

Preface

The cellular microenvironment has a fundamental regulatory role in major cellular functions. This microenvironment is made of an array of polymeric proteins and glycoproteins that constitute the extracellular matrix (ECM). The ECM serve does not only as a structural support but also as a bioactive material. This influences a large plethora of cellular (physiological and pathological) processes, such as differentiation, migration, or proliferation through both biochemical and mechanical stimuli. Many efforts have been dedicated in developing models of the ECM for the study of diverse varieties of physio-pathological phenomena; these models differ in their complexity, physiological relevance, and applications. Among all of them, cell-derived matrices (CDMs) have attracted significant attention due to their superior performance. CDMs are natural extracellular matrices produced by cells or derived from decellularized tissues. CDMs have been rapidly applied in cell biology as bioactive scaffolds due to their advanced capabilities to recapitulate the biological, biochemical, and mechanical properties of the native scenario. Cells cultured in CDMs display phenotypes, gene expression, and dynamic signatures similar to in vivo conditions. This improved performance has led to their adoption by the scientific community for the production of controlled cellular microenvironments for tissue engineering and regenerative medicine applications, disease modeling, or mechanistic studies, among others. Importantly, CDMs can be combined with other technologies typically employed in a cell biology lab, such as lab-on-a-chip devices, bioreactors, or engineered three-dimensional scaffolds for advanced biomimicry. In these two volumes of *Methods in Cell Biology*, we focus on the applications of CDMs to cell biology. Part A (Volume 156) deals with detailed methods describing the fabrication and engineering of CDMs, their compositional and/or structural analysis, and their application in biomedical studies. Part B (Volume 157) gives an account on the methods for the decellularization of tissues, their characterization, and application for tissue engineering and disease modeling. These two volumes cover a broad range of applications of CDMs to cell biology, with detailed discussions and examples. Overall, the purpose of these volumes is to provide to the readers a detailed outline of the methods available to fabricate, analyze, characterize, and understand the functional capabilities of CDMs for cell and molecular biology applications. We hope that these volumes will prove helpful in developing experiments to answer some of the important questions in cell biology, providing the readers with new interesting methods and insights to help them to reveal key mechanisms involved in physio-pathological processes.

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