

Title of Project : Hyper Bio Assembler for 3D Cellular Innovation



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【Purpose of the Research Project】

The main purpose of this research project is to establish a new and innovative methodology: Bio Assembler. This methodology is intended for creating 3D cellular systems such as functional tissue in vitro environments, in which active cells selected from a living organism are used to create the 3D cellular system. This new methodology will bring innovation to the next generation of tissue engineering and will become the world's first creation of 3D cellular systems in vitro environments. This innovation will be achieved by developing a methodology of hyper micro-nano measurement and control. The outcome of this innovation will bring great technological advancements to engineering science and biological science in Japan.

The research consists of three areas: (1) Hyper measurement and separation of useful active cells, (2) Hyper assembling of 3D cellular system from selected active cells, and (3) Analysis and evaluation of 3D cellular systems. The technical development and understanding in these fields will bring progress and systematization to micro-nano engineering science and biological science.

【Research Project Content】

Three research groups corresponding to three research areas are organized to participate in the development of the Bio Assembler research project. Collaborative research will be promoted among these three groups to achieve the creation of the 3D cellular system.

(1) Measurement and Control of Cell Characteristics Group (A01): establishing and systematizing a methodology for measurement of cell characteristics and separation of useful active cells by applying hyper micro-nano robotics.

(2) Assembling of 3D Cellular System Group (A02): establishing and systematizing a methodology for assembling 3D cellular systems from selected active cells by applying hyper micro-nano robotics.

(3) Analysis and Evaluation of 3D Cellular Systems Group (A03): analyzing and evaluating functions of developed 3D cellular systems.

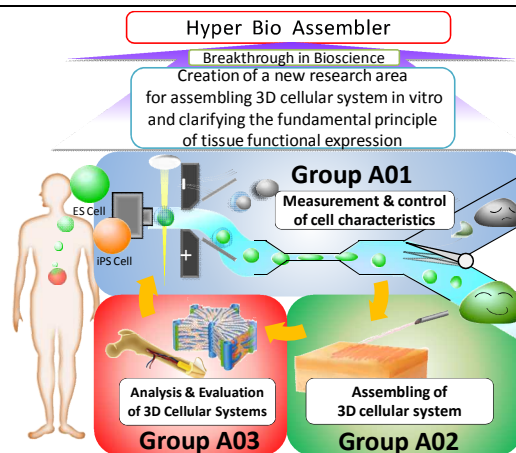


Figure 1 Scheme of the project and its expected achievements

Collaboration of these three research groups with public applied researches will be promoted to enhance diversity of methodologies and research targets.

【Expected Research Achievements and Scientific Significance】

The methodologies for measurement of cell characteristics and separation of useful active cells, and assembling 3D cellular systems from selected active cells will be established and systematized. The fundamental principle of functional expression of 3D cellular systems will be clarified. This research project will bring great technological advancements to engineering science and biological science in the world as well as in Japan.

【Key Words】

Bio Assembler : Methodology and systems to create functional 3D cellular systems
3D Cellular System : 3D structure fabricated by using selected active cells in vitro

【Term of Project】 FY2011-2015

【Budget Allocation】 1, 198, 600 Thousand Yen

【Homepage Address and Other Contact Information】

<http://bio-asm.jp>