

PREFACE

This volume of CTDB consists of 14 chapters, 7 on extracellular matrix (ECM) and 7 on the egg's zona pellucida (ZP) contributed by leading investigators in Australia, India, Japan, Sweden, the United Kingdom, and the United States.

Research on ECM has a long and extensive history with nearly 100,000 primary papers and 20,000 reviews published on the subject during the past 70 years or so (PubMed). ECM is a collection of diverse molecules, including proteins (e.g., collagens, fibronectins, and laminins), proteoglycans (e.g., heparin, keratin, and chondroitin sulfates), and polysaccharides (e.g., hyaluronic acid), that reside outside animal cells. ECM serves many roles, such as providing structural support for cells, tissues, and organs, and regulating numerous events, including gene expression, differentiation, morphogenesis, cellular adhesion, cellular migration, and intercellular communication. Similarly, nearly all animal eggs are surrounded by a unique, specialized ECM, called the ZP, that provides both structural support for eggs and follicle cells surrounding them and species-restricted receptors for binding of sperm during fertilization.

In this volume of CTDB coverage of ECM includes the following seven chapters: (Chapter 1) How the ECM functions as a highly complex entity that regulates tissue organization and cell behavior through dialogue with cellular constituents of tissues (J.M. Muncie and V.M. Weaver); (Chapter 2) Research on matricellular proteins of ECM in nonmammalian animals that provide access to early stages of embryonic development and limb and organ regeneration (J.C. Adams); (Chapter 3) Mechanisms underlying the generation of a collagen fibril network of defined architecture and mechanical properties (D.F. Holmes, Y. Lu, T. Starborg, and K.E. Kadler); (Chapter 4) Developmental and disease dynamics of basement membranes of nematodes, flies, and vertebrates (R. Sekiguchi and K.M. Yamada); (Chapter 5) How ECM composition and physical properties influence cell fate decisions associated with vascular tissue development and disease (R.P. Mecham and F. Ramirez); (Chapter 6) The structure, function, and development of the tectorial membrane and major events during its evolution (R.J. Goodyear and G.P. Richardson); (Chapter 7) How biophysical features of ECM, such as stiffness and viscoelasticity, influence the sculpting of embryonic tissues and regulation of cell fates (B.J. Dzamba and D.W. DeSimone).

In this volume of CTDB coverage of the ZP includes the following seven chapters: Various aspects of the egg's ZP in fish (Chapter 8, E.S. Litscher and P.M. Wassarman), birds (Chapter 9, S. Nishio, H. Okumura, and T. Matsuda), mice (Chapter 10, P.M. Wassarman and E.S. Litscher), marsupials and monotremes (Chapter 11, S. Frankenberg and M. Renfree), and human beings (Chapter 12, S.K. Gupta); (Chapter 13) The atomic structures of ZP module proteins of mammals and nonmammals in the context of sperm-egg interactions (M. Bokhove and L. Jovine); (Chapter 14) The structure and function of metazoan egg coat proteins with emphasis on the potential role their evolution has played in creation and maintenance of species boundaries (E.E. Killingbeck and W.J. Swanson).

We are very grateful to Richard Goodyear and Guy Richardson for providing a beautiful and relevant image for the cover of the volume. Finally, we thank all of the authors for their scholarly contributions to this volume and for their considerable efforts to complete their manuscripts on time in order to meet publisher's deadlines.

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