



Introduction to LMC and Danish meat research

Dr Alan Friis

LMC – The Centre for Advanced Food Studies



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Vision

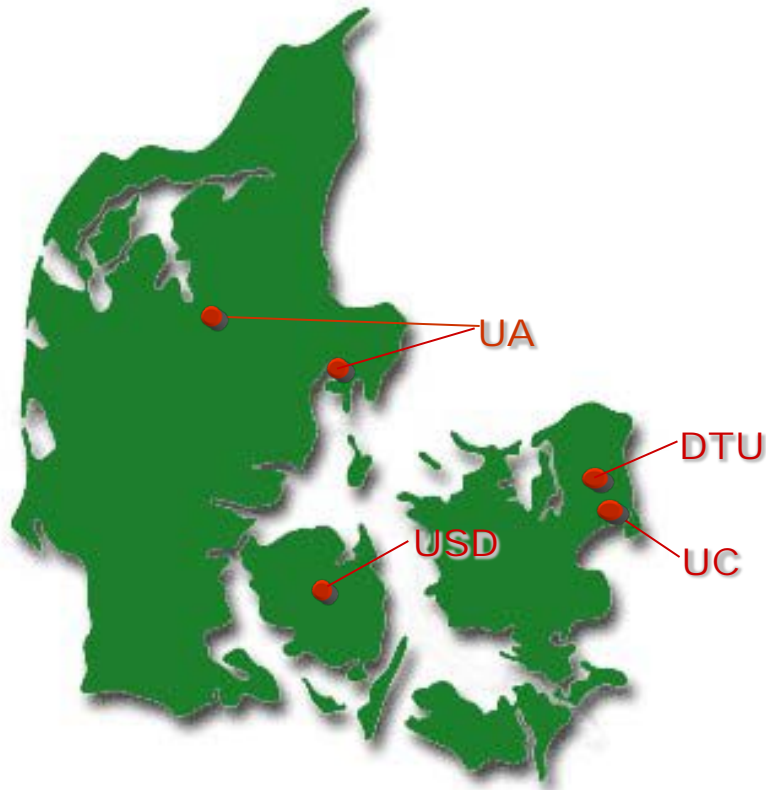
- A unifying gateway to Danish food research

Mission

- To strengthen the Danish food research
- To make it visible through research, education & innovation
- To support and promote a competitive food industry
- To ensure high-quality, healthy, safe and tasty foods



LMC Partners 2009



University of Copenhagen (UC)

- Department of Food Science
- Department of Human Nutrition
- Department of Disease Biology*
- Department of Biology*

Technical University of Denmark (DTU)

- DTU Systems Biology*
- DTU Chemical Engineering*
- DTU Aqua*
- DTU National Food Institute

Aarhus University (AU)

- Faculty of Agricultural Sciences*
- MAPP-centre, ASB

University of Southern Denmark (USD)

- Faculty of Health Sciences*
- Faculty of Sciences*
- Faculty of Engineering*

* Partly



LMC in numbers – 2008

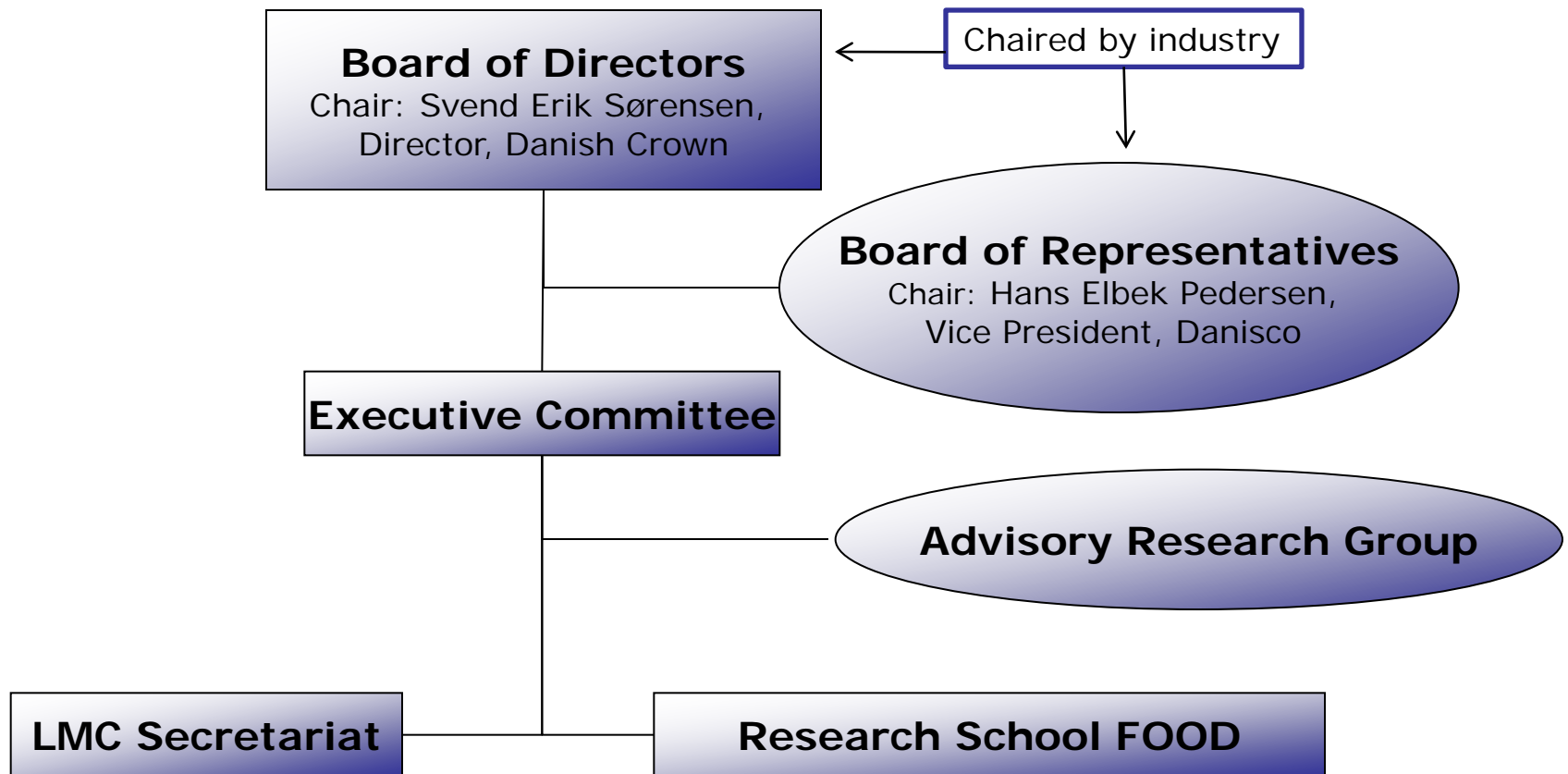
Number of scientists: 620 (man-year)

Turnover: 79 mio. €

- Basic funding: 46%
- National public funding: 35%
- National private funding: 8%
- EU funding: 9%
- International private funding: 2%



LMC Organisation 2009





LMC Objectives

- Framing a strategy on research, higher educations, innovation & public sector consultancy
- Fundraising – in particular EU-programmes
- Profiling & promotion
- Link between academia and industry
- Education coordination
- Research coordination
- Support to the research school FOOD Denmark



LMC Strategy 2009-2013

Key Research Themes

- Consumer-Oriented Added Value in the Food Chain
- Food Safety in a Global Perspective
- Personalised Nutrition and Health
- Sustainable and Ethical Food Production
- Modern Production Technology
- Biocatalysis and Synthetic Biology
- Molecular Functionality



International Advisory Board 2008: 10 out of 31 Groups: International Excellence

- **University of Copenhagen**

Department of Food Science:

Food Chemistry - Sensory Science - Quality and Technology

Department of Human Nutrition

Prevention & Treatment of Obesity - Paediatric and International Nutrition

- **Technical University of Denmark**

Department of Systems Biology:

The Centre for Systems Microbiology - The Centre for Microbial Biotechnology - Enzyme and Protein Chemistry

- **Aarhus University**

MAPP (Centre for research on customer relations in the food sector)

- **University of Southern Denmark**

Department of Biochemistry and Molecular Biology

Protein Research Group





Danish Meat Research



The Actors in Danish Meat Research

LMC

- LMC coordinate the public food-related research
- Main players: University of Copenhagen, Aarhus University, Technical University of Denmark

Danish Meat Research Institute (DMRI)

- DMRI develop and research the entire food chain: The pick-up of animals at the farmers, every step through slaughtering and processing until consumers eat the final product
- DMRI are in the knowledge fore front of meat and slaughter technologies
- DMRI bridge research and industry

Meat Science Committee (MSC)

- Consists of representatives for the Danish public and private institutions/companies: DMRI, LMC and industries: Danish Crown, Tulip Food, Danish Agriculture and Food Council
- MSC has an overall strategy for Danish meat research
- The goals of MSC are:
 - *To coordinate the strategy*
 - *To contribute to Danish meat science being world leading*
 - *To maintain and develop the cooperation between universities and other central actors*
 - *To promote that MSc in Meat Science equals the needs of the industry*



University of Copenhagen, Department of Food Science

Head of department: *Dr Lars Nørgaard*

Research group: *Meat Science*

Head of group: *Professor Dr Anders H Karlsson*

- A broad area, from gene to meat product
- Understanding biological aspects of cell development and fundamental physics, biochemical and molecular biological aspects, processes and mechanisms of importance for the quality of fresh meat, and its quality as a raw material for further processing, and meat functionality aspects in relation to the quality of meat products
- Main areas:
 - *Muscle and Meat Biochemistry*
 - *Muscle Physiology*
 - *Muscle Functionality and Ultra Structure*
 - *Systems Biology and Meat Science*
 - *Bio-Imaging (Center of Advanced Food Imaging)*
- Results are disseminated to the Danish agriculture and food industry, students, the scientific community and the public



Aarhus University, Department of Food Science

Research Director: Jacob Holm Nielsen

Research group: Muscle Biology and Meat Quality

Head of group: Bo Ekstrand

- Physiological, biochemical and physical processes in the living animal, muscles and meat
- Main research areas:
 - *Muscle cell growth and muscle protein turnover in relation to meat quality development*
 - *Muscle energy metabolism - to study processes that are essential to water-holding capacity, color and flavor development in meat*
 - *Water distribution within the muscle in relation to the physiological status of the animal at slaughter and the following processing of the meat*
 - *Identification and interaction of selected genes, proteins and metabolites with an impact on performance and meat quality characteristics in order to find markers for the quality of fresh and processed meat*
 - *Evaluation of carcass and meat composition*
- The research will develop methods which contribute to the production of meat and meat products of high quality, and to an increased knowledge of fundamental biological mechanisms involved in pre and post mortem meat quality development.



Technical University of Denmark, FoodDTU

Centre Director: Alan Friis

Departments: National Food Institute & DTU Informatics

Head of groups: Jens Adler-Nissen, Bjarke Christensen, Bjarne Ersbøll & Rasmus Larsen

- Food safety, process technology, mathematical modeling, vision technology concerning meat processing and optimization of quality of processes meat
- Main research areas:
 - *Optimisation of product safety; minimizing risk for contamination, optimisation of own-control, developing new methods for decontamination of food and packaging*
 - *Improved biotraceability of unintended microorganisms (Biotracer)*
 - *Roasting of meat, eq. understanding the complex processes during the process (change in microstructure, physical properties of meat matrix, etc.)*
 - *Understanding the interaction between process and product by use of vision technology (CT scanning)*
 - *Developing of new measurement techniques, data-analysis and on-line measuring systems*
- The research will develop technologies which contribute to improving the quality and safety of processed meat products as well as providing tools based on image analysis and mathematical models which can optimize and modernize meat slaughterhouses and meat processing



Danish Meat Research Institute

Managing director: Lars Hinrichsen

Research departments: Slaughter Technology, Measuring Systems, Hygiene and Preservation, Meat Quality

Head of groups: Jens Ulrich Nielsen, Peter Wagner, Rie Sørensen, Susanne Støier

- The chain from 'stable to plate'
- Product quality, food safety, process efficiency
- Main areas:
 - *High level technology - improve productivity from stable to retail, improve working environment, develop machines, robots and production systems*
 - *Integrated IT - statistics, computer programming, CT scanning and imaging, control systems that put life into robots, classification of pork, beef and poultry, X-ray, ultrasound and vision*
 - *Safe meat products - focus on safety, quality and sensory properties, mathematical modelling, new processing technologies and ingredients*
 - *Quality from gene to plate - optimal quality of beef, pork and poultry, animal welfare, optimal slaughter and chilling processes, consumer and sensory research for production of high quality products for retail*
- DMRI is the bridge between the Danish meat industry and national and international research and development