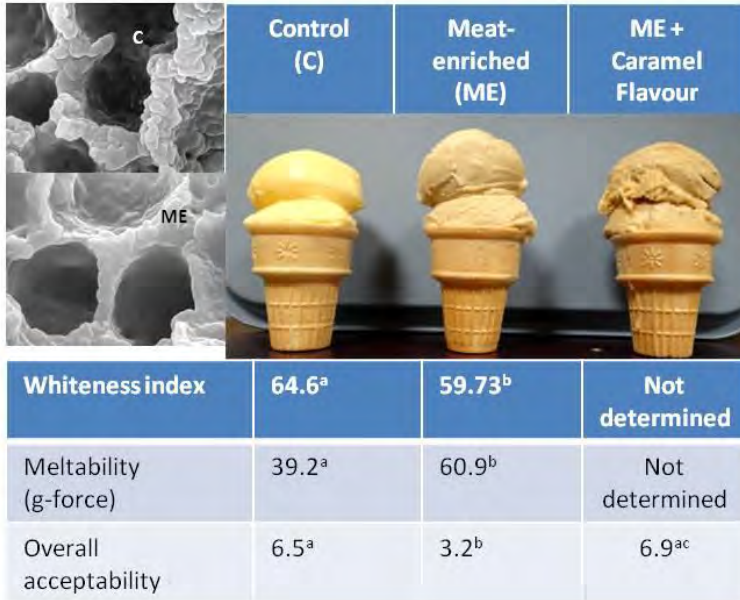
Capitalise on demographics

Capitalise on taste trends
for savoury flavours

*Create opportunities
for meat beyond
the chilled and
frozen food aisles*



Consumer acceptability of novel meat combifoods



CONCLUSION

- NZ meat industry must produce high quality added-value meat products to remain profitable
- Farmers have an important role in ensuring high quality meat is produced in NZ
- Value can be added in response to current market signals but also future demands must be anticipated and met
- Meat quality cues are good pointers for adding value
- Gustatory considerations will continue to determine the value of meat but function will grow in importance

Thank you