Imaging in Development Biology

A LABORATORY MANUAL

IMAGING TECHNOLOGIES HAVE REVOLUTIONIZED the study of developmental biology. In the past, researchers struggled to connect data collected from fixed sections of tissue taken at static time points. Now imaging tools offer scientists the ability to continuously visualize the dynamic form and function of molecules, cells, tissues, and whole embryos throughout the entire developmental process. *Imaging in Developmental Biology: A Laboratory Manual*, a new volume in Cold Spring Harbor Laboratory Press's Imaging series, presents a comprehensive set of essential visualization methods for developmental biologists.

Imaging in Developmental Biology: A Laboratory Manual is organized into four sections, each containing background information and step-by-step protocols.

Model Systems: This section provides a set of primers for live imaging of development in a variety of standard laboratory model organisms, including *Caenorhabditis elegans*, *Drosophila*, zebrafish, *Xenopus*, chick, quail, and mouse.

Cells: Chapters in this section provide detailed instructions for imaging development on a cellular level. Topics include labeling cells for live imaging; imaging cell fate, differentiation, and migration; and imaging circuit formation in the nervous system.

Dynamic Tissues and Organs: Chapters in this section focus on imaging at the tissue and organ levels. Protocols are provided for high-speed imaging, imaging morphogen gradients, monitoring cellular mechanics, observing epithelial morphogenesis, and visualizing the development of a variety of organs and tissues including the notochord, kidney, heart, eye, and imaginal discs.

Whole Embryos: Chapters in this section discuss new technologies that allow for detailed imaging of entire embryos. Methods for quantitative gene expression studies, automated lineage and expression profiling, optical projection tomography, microCT, episcopic 3D imaging, magnetic resonance imaging, and digital scanned laser light-sheet fluorescence microscopy are included.

The manual also features a set of appendices with a glossary of imaging terms and other useful information on spectra, lenses, filters, and the safe handling of imaging equipment.

Imaging in Developmental Biology: A Laboratory Manual provides the detailed explanations and instructions for mastering the imaging techniques that are now required in the developmental biology laboratory.

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