

Preface

The oocytes are female germline cells that after maturation become fertilizable female gametes/eggs. Animal oocytes are produced during a lengthy process of oogenesis that manufactures and assembles highly specialized oocyte infrastructure and culminates with entry into meiosis. Oocytes are very unique in combining generic cellular features with specialized structures, maternal information and functions, necessary to support the development of future embryo and ensuring hereditary continuity of maternal nuclear and cytoplasmic information.

The first part of this volume describes how invertebrate and vertebrate oocytes communicate and exchange information with somatic cells, extracellular environment and symbiotic organisms. The second part describes how structural, cellular, organellar and molecular polarity of oocytes is established and what the developmental consequences of polar distribution of maternal information are. The third part concentrates on epigenetic, transcriptional and translational mechanisms regulating heredity and expression of maternal information. The fourth part focuses on oocyte/egg-specific features and functions of generic cellular organelles and components, such as centrioles, mitochondria, lipids and vitellogenin, and the role of cohesin and condensin, which convey proper topology of chromosomes through the ubiquitous cell cycle, in the meiotic chromosomal events and age-related chromosome segregation errors. Finally, the last part of the volume describes the origin and evolution of the subpopulation of maternal genes and analyses how non-inheritable maternal information present in the oocyte can be used for genetic manipulation and engineering.

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Oocytes

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