

*5th International Symposium*



**Milk Genomics  
& Human Health**

October 14-16, 2008 – Sydney, Australia

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## **Program Schedule**

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Organized by





5<sup>th</sup> International Symposium

## **Milk Genomics & Human Health**

**Tuesday, October 14, 2008**

*Amora Jamison Hotel – Sydney, Australia*

- 8:00** Registration
- 8:30 – 17:30** Program Sessions – Whiteley I
- 8:30 – 8:40** **Welcome**  
Joseph O'Donnell, California Dairy Research Foundation – USA  
Peter Williamson, University of Sydney – Australia
- 8:40 – 9:00** **Opening Remarks – Introduction to Symposium**  
Bruce German, University of California, Davis – USA

The major milestone in understanding milk genomics is the long awaited release of the bovine genome. The process of assembling, annotating and interpreting this massive scientific resource will now begin.

### *The Bovine Genome Project*

#### *The Bovine Genome Reveals Unique Biological Functions*

While each new mammalian genome assembly provides a new opportunity to look at milk from a genomic perspective, none could be more important to the IMGC than the genome assembly of the dairy cow.

- 9:00 – 9:45** **Milking Those Genomes One at a Time**  
Monique Rijkels, Baylor College of Medicine – USA

#### *The Bovine Lactation Genome*

Given the extensive bovine milk and lactation-related data available, the bovine genome assembly provides a first opportunity to map this data to mammalian genomes and provide unique insight into the evolution of milk production.

- 9:45 – 10:30** **The Bovine Lactation Genome: Insights into the Evolution of Mammalian Milk**  
Danielle Lemay, University of California, Davis – USA
- 10:30 – 10:45** Morning Break

*The Bovine Immune Genome: Mucins in Bovine Milk*

The study of immune-related genes in dairy cattle is yielding many interesting stories, one of which is a protein in bovine milk that protects the consumer from bacterial infection.

**10:45 – 11:30**            **Bovine *Muc1*: a polymorphic gene encoding a highly glycosylated milk mucin that protects epithelial cells from bacterial attachment**

Ross Tellam, CSIRO Livestock Industries – Australia

*The Bovine Immune Genome: Evolution of Innate Immune Genes*

Throughout time, some genes are born, some are lost, and some are transformed. With the assembly of the bovine genome, the history of genes involved in protecting the dairy cow can now be told.

**11:30 – 12:15**            **Gene Expansion & Evolution Within Families of Innate Immune-Related Genes in Cattle**

Tom Wheeler, AgResearch – New Zealand

**12:15 – 13:45**            Lunch – Gallery Restaurant  
Poster Setup – Whiteley I

*Insights from Monotreme and Marsupial Milk to Humans*

*The Immune Components of Marsupial Milk*

The evolution of milk is beginning to be revealed by genomics technologies and thanks to stellar programs in marsupial and monotreme genomes we are beginning to see the ‘fruits’ of that research.

**13:45 – 14:30**            **Maternal Secretions and Their Role in the Protection of the Young Marsupial**

Elizabeth Deane, Australian National University – Australia

*The Evolution of Milk and Lactation: Lessons from the Platypus*

Lactation strategies among mammals are remarkably diverse and studies of various mammalian models are providing some of the most insightful research into mammalian biology and the potential to alter dairy production for human health.

**14:30 – 15:15**            **Monotremes & Fur Seals: Models to Study Evolution of Lactation**

Julie Sharp, Deakin University – Australia

**15:15 – 15:30**            Break and Poster Review

*Student Presentations*

**15:30 – 17:00**            **Recipients of the IMGC Student Travel Award Present**

**15:30 – 15:45**            **Transcriptome analysis of the liver during lactation**

Arun Sondur Jayappa, ReproGen – Australia

- 15:45 – 16:00**      **During pregnancy, the goat mammary tissue first express genes representative of the immune function before the acquisition of its complete secretory phenotype**  
Felicie Faucon, INRA – France
- 16:00 – 16:15**      **Comparative analysis of marsupial and eutherian genomes to identify genes critical in bovine milk production**  
Christy Vander Jagt, University of Melbourne – Australia
- 16:15 – 16:30**      **Gut epithelial cells transcriptional response to Bifidobacteria and Human milk oligosaccharides (HMOs), a focus on synergistic changes in surface glycosilation patterns**  
Riccardo LoCascio, UC Davis – USA
- 16:30 – 16:45**      **Transcriptional regulation of the *β-galactoside α-2,6 sialyltransferase 1* gene in the bovine mammary gland**  
Jovana Maksimovic, Monash University – Australia
- 16:45 – 17:00**      **Comparative genomics: The folate receptor alpha gene a potential key regulator of milk protein synthesis**  
Karensa Menzies, University of Melbourne – Australia

### *Discussion*

The final session of the day will catalyze the discussion for the balance of the symposium. The results of the research and their applications to the problems and opportunities posed in day one will be discussed in an open forum.

- 17:00 – 17:30**      **Discussion**  
Bruce German, University of California, Davis – USA
- 19:00 – 20:00**      Cocktail Reception/Poster Review – Whiteley I

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## Milk Genomics & Human Health

Wednesday, October 15, 2008

Amora Jamison Hotel – Sydney, Australia

8:30 Registration

9:00 – 17:00 Program Sessions – Whiteley I

### *Lipids in Milk: How Did They Get There?*

#### *Synthesis of Milk Lipids*

While some milk lipids are derived from the maternal diet, others are synthesized in the mammary gland. How do mammals decide where the fat comes from?

9:00 – 9:45 **Regulation of *de novo* Lipogenesis in the Lactating Mammary Gland: Systemic vs Local Regulation**  
Margaret (Peggy) Neville, University of Colorado -- USA

#### *Secretion of Milk Fat Globules*

The globules of milk are a unique model for lipid particle secretion. Evolution most assuredly took an innovative approach to the globules of lipids in milk and the basic functions are being revealed for their biological and nutritional roles.

9:45 – 10:30 **Butyrophilin (BTN) Binds to Xanthine Oxidoreductase (XOR): Implications for the Function of BTN and XOR in Milk Secretion**  
Ian Mather, University of Maryland – USA

10:30 – 10:45 Break and Poster Review

### *Regulation of Milk Traits*

#### *Regulation of Lactoferrin by Milking Strategy*

Lactation is one of the most complex processes of mammalian biology with many input variables. This study demonstrates a relationship between milking strategy and milk composition.

10:45 – 11:30 **Milking Interval is a Major Source of Variation in Milk Lactoferrin Concentration**  
Steve Davis, ViaLactia – New Zealand

### *Regulation of Milk Synthesis by the Mitochondrial Proteome*

The mammary gland is a remarkable bioreactor, producing myriad constituents with as little expenditure of energy as possible. Let's look into how it is fuelled and why milk production declines over time.

**11:30 – 12:15**                    **Changes in Mammary Gland Function During Prolonged Lactation Coincide With Changes in Mitochondrial Biogenic Processes**

Darryl Hadsell, Baylor College of Medicine – USA

**12:15 – 13:45**                    Lunch – Gallery Restaurant  
Poster Review – Whiteley I

### *Regulation of Milk Traits (Continued)*

### *The Genetic Architecture of Milk Traits in Dairy Cattle*

The dairy industry has devoted enormous resources towards the understanding of genetic control of milk traits. New research in this area has brought us closer to this goal.

**13:45 – 14:30**                    **Whole Genome Analyses Using High Density SNP Screens and Transcriptome Profiling Reveal New Insights in Genetic Architecture for all Major Traits in Dairy Cattle**

Herman Raadsma, CRC for Innovative Dairy Products – Australia

### *Assessment of Milk Trait Effectors in Dairy Cattle*

From identification of candidate genes to their functional assessment, it may soon be possible to control traits such as milk protein expression, longevity of lactation and resistance to mastitis.

**14:30 – 15:15**                    **Elf5 Expression In the Bovine Mammary Gland During the Lactation Cycle and its Role in Milk Protein Gene Expression In Vitro**

Paul Sheehy, University of Sydney - Australia

**15:15 – 15:30**                    Break and Poster Review

### *Researcher Highlights*

**15:30 – 16:30**                    **Research Highlights from Around the World**

### *Discussion*

The final session of the day will again catalyze intensive discussion for the participants. The results of the research and their applications to the problems and opportunities posed in day one will be discussed in open forum.

**16:30 – 17:00**                    **Discussion**  
Bruce German, University of California, Davis – USA

19:15 – 22:00                    Dinner Cruise (Advance Tickets Required)

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## **Milk Genomics & Human Health**

**Thursday, October 16, 2008**

*Amora Jamison Hotel – Sydney, Australia*

- 8:30** Registration
- 9:00 – 13:30** Program Sessions – Whiteley I

### *Looking to the Future*

#### *Discoveries in Human Breastmilk*

Lactation continues to surprise scientists with new discoveries that completely change the way we consider lactation and the products that have emerged from the natural selection process on this bioreactor. Be prepared to be amazed – again!

- 9:00 – 9:45** **Putative Stem Cells in Human Breastmilk**  
Mark Cregan, University of Western Australia – Australia
- 9:45 – 10:15** **Is sialic acid in milk food for the brain?**  
Bing Wang, Nestlé Research Center – Switzerland
- 10:15 – 10:30** Break and Final Poster Review

### *Pulling it All Together*

We have the major genomes of interest. Now the big questions: what can we do immediately with this new resource, what do we still need to assemble to move forward faster? How can the IMGC serve to steward the successful collaborations that are now possible?

- 10:15 – 11:30** **Translating the Dairy Genome: Milk Proteins and Function**  
Peter Williamson, University of Sydney – Australia

### *Summary & Future Direction*

- 11:30 – 12:00** **Summary & Future Direction (Final Session)**  
Bruce German, University of California, Davis – USA  
Peter Williamson, University of Sydney – Australia
- 12:00 – 13:30** Lunch and Poster Teardown

*International Milk Genomics Consortium*

**13:30 – 15:30**      **International Milk Genomics Consortium – Whiteley I**  
Steering Committee Meeting  
*(Members Only)*

**15:30 – 15:45**      Break

**15:45 – 17:30**      **International Milk Genomics Consortium – Whiteley I**  
Scientific Advisory Committee Meeting  
*(Members Only)*





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