

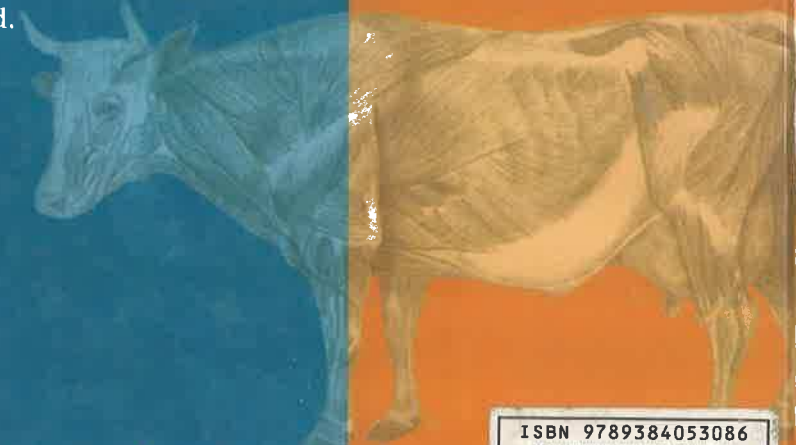
# A HANDBOOK ON ANATOMY & PHYSIOLOGY OF DOMESTIC ANIMALS & BIRDS

A Hand Book on Anatomy and Physiology of Domestic Animals and Birds, First Edition offers a detailed concept on the Anatomical and Physiological aspects of various organ systems of the body. This First edition includes access to discussions especially based on domestic animals and birds. Well illustrated throughout, the book provides in-depth information on the structural and functional views on the major visceral and endocrine organs of the body in a concise manner that will provide good idea to the readers in this regard.



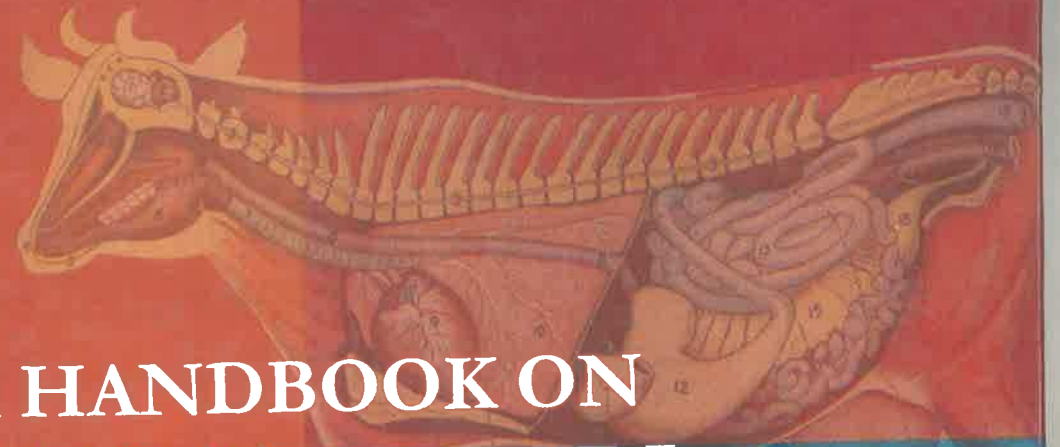
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A HANDBOOK ON ANATOMY  
& PHYSIOLOGY OF  
DOMESTIC ANIMALS & BIRDS

S. SATHAPATHY  
M. K. SINGH  
S. K. JOSHI



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# A Handbook on Anatomy and Physiology of Domestic Animals and Birds

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By :

**S. Sathapathy**  
**M. K. Singh**  
**S. K. Joshi**



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## PREFACE

This book is aimed at Veterinary professionals as it seeks to provide the information related with Anatomical and Physiological aspects of various organ systems of the body. This volume discusses the structural and functional views on the major visceral and endocrine organs of the body in a concise manner.

The Anatomy and Physiology are closely interrelated as one cannot describe any part of the body by excluding its functional significance. We hope that this book will be able to fulfil the basics of the reader about the anatomical and physiological aspects of different body systems, so that they can expand their knowledge by referring other reference books in this regard in an effective manner.

We expect that readers will find this first edition as rewarding to read as we found it challenging and interesting to write.

Srinivas Sathapathy  
Manish Kr. Singh  
Suman Kumari Joshi

## Acknowledgement

We would like to dedicate this edition to our parents, who have supported and guided us in every path of our lives. We also express deep sense of gratitude to our teachers for their valuable suggestions in writing this edition of the book. Our special thanks go to all the co-authors for their significant contribution in writing the different chapters of this book.

We express deep sense of gratitude to the Satish Serial Publishing House, New Delhi for their cooperation and keen interest in the publication.

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## Chapter 1

# Introduction to Anatomy and Physiology

The word Anatomy literally means to cut apart, i.e. complete dissection of a cadaver. In contrast to anatomy, which deals primarily with structure, *physiology* is the study of the integrated functions of the body and the functions of all its parts (systems, organs, tissues, cells, and cell components), including biophysical and biochemical processes. Study in a typical *gross anatomy* laboratory is based primarily on dissection of animal cadavers. These usually have been preserved by embalming, and one or more parts of the vascular system have been injected with a colored material to facilitate identification of the vessels. Careful dissection coupled with close observation gives a concept of the shape, texture, location, and relations of structures visible to the unaided eye and the use of the microscope with properly prepared tissue sections on slides is essential for understanding structures that are so small they cannot be seen without optical or electron microscopic assistance. In physiology the response of whole animals, isolated organs, or individual cells to changes in their environment (both internal and external) are studied.

The anatomist applies the principles of physics to the use of microscopes and applies knowledge of chemistry in the staining of various parts of cells and tissues. The combination of chemistry and microscopic anatomy is known as *histochemistry*. *Gross (macroscopic) anatomy* is the study of the form and relations (relative positions) of the structures of the body that can be seen with the unaided eye. *Comparative anatomy* is a study of the structures of various species of animals, with particular emphasis on those characteristics that aid in classification. *Embryology* is the study of developmental anatomy, covering the period from conception

removed after injections of oxytocin, but the routine use of such injections tends to shorten the lactation period.

### Colostrum

Colostrum, the first milk produced upon delivery of the newborn, is important for the survival and vitality of newborn domestic animals. Colostrum contains a high concentration of immunoglobulins produced by the immune system of the dam that are needed by the neonate to provide temporary immune protection against infectious agents in the environment. Colostrum consumption is especially important in domestic farm animals because of limited transfer of immunoglobulins from the dam to the fetus via the placenta. The primary sources of energy in colostrum are milk proteins and lipids, because colostrum has a relatively low concentration of lactose. The colostrum of most species also has tends to have relatively high concentrations of vitamins A and D and iron, but some species differences also exist with respect to the composition.

### Inhibition of Lactation

Daily milk production reaches a maximal value at some point after lactation begins and then gradually declines over time in most species. The decline in milk production is associated with a gradual decrease in the number of active alveoli and an increase in the relative amount of connective tissue. Mammary gland involution is the term describing the conversion of a milk secreting gland with milk-filled alveoli to one characterized by small, nonsecreting alveoli surrounded by an extensive amount of connective tissue.

□□□

## About the Authors

The author, **Dr. Srinivas Sathapathy** was born on 27<sup>th</sup> November 1987 at Berhampur, Odisha. He passed his B.V.Sc. and A.H. degree from the College of Veterinary Science and Animal Husbandry, O.U.A.T, Bhubaneswar, Odisha in 2011. He completed his M.V.Sc. in Veterinary and Histology from Nagpur Veterinary College, Nagpur, M.A.F.S.U, Maharashtra in 2013. He is now pursuing his PhD. Degree in Veterinary Anatomy in the College of Veterinary and Animal Sciences, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand. During this journey he has been awarded with ICAR JRF, SRF, DST Inspire Fellowships and qualified ASRB NET in 2013. He has significant contributions in the field of Veterinary Science by publishing so many research papers, popular articles and abstracts in reputed Journals, magazines and conference papers respectively.

The author, **Dr. Manish Kr Singh** S/o Mr. Umesh Prasad Singh and mother Let. Indira Singh was born on June 1, 1984 at Vaishali, Bihar. He earned his B.V.Sc. & A. H. degree from Bombay Veterinary College, Parel, Mumbai in July, 2011. Thereafter, he joined the College of Post Graduate Studies, G. B. Pant University of Agriculture & Technology, Pantnagar, Uttarakhand in July, 2011 to pursue his Masters' degree in the Department of Livestock Production Management with major in "Poultry Science" and finally completed his Masters degree in July, 2013 by securing an OGPA of 8.1/10 (first division). During his glorious academic career, he has been involved in ICAR funded research projects and published research papers in indexed international and national Journals. He has also qualified ASRB NET 2014 (1) in the concerned discipline with flying colors. He is now currently pursuing his PhD. Degree in the same University.

The authoress of this book, **Dr. Suman Kumari Joshi** D/o Mr. Sarathi Kumar Joshi and mother Smt. Mandakini Joshi, was born on August 17, 1985 at Brahmanpara, Sundergarh, Odisha. She earned her B.V.Sc. & A. H. degree from the College of Veterinary Science and Animal Husbandry, O.U.A.T, Bhubaneswar, Odisha in 2011. Thereafter, she continued her M.V.Sc. degree in Livestock Production Management in the same college and finally completed her Masters' degree in 2013. She is now pursuing her PhD. Degree in the National Dairy Research Institute, Karnal, Haryana. She has not only excelled in the field of Veterinary Science, but also has significant contributions in the fields of dance and sports. During her academic journey she qualified ASRB NET 2013 and has been awarded with ICAR SRF and DST Inspire Fellowship for pursuing her PhD. Degree.

All the three authors of this book are being included in the Review Committee of the Poultry Punch monthly magazine, New Delhi from May 2014 issue onwards.