Foreword

Matrix-mediated cell behaviour and properties

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Extracellular and cell surface-associated matrix macromolecules constitute tissue-specific structural and functional components. It is well established that they form dynamic networks affecting cell functional properties and (patho)physiological processes. Specific categories of matrix molecules are mediators of cell signaling and cell functions. They are involved in disease progression including inflammatory conditions. Among the most important matrix effectors are cell surface and secreted proteoglycans (including glycosaminoglycans), matrix-degrading enzymes, integrins, collagens and non-collagenous proteins, and matrix receptors. They play crucial roles in cell growth, phenotypic transition, stem cell niche, autophagy, cytoskeleton rearrangement and tissue organization.

In the last decade matrix pathobiology emerged as a research area of significant importance in our endeavor to understand cell function and holds the potential to drive the design and development of novel new pharmacological agents and tools for disease targeting.

This special issue of *BBA-General Subjects* on "*Matrix-Mediated Cell Behaviour and Properties*" contains five thematic sections with twenty-six recent research communications and several reviews that critically address this emerging and diverse field of research. The first thematic section contains four articles on matrix assembly, cytoskeleton rearrangement and tissue organization. Collective invasion of mesenchymal tumor cells and molecular control of chondrocyte differentiation for proper cartilage matrix reconstruction are among the issues covered. The diverse roles of proteoglycans on cell functions, morphology and cell signaling are presented in the seven articles of the second thematic section. In these articles, issues related with the significant roles of proteoglycans in disease development and progression as well as the possibilities for pharmacological targeting, are critically discussed. In the third thematic section which includes five articles, aspects of the regulatory roles of extracellular and cell-surface macromolecules in stem cell niches and cell functional properties are presented, i.e. their role in creating a dynamic microenvironment for stem cell function as well as for cell–cell and cell–matrix interactions, which are not only critical processes for physiological development, but also disease progression.

Matrix degradation is a multifaceted process in which several enzymes and their regulators participate. It regulates normal remodeling and may significantly affect disease progression. Therefore, the fourth thematic section entitled "*Matrix degrading molecules in inflammation and cancer*" in its five articles presents the crucial roles of matrix metalloproteinases, caphepsins, EMMPRIN, matrikins and heparanase in disease progression, their potential for disease diagnosis and prognosis as well as for developing new anti-cancer therapies via their targeting.

The last thematic section with its five articles covers critical issues related to the growth factor-mediated expression of matrix molecules, regulation of cell properties and epithelial to mesenchymal transition, as well as the importance of miRNA-dependent targeting of matrix molecules.

Hopefully this special issue will serve as a comprehensive guide with fresh ideas on the area of matrix-mediated cell properties and pathobiology and attract young scientists in the field.

I am very grateful to the contributing authors who wrote the excellent reviews and original articles that cover these topics as well as to the reviewers of the manuscripts for their excellent comments and suggestions. From my personal point of view, it was another fascinating journey to the spectacular world of the extracellular matrix and I am amply rewarded by the knowledge I acquired through reading and reviewing the manuscripts.

I would also like to thank the BBA team for making the editing of this issue an enjoyable task. Finally, I am very much obliged to Dr. Elias Arner, Editor-in-Chief of *BBA-General Subjects* who entrusted to me this special issue, encouraging and helping me during the steps of this endeavor.

Nikos K. Karamanos is a Professor of Biochemistry & Organic Biochemical Analysis at the University of Patras. He is the coordinator of the Hellenic Matrix Biology Section and of the intra-University Research Network on *Biotargeting — Biomedical and Biotechnological Applications*. He studied Chemistry and Biochemistry at the University of Patras and carried out pre- and post-doctoral research work at the Karolinska Institute. He is the chairman of the FEBS Advanced Lecture Courses "*Matrix Pathobiology, Signaling and Molecular Targets*" held every other year since 2007. Dr. Karamanos is a member of the editorial boards and academic editor of several international peer-review journals, editor of the international book edition: *Extracellular Matrix: Pathobiology & Signaling*, and guest editor/coordinator of several journals' special issues and thematic series. His research activity in Biochemistry, Biochemical Analysis & Matrix Pathobiology is focused on proteoglycans, glycosaminoglycans and metalloproteinases and especially on the ways they are implicated in tissue organization, cell properties as well as in pathogenesis and progression of various disorders. The pharmacological targeting of signal transduction pathways regulating the expression and activity of matrix molecules, and the development of sensitive biochemical assays and protocols for analysis of glycosaminoglycans in biologic samples for elucidating the structure–function relationship are also among his active research fields.

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