

BOOK REVIEW

Fundamentals of Veterinary Developmental Anatomy. T.S. Chandrasekara Rao and P. Jagapathi Ramayya (2013). pp. 166. New India Publishing Agency, Pitam Pura, New Delhi–110088. Rs. 695/- ; US\$ 30.00.

The scope of veterinary science is vast and wide. The range of animal species covered under this scientific discipline is quite large and getting larger day by day due to the scientific interest growing limitlessly, encompassing hitherto unknown and less familiar species of animal life. The practicing vet is quite familiar with farm animals, domestic avifauna and normally reared pets at home. Exotic species and wildlife are attracting the attention of the field vet presently owing to the concerns expressed on their possible extinction and impact on eco-environment. This has now led to the emergence of specialized vets who might have to devote their whole life time, to render full justice to their cause. It is in this context, an understanding of commonalities among animal species, both familiar and unfamiliar, becomes quite appropriate and handy for practical applications. The study of veterinary embryology is a valuable and inescapable tool in creating such an understanding to the field vet. This specialized discipline brings out the similarities and uniqueness among various animals during the process of their embryonic development which is dynamic in general and characteristic to each species individually. The book under review has taken up the task of bringing to light the fundamentals of developmental anatomy of animals according to the syllabi and course curriculum prescribed by the Veterinary Council of India at both the graduate and post-graduate levels.

The book is broadly divided into two parts: Part I dealing with general aspects of embryology and Part II with special embryology covering the embryological development of various functional systems of the animal body. The first part has one chapter with ten sub-sections and begins with a brief historical account of the discipline of embryology. A crisp distinction between developmental anatomy and embryology puts the subject in proper perspective, to begin with. Developmental processes such as cell proliferation, growth, differentiation and integration are briefly touched upon. Description of different stages of development commences with a brief account of gametogenesis followed by fertilization, cleavage, gastrulation, and differentiation of mesoderm, development of foetal membranes and a classified account of placenta. Types of implantation and determination of age of developing foeti are the concluding sub-sections of this Part which provides all salient features relating to the general account of embryology copiously enriched with definitions, description of terms and tabulated information relating to various species of animals apart from summed up information as highlights.

The Part II of the book dealing with special embryology has 13 sub-sections commencing with face, mouth and pharynx in the initial sub-section and followed by digestive tube and associated glands, respiratory system, urinary system, reproductive systems, cardio-vascular system, lymphatic system, musculo-skeletal system, integument, nervous system, sense organs and endocrine glands. This part concludes with an account on teratology. Face, mouth and pharynx are dealt with together since they are anatomically and functionally closely related. Details are provided on branchial arches, pharynx, salivary glands, pituitary gland, tongue and teeth. The line diagrams are quite appropriate and illustrative. The section on digestive tube and associated glands deals with the alimentary canal and its various sections such as oesophagus, stomach, both simple and complex, intestinal tract, glands such as liver and pancreas. The respiratory system deals with details of larynx, bronchi, lungs and their comparative account among various animals.

The section on urinary system describes the developmental features of pronephros, its differentiating development into mesonephros and metanephros which ultimately constitutes the adult kidneys, urinary bladder and urethra. In the section on reproductive systems, development of gonads, the ovaries and testes and the duct systems of the males and females are described. Genital ligaments, descent of gonads and accessory sex glands such as bulbo-urethral glands, prostate glands and seminal glands are briefly touched upon. The external genitalia of the male and the female are also narrated along with a tabular account of the homologues of these organs in the male and the female. In the section on cardio-vascular system, vasculogenesis, angiogenesis and

development of the heart and its different septa are described along with a brief narration of foetal blood circulation. Formation of major arteries and veins and prenatal hemopoiesis are explained aptly. The section on lymphatic system deals with lymphatic vessels and lymph glands. A significant difference between the porcine lymph node and those of other domestic animals is brought out during discussion, in that the flow of lymph in the porcine lymph node is in the opposite direction to that in other animals because of the differential placement of lymph nodules centrally and the cords at the periphery in the porcine lymph nodes. Lymph glands such as spleen, thymus and Bursa Fabricius (in chicken) are briefly touched upon.

The musculo-skeletal system is combined under the next section since muscles and bones are structurally and functionally inseparably related. Sclerotome, myotome and dermatome give rise to skeletal, muscular and dermal elements respectively. Descriptions are provided on the connective tissue and skeletal system which consists mainly of bones and cartilages. Osteogenesis and different types of ossification are explained. Developmental details pertaining to the skull, vertebral column, ribs and sternum are provided along with formation of joints and limbs. Under the muscular system, striated muscles, smooth muscles and cardiac muscles are treated aptly with their differentiating features. The section on integument deals with the development of epidermis, dermis, hypodermis, hair and sebaceous glands. Avian skin, equine hoof, ruminant and porcine hooves and horns find special mention. The section on the nervous system describes the formation of the neural tube, the spinal cord and the brain along with the surface features like gyri and sulci. Ganglia and meninges are also briefly dealt with. Under the section on sense organs, the eye and the ear with their component parts are described. The section on endocrine glands gives an account of pituitary and thyroid glands described elsewhere in the book in earlier chapters and pineal gland, adrenal glands and pancreatic islets. The last section of this book deals with teratology and its etiological basis. Abnormal genes, chromosomal aberrations, environmental agents such as radiation, hormones, chemical agents, infectious agents and nutritional deficiencies are mentioned as the chief causative factors. There is an account of classification of the anomalies with explanation on technical terms used to describe such anomalies. Monstrosities are finally discussed briefly along with twins and multiples, joined and separate and their implications on foetal development.

The book carries a Glossary section at the end as appendix in the alphabetical order providing commonly used technical terms along with their precise descriptions. The book has no obvious or glaring errors, typographical or technical. A blurb on the jacket gives an account of the authors who are only too familiar to the teachers and students of the subject matter on hand. The book is hard-bound with an art cover, the back cover giving an account of what this publication offers. The publishers deserve full appreciation for their wonderful effort in making this book attractive and handy in its getup. The authors, well informed and competent in their realm of specialization have done great credit to the veterinary profession as a whole by bringing out this crisp and highly informative book which will go a long way in meeting the basic requirements of the students and the scholars alike in the field of embryology and developmental anatomy. If and when another edition of this book comes, a noteworthy addition in the form of references for further reading under each chapter or at the end of the book will be of immense value to the readers.

N. Balaraman