



**AFNS**

**Agricultural, Food and Nutritional Science**

Acclaimed Centre for Agri-Food Excellence



# Innovation in Meat Science and Technology

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## Thanks to...

- Dr. Linda Saucier, Université Laval, Québec, Canadian Meat Science Association Technical Chair



Institute for Food and Agricultural Sciences, Alberta

## What we'll talk about today...

- Link between innovation and R & D
- Three advancing meat quality technologies
- Market implications

# Innovation:

- **noun 1** the action or process of innovating. **2** a new method, idea, product, etc. (Compact Oxford English Dictionary)

# Research and Development

- **noun** (in industry) work directed towards innovation in and improvement of products and processes. (Compact Oxford English Dictionary)

# Meat Quality Technology #1

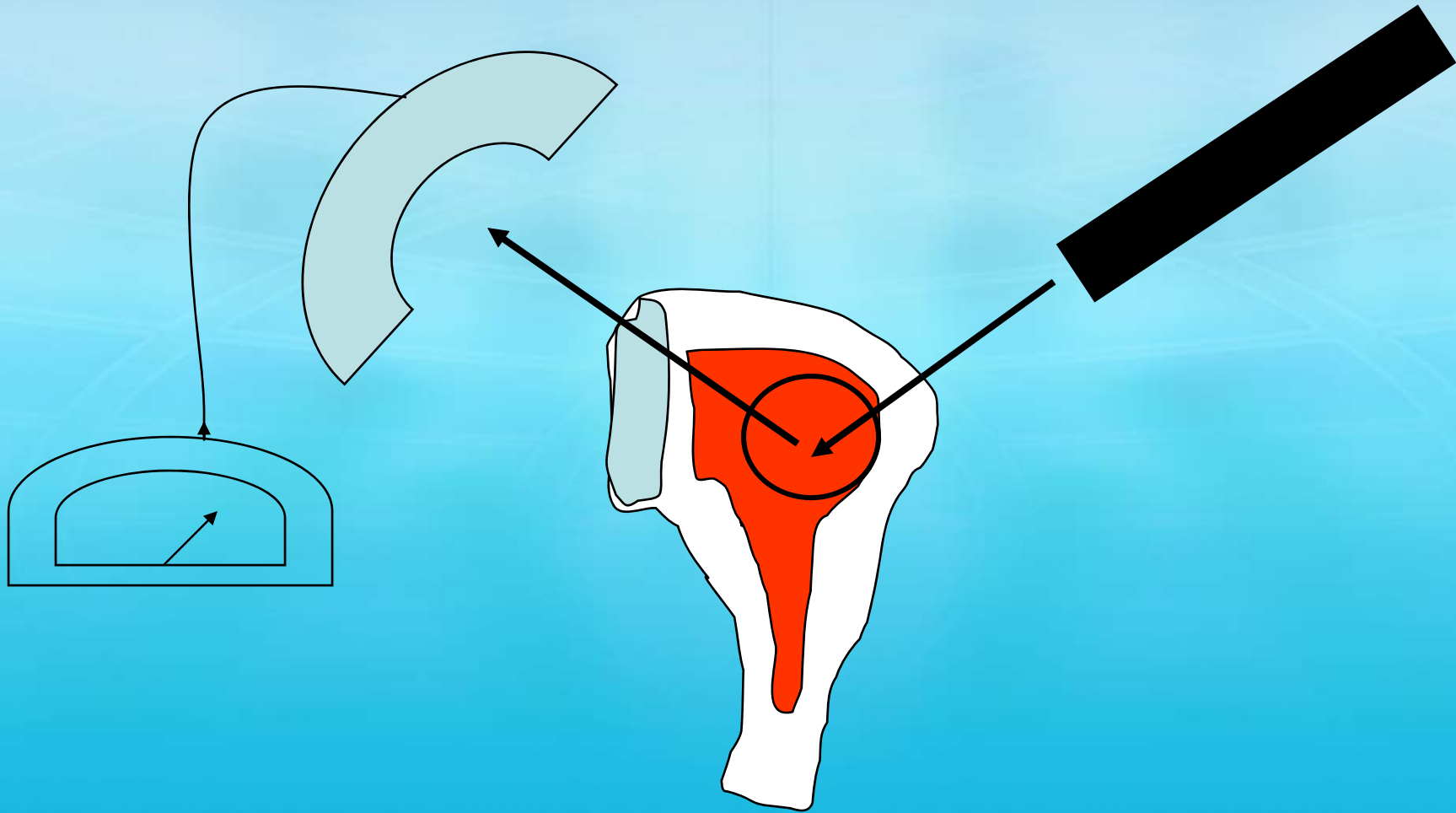
Near-infrared spectrometry  
(NIR):

- Scans sample with light from 730 to 1100 nm
- Visible light from 400 to 700 nm



SpectraStar 2400 RTW  
Unity Scientific, USA

# NIR continued



# NIR continued

- Currently estimates:
  - fat content
  - Moisture
  - Collagen
  - Protein content
  - Salt content



FoodScan™ Meat Analyzer

# NIR continued

Characteristic	R <sup>2</sup> value (R <sup>2</sup> = 1 is perfect)		
	Andrés et al. 2008 (raw beef steak)	Ripoll et al. 2008 (raw beef mince)	Qian et al. 2007 (raw pork chop)
pH <sub>24 hours</sub>	0.97	NA	0.28
L* 60 min	0.82	NA	0.62
Tenderness	NA	0.96	NA
Juiciness	NA	0.34	NA
Contraction	0.16	NA	NA
Water loss	0.20	0.89	0.61
Toughness	0.65	0.74	NA

# NIR continued

- Applications:
  - On-line characterization of meat quality
    - Sausage, processed meats
    - Pork/beef pH
  - Quality verification
- Advantages:
  - Non-invasive, non-destructive, fast, high-throughput
  - Clean, cost-effective
- Disadvantages:
  - Equipment bench top, not portable
  - Monitoring only

# Meat Quality Technology #2

## Genomics

- What is it?
  - Structural – sequencing and mapping
  - Functional – gene expression
- What can it do?

## Proteomics

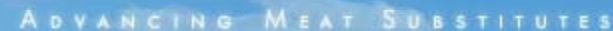
- What is it?
- What can it do?

# Genomics/Proteomics

- Closes gap between genetics and meat quality
- Examples:
  - DNA test for PSS (HAL – 1843 gene)  
(GenMark/Vita-Tech Inc.)
  - RN<sup>-</sup> (Redement Napole, PRKAG3 gene)
  - Calpastatin & calpain (GeneSTAR®, formerly Bovigen LLC now Pfizer Animal Health)

# Meat Quality Technology #3

## Cell culture meat

The logo for New Harvest is located in the top left of a white banner. It consists of the words "New Harvest" in a black, sans-serif font, with a small orange and yellow leaf icon between the words.A blue banner with the text "ADVANCING MEAT SUBSTITUTES" in white, all-caps, sans-serif font, located in the top right of the white banner area.

- a nonprofit research organization working to develop new meat substitutes, including cultured meat (meat produced in vitro), in a stem cell culture, rather than from an animal
- First in vitro meat consortium conference April 9-11, 2008, Norway
- Environmentally concerned scientists

# Cell culture (continued)



(Dr. Louis Lu, CSIRO HSN)

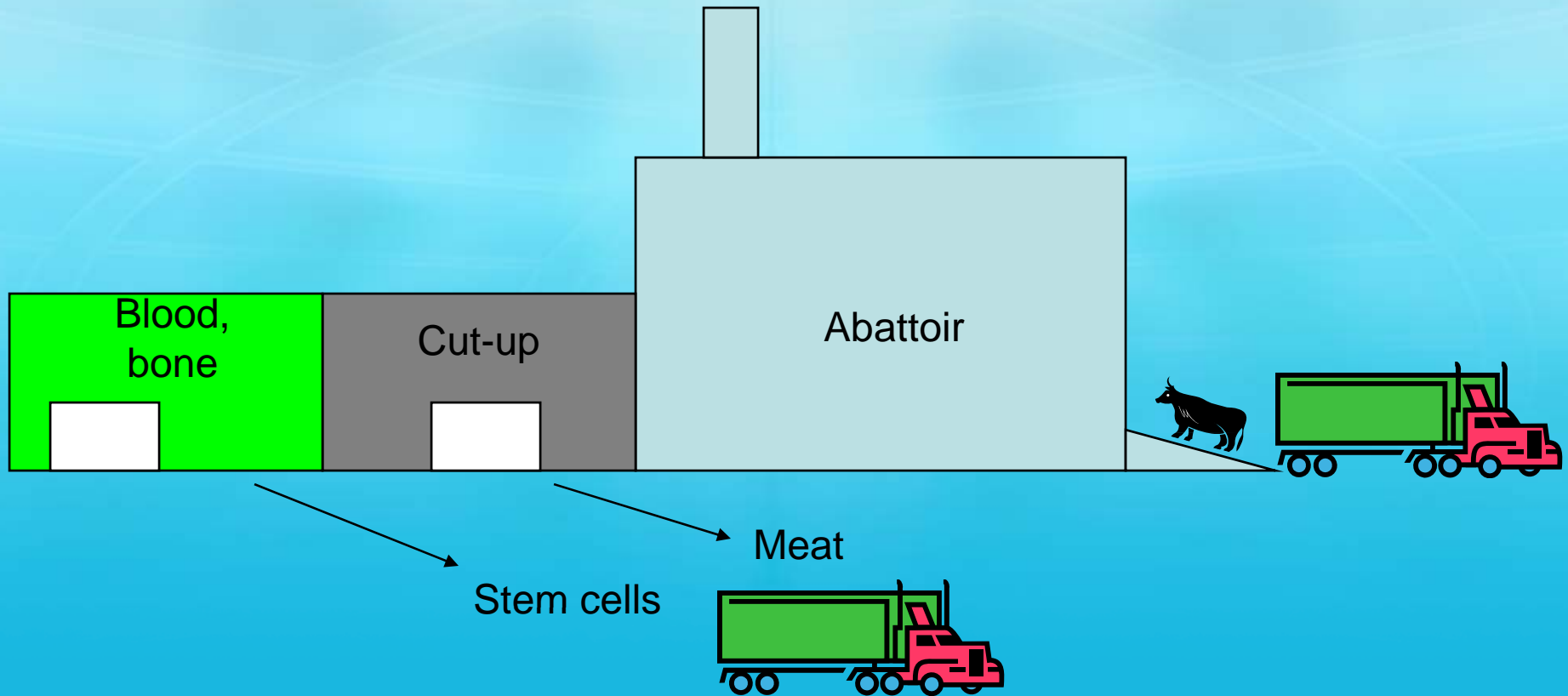
# Market Implications

- NIR
  - new grading system?
  - index for consumers?
  - 4 significant patents for on-line apparatus
  - Coupled with ViaScan (beef) for retail yield and quality?

# Market Implications (continued)

- Genomics
  - interaction with processing environment
  - targeted processing of animals
- Stem-cell meat
  - expensive now
  - limited by technology, understanding
  - two-tiered market?

# Market Implications: In vitro meat



# Forward-looking:

- **adjective** favouring innovation;  
progressive

Thank you!

