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Nota di contenuto	Preface; Contents; Contributors; Chapter-1; Cell Signalling During Blastocyst Morphogenesis; 1.1 Introduction; 1.2 Intrinsic Signals Regulating Blastocyst Morphogenesis; 1.2.1 Cell Signalling at Fertilisation and Activation of the Development Programme; 1.2.2 Cell Signalling at Compaction; 1.2.3 Cell Signalling and Blastocyst Formation; 1.2.4 Cell Signalling and the Stabilisation of Emergent Cell Lineages; 1.3 Extrinsic Signalling Pathways; 1.3.1 Insulin and Amino Acid Signalling-The mTORC Signalling Network; 1.3.2 Energy Homeostasis-The AMPK Signalling Network 2.8 Expression of Components of the MTOR Cell Signaling Pathway in Ovine Conceptus Trophectoderm 2.9 Amino Acids Stimulate MTOR Cell Signaling; 2.10 Beneficial Effects of Dietary Arginine Supplementation on Embryonic/Fetal Survival and Growth in Mammals; 2.11 Summary; References; Chapter-3; The Role of Hexosamine Biosynthesis and Signaling in Early Development; 3.1 The Embryo and its Environment; 3.2 A Role for Glucose in Early Development?; 3.3 Glucose Primes Embryos to Adapt to Their Environment; 3.4 Hexosamine Biosynthesis: An Embryonic Nutrient-Sensing Pathway

3.5 The Response Path: N-Linked Vs. O-Linked Glycosylation? 3.6 Hexosamine Signalling: A Nutrient Response Pathway; 3.6.1 The Enzymes; 3.6.2 The Targets; 3.7 O-GlcNAcylation in Development; 3.8 The HSP: Sensor of an Adverse Environment?; 3.9 Perturbed O-GlcNAcylation and Embryo Development; 3.9.1 Embryotoxic Effects of Hyperglycemia and O-GlcNAcylation; 3.9.2 Glucosamine as a Hyperglycemic Mimetic; 3.9.3 Periconceptional HSP Perturbation and Postnatal Outcomes; 3.10 Nutrient Stress, Embryonic Programming and O-Linked Glycosylation; 3.11 What Makes the Early Embryo More Susceptible? 3.12 ConclusionReferences; Chapter-4; Molecular Biology of the Stress Response in the Early Embryo and its Stem Cells; 4.1 Introduction; 4.2 Early events in Embryogenesis Balancing Anabolism and Stress During Early Embryonic Programming; 4.2.1 Defining Stress and Categorizing Classes of Stress by the Transcription Factors in the Survival Responses of Somatic Cells, Stem Cells and Embryos; 4.2.2 Integrating Maternal Nutritional/energy Status to Enable Peri-Implantation Embryogenesis to use Energy for Normal or Stressed Development; 4.2.3 Stress During IVF/ART 4.2.4 Using Stress Responses to Optimize IVF

Sommario/riassunto

The book considers signaling events from the zygote embryo through to the blastocyst with relevant data from embryonic stem (ES) cells, including dialogue with the extracellular environment and with the maternal tract during the implantation process. Application of the knowledge described to improve the success of human and animal assisted conception is considered where appropriate, but the focus is largely on fundamental rather than applied cell/molecular biology, as this is the area that has historically been neglected. While the general features of metabolism during preimplantation development are well established, especially in terms of nutrient requirements, uptake and fate, remarkably little is known about early embryo signaling events, intracellular or intercellular, between individual embryos in vitro or with the female reproductive tract in vivo. This contrasts with the wealth of information on cell signaling in somatic cells and tissues, as a glance at any textbook of biochemistry illustrates. This lack of information is such that our understanding of the molecular cell biology of early embryos -- a prerequisite to defining the mechanisms which regulate development at this critical stage of the life cycle -- is seriously incomplete. This volume is the first to address this issue by describing the current state of knowledge on cell signaling during mammalian early embryo development and highlighting priority areas for research.
