
Introduction – Volume 2: Clinical Medicine and Reproduction

Donkeys, mules, and hinnies present unique clinical challenges and opportunities that demand a specialized understanding of their biology and medicine. Their stoic demeanor, adaptive metabolism, and hybrid physiology can mask disease symptoms and alter therapeutic responses, requiring veterinarians to think beyond conventional equine models. *Volume 2: Clinical Medicine and Reproduction* offers a detailed, evidence-based exploration of the diagnostic, therapeutic, and reproductive dimensions of these remarkable animals, representing a culmination of decades of research and clinical insight.

This volume is organized into three major parts that together define the modern clinical and reproductive science of long-eared equids.

Part “Medical Systems and Diseases” provides a comprehensive examination of the organ systems and the disorders that affect them. Readers will find in-depth chapters on cardiovascular, respiratory, hepatic, endocrine, neurologic, gastrointestinal, urogenital, and integumentary systems, supported by the latest diagnostic and treatment protocols. The inclusion of immunology and genomic studies underscores the growing recognition that donkeys and mules possess distinct immune responses and disease susceptibilities, challenging assumptions derived from horse-based models. These insights form the basis for improved diagnostic accuracy, therapeutic efficiency, and preventive healthcare.

Part “Diagnostics, Treatment, and Surgery” focuses on the practical implementation of clinical knowledge. It outlines best practices for sample collection, laboratory testing, pharmacology, anesthesia, pain management, and surgical interventions, taking into account the species’ unique physiology and pharmacokinetics. Through detailed guidance and clinical case studies, this section demonstrates how tailored diagnostic and surgical strategies can reduce complications and improve recovery outcomes. Each chapter is designed to equip practitioners with the decision-making tools necessary to provide safe, compassionate, and effective care.

Part “Reproduction and Advanced Breeding” delves into the reproductive biology and technologies that are transforming equid breeding programs. Topics include male fertility assessment, semen collection, embryo transfer, assisted reproductive technologies (ART), and neonatal management. The section also examines hybrid reproduction—addressing the complexities of mule and hinny sterility, the rare

occurrences of hybrid fertility, and the molecular mechanisms that underlie these phenomena. The integration of genomics, proteomics, and advanced imaging has ushered in a new era of reproductive science, where precision tools and ethical breeding practices converge to improve both productivity and welfare.

Throughout this volume, readers are encouraged to approach donkey and mule medicine as a discipline in its own right—grounded in comparative physiology but shaped by the distinctive traits of these species. Their metabolic efficiency, unique pain responses, and differing reactions to drugs and anesthesia highlight the importance of clinical protocols developed specifically for them, rather than adapted from horses.

In uniting clinical rigor with a compassionate understanding of long-eared equids, this work aims to advance the standard of veterinary care across global contexts. Whether in rural clinics, academic hospitals, or conservation programs, the principles outlined here provide a framework for evidence-based, humane, and sustainable veterinary practice.

These animals have served humanity for millennia; it is now our responsibility to serve them with the same dedication—through science, care, and respect.

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