

1. Record Nr.	UNINA9910826824503321
Titolo	Systems biology and livestock science / / edited by Marinus F.W. te Pas, Henri Woelders, Andre Bannink
Pubbl/distr/stampa	Chichester, West Sussex ; ; Ames, Iowa, : Wiley-Blackwell Wageningen, : Wageningen UR Livestock Research, 2011
ISBN	9780470962961 0470962968 9780470962930 0470962933 9780470963012 0470963018
Edizione	[1st ed.]
Descrizione fisica	1 online resource (756 p.)
Altri autori (Persone)	PasM. F. W. te BanninkAndre WoeldersHenri
Disciplina	636.089/2
Soggetti	Veterinary physiology - Computer simulation Livestock Livestock - Genetics - Computer simulation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover; Title Page; Copyright; List of Contributors; Preface; From livestock production to biological science: from systems biology to livestock production; Chapter 1: Introduction to Systems Biology for Animal Scientists; Why Should Animal Scientists Be Interested in Learning About Systems Biology?; What Is Systems Biology?; A Systems Biology Paradigm: The Progress in Analysis of the Mammalian Immune Response Network; What Parts of Systems Biology Are in Use in Animal Science Today?; Further Reading; Partial Listing of Online Resources for Systems Biology; Web sites; Acknowledgments Chapter 2: Modeling Approaches in Systems Biology, Including Silicon Cell ModelsWhat Is Systems Biology; Various Systems Biological Models; Three Strategies to Build a Model: Top-Down, Middle-Out, and Bottom-

Up; Perspectives of Silicon Cell Models: Advantages and Concerns; Use of Systems Biological Models, Including Silicon Cell Models; Acknowledgments; Chapter 3: The IUPS Physiome Project: A Worldwide Systems Biology Initiative; Introduction; Fundamental Principles of the Physiome Project; The Framework and Strategies of the Physiome Project; The Current Status of Physiome Modeling Conclusions and Future Directions Acknowledgments; Chapter 4: Systems Biology in Livestock Health and Disease; Introduction; Defining Systems Biology in the Medical Context; Establishing the Need for Systems Biology Approaches in Human and Veterinary Medicine; Systems Biology and Personalized Healthcare in Human Medicine; Areas of Application of Systems Biology to Human Medicine; Barriers to Implementing Personalized Medicine in Human Medical Practice; Systems Biology Techniques; Novel Technologies; Personalized Medicine Versus Livestock Population Health; Molecular Diagnostics Using Systems Biology to Understand Host-Pathogen Interactions Molecular Epidemiology; Example of Systems Biology Applications in Livestock Health: Mastitis in Dairy Cattle; Conclusion: Challenges of Applying Systems Biology Concepts and Techniques to Livestock Health Management; Chapter 5: Systems Biology of Host-Food-Microbe Interactions in the Mammalian Gut; The Gastrointestinal Tract and Body Homeostasis; The Need for Systems Approaches to Study Diet-Host-Microbiota Interactions; The Gastrointestinal (GI) Tract; Energy Homeostasis; Signaling and Hormone Homeostasis Homeostasis of Tolerance and Immunity Nutritional Challenges; The Intestinal Microbiota; Integrated Modeling Approaches; Challenges Ahead; Conclusions; Chapter 6: From Visual Biological Models Toward Mathematical Models of the Biology of Complex Traits; Introduction; Generation of a Biological Model; Association Studies Relating the Expression Levels of Genes or Proteins to Quantitative Traits; Bioinformatics Toward Systems Biology: Biological Models Toward Mathematical Models; Future Expectations; Acknowledgments Chapter 7: Molecular Networks as Sensors and Drivers of Uterine Receptivity in Livestock

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#### Sommario/riassunto

Systems Biology is an interdisciplinary approach to the study of life made possible through the explosion of molecular data made available through the genome revolution and the simultaneous development of computational technologies that allow us to interpret these large data sets. Systems Biology has changed the way biological science views and studies life and has been implemented in research efforts across the biological sciences. Systems Biology and Livestock Science will be the first book to review the latest advances using this research methodology in efforts to improve the efficie

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