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Editorial

Preface of the special issue Hyper BioAssembler



This special issue of *Regenerative Therapy* contains original papers and review articles of research supported by Grants-in-Aid for Scientific Research on Innovative Areas “Hyper BioAssembler” (2305) from the Ministry of Education, Culture, Sports, Science and Technology of Japan. The main objective of this grant support is to establish a new research paradigm, Hyper BioAssembler, for the discussion of new and innovative tissue engineering methodologies for creating 3D complex multicellular systems. In these systems, active functional cells selected from living organisms are used to create 3D cellular systems, including *in vitro* functional tissue environments. These new methodologies will promote innovation in the next generation of tissue engineering and regenerative therapy research through the development of hyper micro-nano measurement and control methodologies. Through this innovation, great technological advances in both engineering and the life sciences will be possible.

- High-speed measurement of cell and tissue characteristics
- High-speed cell and tissue separation
- High-speed cell and tissue manipulation
- High-speed cellular system assembly
- Analysis and evaluation of complex multicellular systems to understand cell behavior in the context of sociocytology

The contributors of this special issue belong to the A03 team of the Hyper BioAssembler group. The A03 team mainly focuses on the analysis and evaluation of complex multicellular systems to understand cell activity and behavior in the context of sociocytology.

All of the contributors believe that the various cell types and exquisite extracellular matrix composing tissues and organs communicate via soluble signals and physical or mechanical

interactions between each other and their environment to perform coordinated specific functions.

This issue provides a survey of the diverse scope of this new field that is expected to realize regenerative therapies for currently incurable, intractable diseases. It is important for readers of this special issue to recognize that the breadth of this new research field is not limited to conventional molecular cell biology and traditional engineering fields, but pervades all of biology, engineering and medicine. This special issue hopefully highlights the large number of unanswered questions that remain and, indeed, have grown within this interdisciplinary field. It is the hope of the special issue editors that the articles contained herein not only educate,

We believe that through greater knowledge and synergy of ideas from these different fields, come greater opportunities to create and establish more efficient therapeutic approaches.

Taken together, this special issue provides a broad, though not comprehensive survey of the next generation of tissue engineering and regenerative medicine. We hope that readers will enjoy this special issue. We thank all of the contributors as well as the reviewers.

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