



AFNS

Agricultural, Food and Nutritional Science

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Innovation in Meat Science and Technology

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Thanks to...

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



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

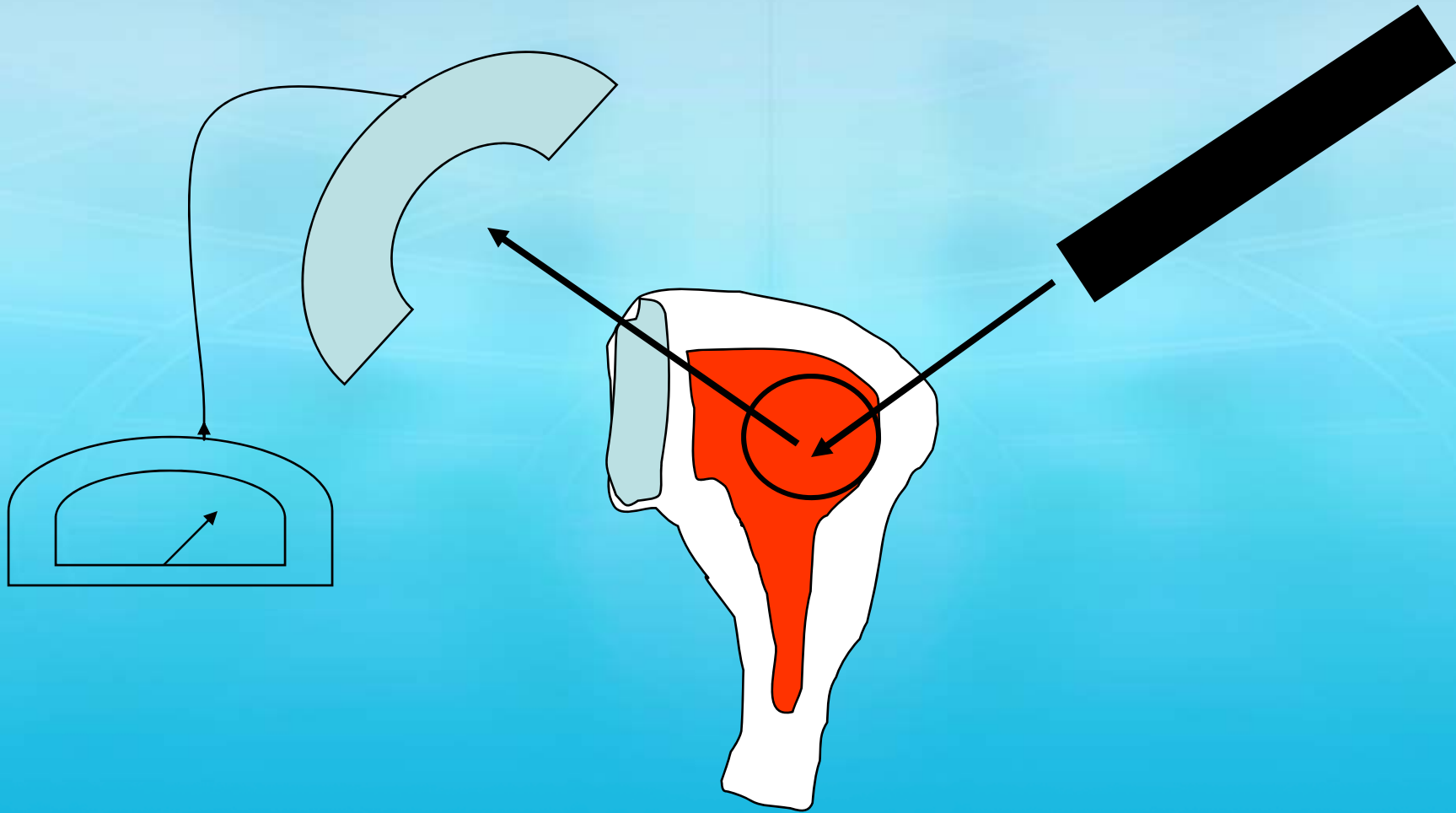
Near-infrared spectrometry
(NIR):

- 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 ² value (R ² = 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 _{24 hours}	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⁻ (Redement Napole, PRKAG3 gene)
 - Calpastatin & calpain (GeneSTAR®, formerly Bovigen LLC now Pfizer Animal Health)

Meat Quality Technology #3

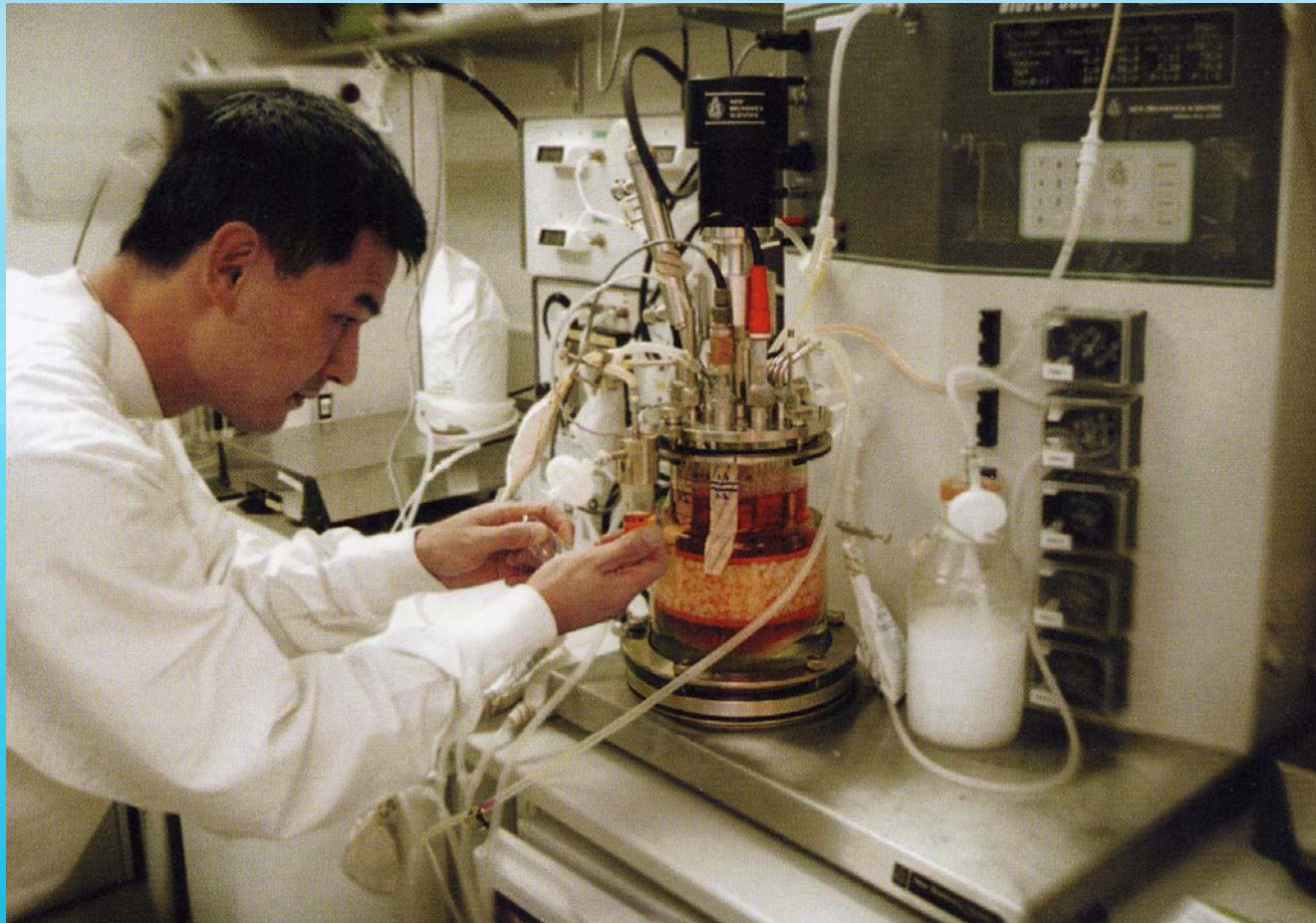
Cell culture meat

New  Harvest

ADVANCING MEAT SUBSTITUTES

- 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)

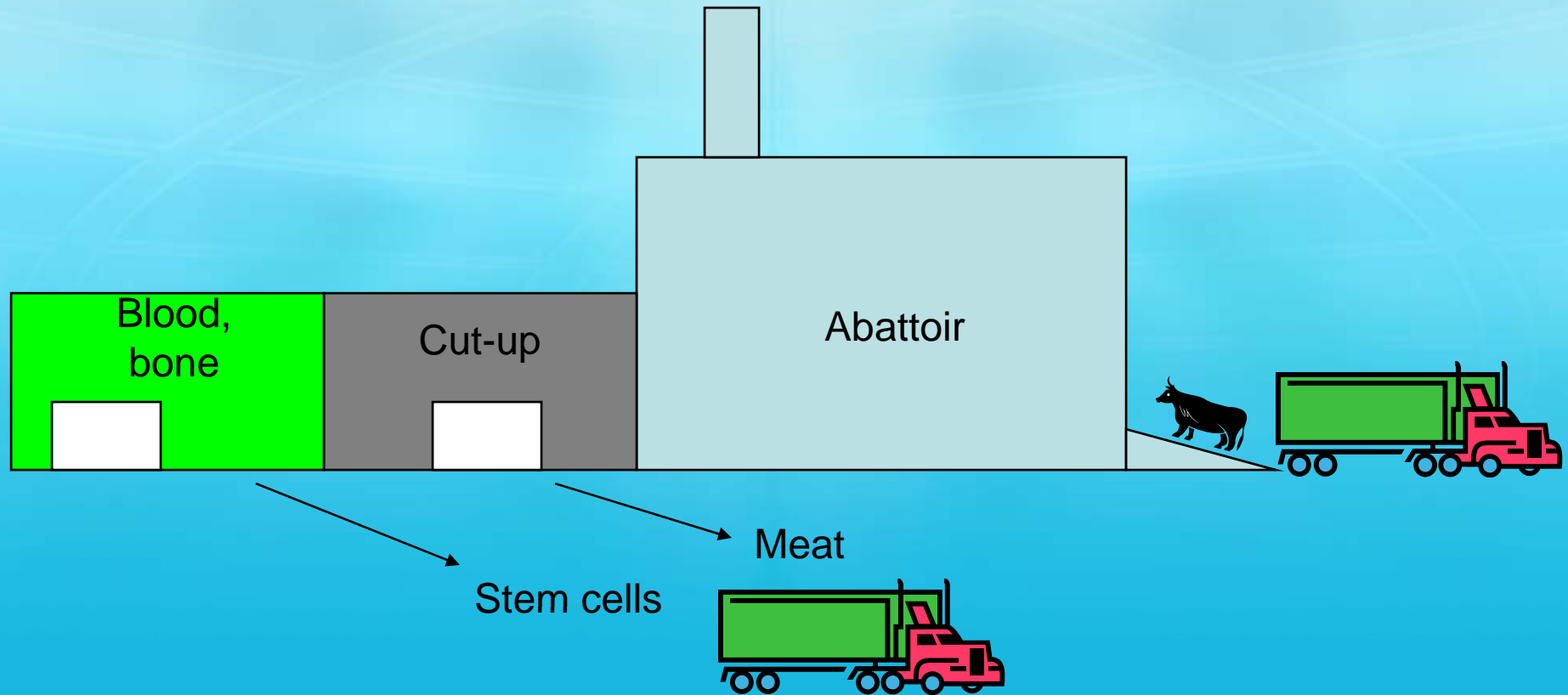
Market Implications

- 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!

