

A high-magnification scanning electron micrograph showing the intricate, finger-like projections of intestinal villi. The villi are densely packed and have a complex, folded surface. The image is framed by a large, semi-circular magenta shape on the left side.

# Interfacing Immunity, Gut Health and Performance

**CONTEXT**

Edited by LA Tucker  
and JA Taylor-Pickard

# Interfacing Immunity Gut Health And Performance

**Prof. Steven C. Ricke**



### **Interfacing Immunity Gut Health And Performance:**

*Interfacing Immunity, Gut Health and Performance* L. A. Tucker, J. A. Taylor-Pickard, 2004-01-01 This book contains an edited collection of papers taken from a series of one day seminars devoted to bringing together the disciplines of monogastric animal production feed gut physiology microbial populations and immunity in an understandable manner for practical nutritionists and meat producers It provides an overview of key elements of related disciplines some highly technical whilst relating the science back to practical animal production It is intended as an update on the status of specialised topics of the gut As animal science becomes more multi factorial in its nature understanding across disciplines will become crucial in adapting animal production practices to meet both economic and welfare demands Contents Future challenges in poultry meat production Early gut development the interaction between feed gut health and immunity Interaction of nutrition with intestinal microbial communities Commensal bacteria and intestinal development studies using gnotobiotic pigs Regulation of gut function and immunity Controlling gastrointestinal disease to improve absorptive membrane integrity and optimize digestion efficiency Impact of mannan oligosaccharide on gut health and pig performance Index This book is ideal for nutritionists animal producers students and researchers studying animal and applied biological sciences

*Functional Mechanisms at the Avian Gut Microbiome-Intestinal Immunity Interface and its Regulation of Avian Physiological Responses* Michael Kogut, Mariano Enrique Fernández-Miyakawa, 2022-11-25 **The Living Gut** W.N. Ewing, 2009-04-01 Fully revised and updated this study is a significant contribution to the understanding of animal nutrition health and productivity Covering an array of modern topics from the biology of the gastrointestinal tract and the analysis of microbial populations to understanding bio feed ingredients and the use of enzymes oligosaccharides probiotics and organic acids to replace antibiotics in animal diets this is a must have reference for anyone involved in the animal sciences

**Biotechnological Tools in Fisheries and Aquatic Health Management** Bijay Kumar Behera, 2023-11-22 This edited book is focused on SDG 14 life below water This book covers all aspects of fish biotechnology and health management A detailed description is provided of CRISPR Cas9 technology application in the development of superior variety of fish with better growth disease resistance etc accompanied by numerous helpful photographs and schematic diagrams In addition recent developments in nanotechnology and its application in fisheries production enhancement have been discussed Further topics includes probiotics immunostimulants fish genetic markers bioremediation metagenomics transgenerational immune priming application of cell culture in fisheries and nano biosensor application on fish disease diagnosis pollution monitoring etc are provided in details The book is helpful for researchers teachers students farmers and entrepreneurs in utilizing the knowledge on recent advancements in different aspects of fish genetics and biotechnology for future research and aquaculture production enhancement **Antimicrobial growth promoters** D. Barug, J. de Jong, A.K. Kies, M.W.A.

Verstegen, 2023-08-28 It is widely acknowledged that the inclusion of antimicrobial growth promoters AGPs in the diet of

livestock increases growth rate However many questions arise on whether the benefits outweigh the risks or vice versa Recent legislative developments in the European Union and USA recommendations by the World Health Organization initiatives taken by the food chain and consumer concerns all point to a widespread voluntary removal of antibiotic feed additives for animal growth promotion In particular Regulation EC 1831/2003 lays down provisions phasing out the authorisations of AGPs in the European Union as from 1 January 2006 This book discusses how this will affect the use non use practice of AGPs Attention is given to the current status and rational design of developments and strategies for animal feeding without the inclusion of AGPs Topics covered include benefits and risks of AGPs risk assessment consumer concerns and demands regulatory aspects and international developments mode of action and innovative alternatives and recent advances in the analysis of AGPs and related products This book contains peer reviewed papers presented at the international conference Antimicrobial Growth Promoters Worldwide Ban on the Horizon The book is filled with valuable information on the pros and cons of use of AGPs as well as on alternative nutritional solutions It is aimed at professionals and researchers in the feed and food industry

Direct-Fed Microbials and Prebiotics for Animals Todd R. Callaway, Steven C. Ricke, 2023-10-11 In this exciting update readers will learn how feeding direct fed microbials including eubiotics postbiotics prebiotics and synbiotics is becoming increasingly widespread during food animal production Animal production must improve efficiency of growth and the use of direct fed microbial and prebiotic additives to domestic animals has become widely accepted and utilized The benefits of probiotic type approaches in cattle pigs fish and poultry include improved general animal health reduced foodborne pathogen populations increased growth rate and feed efficiency improved milk and egg production and have been reported world wide Successes from probiotic approaches in multiple species have ensured their adoption however several fundamental questions remain Early establishment and retention of an ecological balance in the gastrointestinal tract is an important first step for an external biological additive to be effective in young animals suggesting that some of the benefits of direct fed microbials may be due to an early establishment of a normal native gut microbial population Research has indicated that the establishment of a normal population can enhance gut epithelial integrity preventing inflammation and improving animal health Thus it is important that we understand the key processes that occur during the establishment of the gut microbial population that can impact gastrointestinal fermentation and provide protection against pathogens of the animals and of human consumers Knowing how these processes work and how they impact animal energy and protein expenditures can guide further improvements of available and future commercial products Exciting research opportunities are discussed in this book examining different characteristics of DFMs that are fed to animals to meet different production demands in different production scenarios e g beef versus dairy versus swine versus fin fish The advent of molecular and next generation sequencing offers methods of developing tailored DFMs and of early detection of successful DFM establishment in the gut These techniques will further deepen our insight into understanding

the microbial population of the gut and how these populations impact animal health food safety and sustainability of animal derived protein production      *Diagnosis and Control of Diseases of Fish and Shellfish* Brian Austin,Aweeda

Newaj-Fyzul,2017-03-20 There has been a continual expansion in aquaculture such that total production is fast approaching that of wild caught fisheries Yet the expansion is marred by continued problems of disease New pathogens emerge and others become associated with new conditions Some of these pathogens become well established and develop into major killers of aquatic species *Diagnosis and Control of Diseases of Fish and Shellfish* focuses on the diagnosis and control of diseases of fish and shellfish notably those affecting aquaculture Divided into 12 chapters the book discusses the range of bacterial viral and parasitic pathogens their trends emerging problems and the relative significance to aquaculture Developments in diagnostics and disease management including the widespread use of serological and molecular methods are presented Application dose and mode of action of prebiotics probiotics and medicinal plant products used to control disease are examined as well as the management and hygiene precautions that can be taken to prevent control the spread of disease This book will be a valuable resource for researchers students diagnosticians veterinarians fish pathologists and microbiologists concerned with the management of diseases of fish and shellfish      *Biology of Breeding Poultry* Paul M. Hocking,2009 This book reviews the biological science and background to breeding meat poultry specifically broiler turkey and duck These commercial birds have been changed by genetic selection to such an extent that they are substantially different from traditional breeds and laying hens Covering science management and husbandry systems this book is an essential reference for researchers and students in animal science as well as technical staff of breeding companies and poultry meat producers Part of the Poultry Science Symposium Series      ***Isolation of Lactic Acid Related Bacteria from the Pig Mucosal Proximal Gastrointestinal Tract, Including Olsenella Umbonata Sp. Nov. and Veillonella Magna Sp. Nov*** Mareike Kraatz,2011 Whose habitat is this What are their geno pheno and ecotypes These fervent questions in gastrointestinal microbiology are still for the most part unanswered when it comes to what decisively influences pig host nutrition and health the individual bacterial species of the porcine mucosal gastric and small intestinal microbiota Lactic acid producing bacteria in syntrophism with lactic acid fermenting bacteria i e communities of lactic acid related bacteria LARB constitute the predominant and generally most beneficial part of this microbiota The present book gives answers to the aforesaid questions Outlined in six major chapters the book starts off by reviewing the microecology of the pig proximal gastrointestinal tract as well as the different groups of LARB chapter II This leads over to the methodological chapters III and IV which explain the application of two newly developed culture based approaches for isolation of novel species of manganese catalase positive lactobacilli and mucin fermenting LARB Chapters V and VI contain the valid taxonomic descriptions of two novel LARB species namely *Olsenella umbonata* Kraatz et al 2011 and *Veillonella magna* Kraatz and Taras 2008 from porcine mucosal jejunum Chapter VIII ends the book with a discussion of the ecological status niches and host

relationship of *O. umbonata* and *V. magna* thus taking the reader back to the microecology of chapter II

**Alternatives to Antibiotics against Pathogens in Poultry** Awad A. Shehata,Guillermo Tellez-Isaias,Wolfgang Eisenreich,2024-12-02 This volume provides a comprehensive overview of poultry intestinal health and recent advances in alternatives to drug treatment of significant disorders The chapters start with an insight into immunological processes and the communities of gut microbiota In the following a range of antibiotic alternatives in poultry feed and production management is presented including enzymes phytobiotics bacteriophages the use of probiotics synbiotics and many more Expert contributions on the latest technological and diagnostic developments in the field round off this work to accelerate the study of natural products and next generation disease therapy Meeting the demand to combat increased resistance to classic treatment methods this book forms an indispensable guide for all professionals veterinarians nutritionists students and researchers in the poultry industry food production and academia

*Gut Microbiota, Immunity, and Health in Production Animals* Michael H. Kogut,Glenn Zhang,2022-01-19 This work sheds new light on the interplay between the gut gut microbiota and host physiological processes in production animals The gut microbiome shapes health and susceptibility to disease and has become a leading area of research in the animal sciences Gut health encompasses a number of physiological and functional features Nutrient digestion and absorption host metabolism and energy generation a stable microbiome mucus layer development barrier function and mucosal immune responses all of which are required to interact to make an animal perform physiologically and according to its greatest genetic potential This carefully presented book broadens our vision approach and results on gut health and the ability to regulate animal production Understanding the chemistry of microbiomes has broad implications including providing functional annotations for the microbial genomes insights into the chemical languages that link microbes to each other and to their host and translational implications for precision veterinary medicine environmental health and sustainable animal agriculture and welfare Experts working in microbiome research host immunity and animal production veterinarians and researchers in livestock science will understand the great importance of this volume

*Fish Diseases* Galina Jeney,2017-02-11 *Fish Diseases Prevention and Control Strategies* provides essential information on disease prevention and treatment by the most experienced fish culturists in the industry The book presents both traditional and novel methodologies of identifying and addressing fish disease risk along with preventative and responsive insights to the challenges impacting fish production today Both specific vaccination and non specific immunostimulation approaches are explored from maintaining optimal environmental conditions to understanding how stressors in fish affect their immune system Includes relevant information on government restrictions on drug usage in aquaculture to address the strict demand for fish products free of pollutants antibiotics Presents best practices in fish farming to prevent disease and promote good health status and fish disease management Provides the most recent research on fish diseases prevention the pathogens most studied and options for methods of treatment

**New Progress of Nutritional Immunity on Aquatic Animals by**

## **Functional Feed Additives under the Condition of Low Fish Meal** Hongyu Liu, Samad Rahimnejad, Qun Zhao, 2025-06-18

Fish meal constitutes a relatively high proportion of aquaculture feed nowadays while too much reliance on this kind of classic protein source brings high costs and will restrain the development of other available energy providing ingredients. Lipids and carbohydrates are widely acknowledged as great alternatives to fishmeal for their friendly prices and good ability to provide consumable energy. To counteract the negative effects of excess dietary lipids and carbohydrates, specific additives can be introduced into aquatic feed for taking advantage of their benefits for health and immunity. Green functional additives can be a better alternative to antibiotics and have been commonly used in aquatic animal feeds. How to improve the utilization of feed resources and ensure feed safety is the focus of research in aquatic animal nutrition. In order to improve feed safety and aquatic product quality and safety, the development and application of green non-polluting functional additives is particularly important. However, research on functional additives is still at an early stage and their deeper mechanisms of influence on aquatic animals need to be further explored. Feed quality and composition is a key factor in determining fish health. It has been shown that fish growth, serum immunity, gut development, flora structure, immune response, and signal transduction are all closely related to feed quality. Fish consuming low fishmeal feeds often exhibit reduced growth and disease resistance processes that require corresponding changes in metabolic systems and immune response functions. This can be mitigated by supplementing feed with functional additives. Although a number of functional additives have been shown to have a positive impact on aquatic animal growth, research into the specific mechanisms and targets that regulate the physiological state and immune response system of aquatic animals is still at the exploratory stage. Currently, functional additives have been shown to interact with the intestinal flora. At the same time, during the digestion of functional additives in the aquatic animal intestine, their key components can also cause a series of metabolic processes and immune response changes in aquatic animals. Therefore, the specific processes of absorption and metabolism of functional additives as well as the mechanisms affecting aquatic animals need to be studied. Currently, more comprehensive and advanced experimental tools and methods, including cell signaling, correlation analysis, multi-omics, metabolic mechanisms, and immune response analysis, are needed to enrich and elucidate the feasibility and prospects of the application of green functional additives in aquafeeds. The purpose of this Research Topic is to evaluate the influence of such functional feed additives on growth, nutritional, and immunity parameters in marine aquatic animals, especially under the condition of low fish meal. We aim to study the effect of functional feed additives on the nutritional immunity of marine aquatic animals, especially under the condition of low fish meal. Related studies in the format of Original Research, Reviews, and Mini Reviews are welcomed. Development and application of new functional aquatic additives, immunological, metabolic, and intestinal health research affected by low fishmeal feeds and functional feed additives, establishing linkages between target organs (e.g., hepatic, intestinal axis, brain, intestinal axis) based on low fishmeal feeds and functional feed additives, immunological regulation of

aquatic animals by functional feed additives In vitro and in vivo experiments to validate the mechanisms of action and immune regulation of functional additives

**Optimising pig herd health and production** Prof Dominiek Maes, Prof Joaquim Segalés, 2022-10-31 Summarises the wealth of research on optimising pig herd health for increased protection against major diseases including ASF and PRRS Reviews recent advances in understanding gut function and immunity in pigs including the development of nutritional strategies to boost immune function and resistance to disease Explores key challenges facing pig production including breeding disease resistant pigs with a narrowing genetic base and the development of fungicide resistance

*Improving gut health in poultry* Prof. Steven C. Ricke, 2019-11-26 Particular focus on development of the chicken gut microbiome over the lifetime of the bird Reviews interactions between pathogens and the gut and the role of antibiotics in this process Comprehensive review of research on efficacy of poultry feed additives probiotics prebiotics synbiotics antimicrobials essential oils and other botanicals cereal grains

**The Role of Nutritional Strategies in the Regulation of Gut Microbiota and Host Immune System** Li Wang, Caihong Hu, Ming Fan, 2024-12-17 The gut microbiota not only plays important roles in many metabolic pathways but it also provides the host with a variety of functions that promote immune homeostasis immune responses and prevent pathogen colonization The gut microbiota as well as their metabolites and components are required for immune homeostasis and influence host susceptibility to a wide range of immune mediated diseases and disorders The composition of the gut microbiota influences immune system development and modulates immune mediators which in turn affects the function of the intestinal barrier To this end This Research Topic aims to present and discuss the most recent evidence on the role of nutritional strategies in regulating gut microbiota and host immune system which will assist in understanding how nutritional strategies can promote immunity homeostasis and intestinal barrier function via the gut microbiota

**Aquatic Nutrition and Intestine Immunity** Qiyu Xu, Mingchun Ren, Liansheng Wang, Fernando Yugo Yamamoto, Changle Qi, 2023-10-10

*Environmental effects on gut health in production animals* Mike Kogut, Mariano Fernandez-Miyakawa, 2024-08-19 Optimal gut health is of vital importance to the performance of production animals fish poultry swine cattle Gut health is key to making the productivity well being and sustainability of animal production more efficient Directly and indirectly the environment is a powerful regulator of gastrointestinal physiology that decisively influences the functional state of the animal Production animals reared under conventional conditions of intensive production are subjected to various exogenous and endogenous sources of environmental factors that can impact gut health Exogenous factors are environmental stressors derived from external sources connected with diet infectious disease mycotoxin exposure climate heat and cold management practices biosecurity level housing litter feed access quality and components Endogenous factors are host related such as age sex genetics and breed or are made within the host's body such as hormones and neurotransmitters in response to a stimulus stressor or trigger Endogenous factors serve to communicate signals both locally and distantly in the body Understanding the



interactions between the diverse environmental factors and the different physiological characteristics of the gastrointestinal tract allows us to advance the understanding of gut health and the ability to regulate animal production. The spirit of this book is to critically address how the interactions of different environmental stressors both internal and external influence the various functions of the gastrointestinal system of production animals and to be able to use the information to advance scientific research as well as improve the use of the productive tools available.

**Diseases of Poultry** J.R. Glisson, L.R. McDougald, L.K. Nolan, D.L. Suarez, V.L. Nair, 2013-07-11. *Diseases of Poultry* is the most comprehensive reference for all aspects of poultry health and diseases including pathogenesis, diagnostics, epidemiology, and control methods. Published in partnership with the American Association of Avian Pathologists, the Thirteenth Edition remains the international definitive reference, adding newer diagnostic methods and a new chapter on the emerging importance of zoonotic infections for poultry pathogens. Other updates include new high quality photographs, additional discussion of conceptual, operational, biosecurity, and disease control in organic production systems, and a greater emphasis throughout on the differences in disease incidence and treatments for the United States and other areas around the globe. Organized logically by disease type, the book offers detailed coverage of the history, etiology, pathobiology, diagnosis, and intervention strategies, as well as the economic and public health significance, for an exhaustive list of common and uncommon diseases. *Diseases of Poultry* 13th Edition is an essential purchase for poultry veterinarians, veterinary diagnosticians, poultry scientists, students specializing in poultry health, and government officials who deal with poultry health in regulatory climate.

**Nutrition, Immunity and Infection** Prakash S. Shetty, 2010. This textbook discusses the interrelationships between infections and nutritional status. It deals with the fundamentals of the immune function of the human body and the role that nutrition and nutrients play in its optimal functioning. The role that infective processes play in the etiology of malnutrition and the relationships between poor nutritional status and risk of infections are described. There are chapters describing nutrient deficiencies, e.g., vitamin A, and the risk of infections, and chapters on specific infections, e.g., TB, AIDS, and their role in poor nutritional status. Specific coverage is given to those people most at risk from infections: infants, children, and the elderly.

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