



# **Mammalian Reproductive System**

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# Foreword

Mammalian reproduction has gained immense interest as an area of research, a clinical specialty and a subject in the curricula of many colleges and universities. This has augmented the requirement of illustrative scientific documents for lucid understanding of the readers in this field. This book by Adriana Kolesárová, Anandan Das and Shubhadeep Roychoudhury serves this very purpose of highlighting the scientific value of the concerned subject matter in a rational manner. The title itself defines the theme of the book, wherein the authors have considered to discuss the mammalian reproduction in the light of human system and some economically important mammals such as *Bos taurus*, *Sus scrofa domestica*, *Equus* sp., *Canis familiaris*, and *Camelus* sp.

The book is divided into four chapters which broadly cover the basic aspects of the mammalian reproductive system. The first chapter presents an introduction to the topic with a highlight on the economical and biological significance of the concerned mammals. The following two chapters are based on the male and female reproductive systems in which the authors have covered the anatomical aspects of human and other mammalian models in great details. This will help the learners in having a better perception of the anatomical resemblance and variation among the mammalian systems. The authors have also presented an elaborate description of the hormonal regulation and gametogenic processes in both the male and the female in the respective chapters. Finally, in the concluding chapter, the authors have highlighted the current status and future outlook of the technologies used in the production of farm animals.

The authors have done remarkably well in providing chapters with concepts using fine illustrations. They have used simple language throughout the book which will make it easy for the readers of both scientific and non-scientific background to understand the subject matter. I am confident that the book will be well received by the Masters' students and young researchers including the Ph.D. students of the Slovak University of Agriculture (SUA) in Nitra as well as of other universities in the relevant field(s) of study. I am delighted to recommend this first issue of "Mammalian reproductive system with reference to human and other economically important animals" as a reliable resource for the learners.

**Prof. Ing. Jozef Bulla, DrSc.**  
**Emeritus Professor and Former Dean**  
**Faculty of Biotechnology and Food Sciences of the SUA in Nitra**

# Preface

Accomplishment of reproduction is of utmost importance for ensuring expansion and evolution of a species. This makes reproductive biology a uniquely important and a constantly developing field of study. Our knowledge of reproductive biology has hugely amplified recently on the anatomical, molecular and genetic levels, which resulted in significant advances in techniques such as *in vitro* fertilization (IVF) and assisted reproductive technologies (ART) which has helped many couples enjoy the joy of biological parenthood. Moreover, ART also finds its application in increasing the population of farm animals and endangered species. Many of these developments, in combination with recent success in farm animal production prompted us to author a book on mammalian reproduction particularly aimed at the Master students and young researchers of Slovak University of Agriculture in Nitra in particular which may also be used by students and Ph.D. scholars of other universities across the globe.

In this book, we have tried to illustrate mammalian reproductive biology in the light of human system and some animals of economic importance such as *Bos taurus*, *Sus scrofa domesticus*, *Equus* sp., *Canis familiaris* and *Camelus* sp. The monetary significance of cattle farming throughout the world cannot be overstated, as production of livestock such as *Bos taurus* and *Sus scrofa domesticus* contribute to rural livelihood, employment and poverty relief. *Equus* sp. also contribute to the economy by working as a mean of recreation, transportation and sports. *Canis familiaris* is undeniably the canine of greatest economic significance, particularly in the Western societies because of its importance as a pet. *Camelus* sp. is also an important livestock species adapted to the arid environmental conditions, especially in the Afro-Asian dryland belt, where they serve as a means of milk, meat and wool. The chapters have been broadly divided into male and female reproductive systems, in which we have elaborately described the respective structural features of human and other animal models. We believe that this approach will help in better understanding of the anatomical affinities of the reproductive system in human with the above-mentioned mammals. This is followed by a generalized discussion on the physiological aspects of the male and female reproductive systems which include hormonal regulation and gametogenesis. Lastly, we conclude with highlighting some of the future outlook of research in this field.

We are grateful to Prof. Ing. Jozef Bulla, DrSc., Emeritus Professor and Former Dean of the Faculty of Biotechnology and Food Sciences of SUA in Nitra for the kind



endorsement of this book. We appreciate our colleague Ms. Saptaparna Chakraborty for help in the preparation of the figures. We are highly obliged to doc. Ing. Klaudia Halászová, Ph.D., the Rector, Slovak University of Agriculture in Nitra, Slovak Republic for her approval for the publication of this book. We are thankful to the Dean of the Faculty of Biotechnology and Food Sciences, SUA in Nitra Prof. Ing. Norbert Lukáč, Ph.D. and the Head of the Institute of Applied Biology of the Faculty of Biotechnology and Food Sciences, SUA in Nitra Prof. MVDr. Peter Massányi, DrSc. for their overall support. Our special thanks to Ing. Ľubica Ďudáková, Director, Publishing Center of SUA in Nitra for her sincere assistance and support. We would also like to thank Mr. Martin Lopusný from the Publishing Center of SUA in Nitra for the impressive cover and graphic design. We genuinely hope that this book will support and enrich the knowledge of mammalian reproduction in the readers.

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**Anandan Das**

**Shubhadeep Roychoudhury**

# List of abbreviations

Abbreviation	Full Form
ABP	Androgen-binding protein
AChE	Acetylcholinesterase
ART	Assisted reproductive technology
cAMP	Cyclic adenosine monophosphate
DNA	Deoxyribonucleic acid
FSH	Follicle-stimulating hormone
GnRH	Gonadotropin-releasing hormone
HPG	Hypothalamic pituitary gonadal axis
HPLC	High-performance liquid chromatography
IFN	Interferon
IVF	<i>In vitro</i> fertilization
KNDy	Kisspeptin-neurokinin-dynorphin
KP	Kisspeptin
LH	Luteinizing hormone
PKA	Protein kinase A
RNA	Ribonucleic acid
SCF	Stem cell factor
SRY	Sex-determining region Y
TDF	Testis-determining factor

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## **Mammalian Reproductive System**

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