

Seeking Revolutionary Biomaterials

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There has been much anticipation for the development of a new biotechnology that would enable us to recover our humanity and contribute to healthy enjoyable lives. In addition to the great contribution from materials created through our latest technologies, the construction of a biointerface for interfacing with organisms is an important subject. It is our hope that Japan will pioneer future biotechnology in medical devices, time reset medical treatment, order-made medical treatment, brain function analysis, biochips, after genetic information analysis.

Biomaterial is indispensable for constructing a reliable interface between living organisms and material. At the Ishihara-Takai Laboratory, we have no doubt that "biomaterial engineering is the field that will enable us to realize our dreams." Under this philosophy, we are working toward the development of new biomaterials and advanced medical devices for the 21st century. To achieve this, we have studied the design, synthesis, and functional evaluation of novel polymer materials dividing four research teams responsible for biointerface, bioconjugate, biomatrix, and nanobioprocessing. These teams are systematically conducting research in the following eight fields.

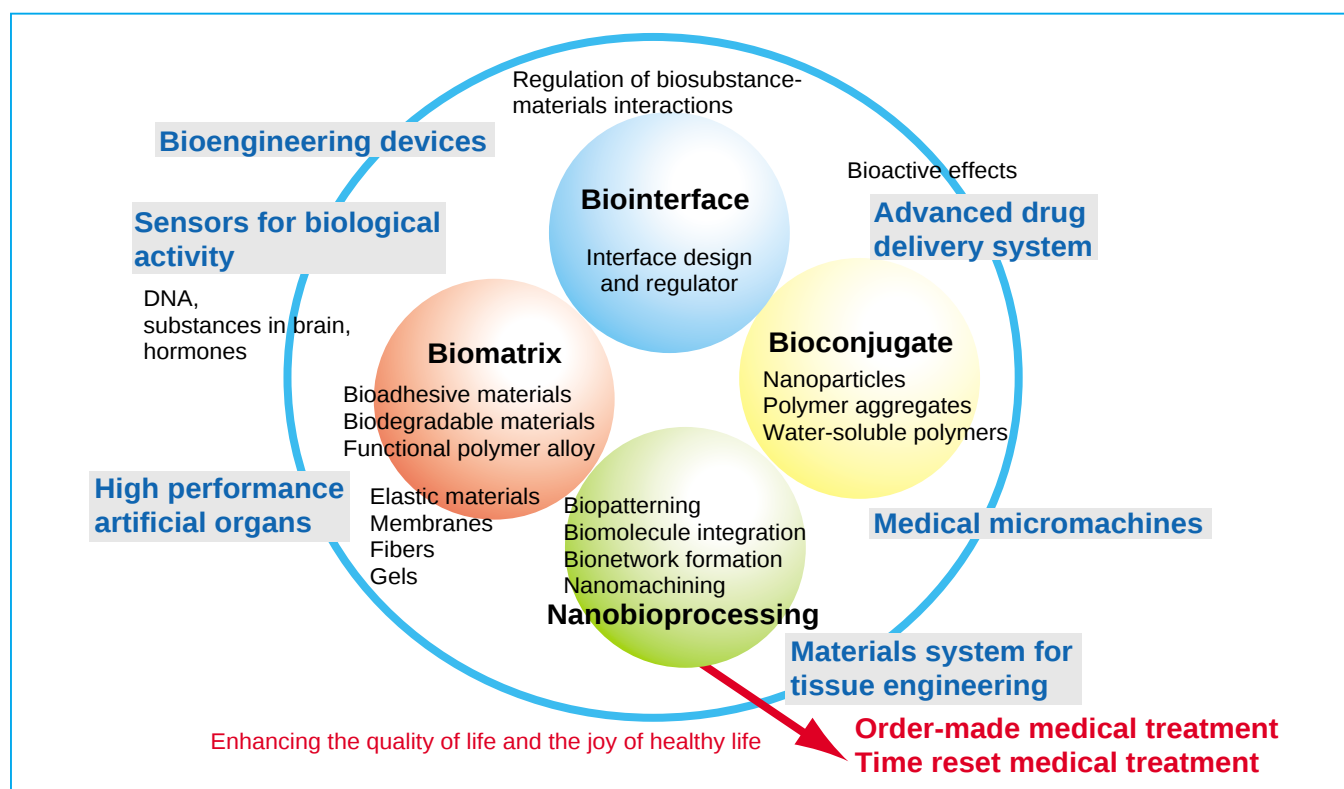
1. Synthesis of phospholipid (MPC) polymers and their applications in biomaterials
2. Preparation of a supramolecular polymer materials for cellular engineering
3. Preparation of polymer membranes for the efficient separation of biomolecules
4. Precision synthesis of polymeric biomaterials
5. Preparation of bioactuator materials
6. Study on bioinspired polymer gel for nanomachines

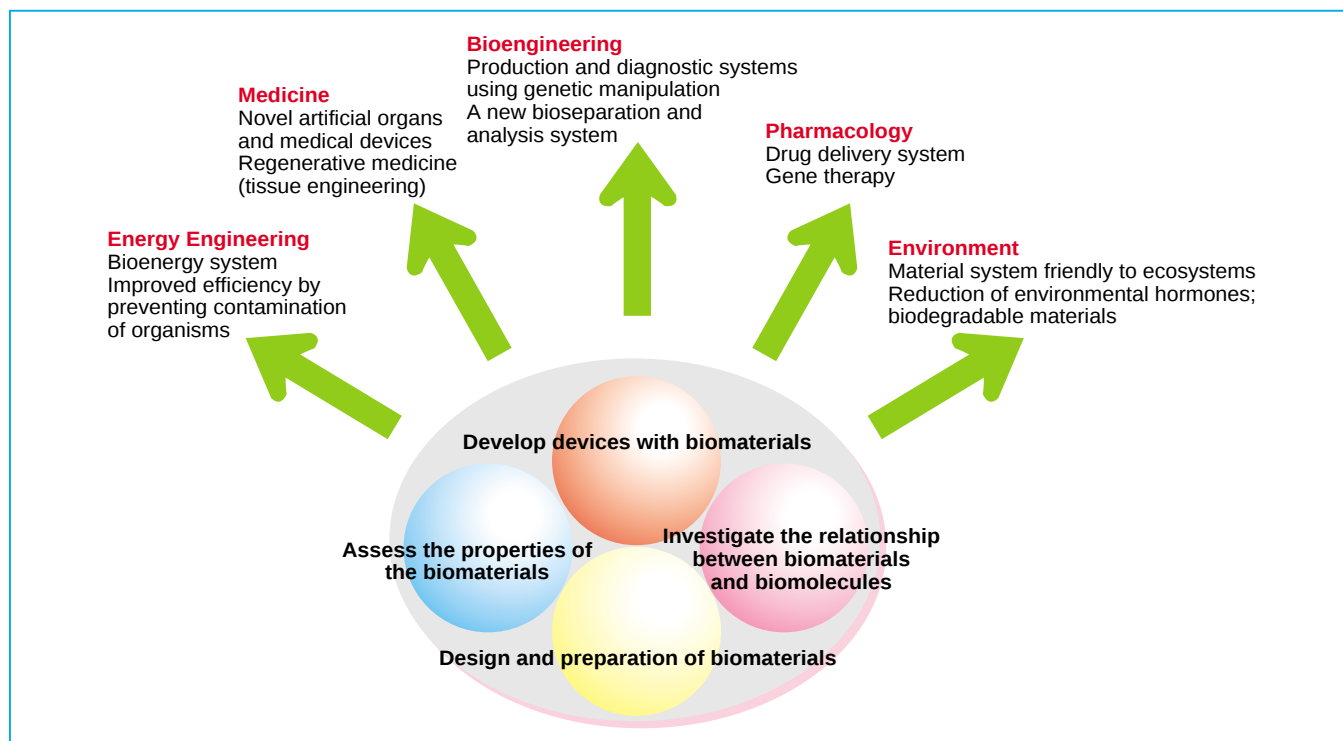
7. Synthesis of polymers for stabilizing bioactive molecules

8. Preparation of protein adsorption resistible materials for use in microspaces to improve chip functions

Professor Kazuhiko Ishihara (an associate professor at the time) established this laboratory in April 1998 with two undergraduate students as part of the material engineering developments. As of April 2003, five years later, the staff at the laboratory includes Professor Ishihara, lecturer Dr. Madoka Takai, research associate Dr. Junji Watanabe, researcher Dr. Kikuko Fukumoto, and Ms Kyoko Fukazawa as an assistant member. In addition, the laboratory includes one project researcher and 17 graduate students (9 in the doctoral course and 8 in the master's course) and 4 senior undergraduate students, making a total of 27 people in this large laboratory.

All researchers at the laboratory vigorously conduct research and development through repeated experiments and discussions on their specific research topics. The environment at the laboratory is such that anyone can freely use instruments for material preparation and processing, polymer synthesis and analysis, and property evaluation. We are involved in much collaborative research with universities and companies domestically and overseas, while supplying MPC polymers that can make biocompatible on the device surfaces. In particular we have succeeded in the industrialization of MPC polymers through close cooperation with businesses and have commercialized skin care and eye care products through our research. Recently we have developed a method of polymer treatment that can reduce protein adsorption on the surfaces of biochips and capillaries by 98% and are providing information on this method. This technology is also effective in





micromachine development. Work at the laboratory is performed in a cheerful and enjoyable environment under the motto that research should always be conducted with viewpoint

towards to the world. (For more information on our research activities, please see the Laboratory web site at <http://bmw.mm.t.u-tokyo.ac.jp/ishihara/>).

Preliminary Announcement

The 9th International Micromachine / Nanotech Symposium

November 13, 2003

at Science Hall, Science Museum, Tokyo, JAPAN



Exhibition MICROMACHINE 2003

November 12 - 14, 2003

at Science Museum, Tokyo, JAPAN

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