

Principal Researcher	Toshihiro Akaike			Number of Reserchers	3	
Research Institution • Department • Title	Professor, Department of Biomolecular Engineering, Tokyo Institute of Technology			Location of Institution	Yokohama-City	
Title of Project	Designing novel nano-controlled cell recognizable device and its application to the tissue engineering					
Abstract of Research Project	<p>In our project, we will find out the answer of "why we could not realize the <i>in vitro</i> culture system as quite same as <i>in vivo</i>" by designing and using new nano- cell recognizable micells. Using those novel device as well organized nano-eviroment system to the cells, we will analyze dynamics of what is happening at inside or outside of a cell in nano-meter scale. Also, we will create new three dimensional culture system with two-photon excitation reaction with highly arrayed cells.</p> <p>We will perform our research with "Matrix engineering concept". New polymer micells we create hold cell recognizable ligands models such as sugars, proteins, and hormones. Scince our probes are polymer micells which contains hydrophilic and hydrophobic section, it is quite convenient to immobilize to hydrophobic substrata especially our three dimensional substrata with highly ordered nm spacing (fig). The new culture system is fundamental for cellular environment but quite simple which help us to use computer memory to observe dynamics of each cell. We believe that our new concept which is called Computer-Aided Matrix Biology(CAMB) system is necessary to develop artificial organs or tips.</p>					
References	<p>(1) Sang-Heon Kim, Mitsuaki Goto, and Toshihiro Akaike, Specific Binding of Glucose-dervatized Polymers to the Asialoglycoprotein Receptor of Mouse Primary Hepatocytes, <i>J. Bio. Chem.</i>, 276,35312-35319 (2001)</p> <p>(2) M. Goto, K. Kobayashi, A. Hachikawa, K. Saito, C-S. Cho, T. Akaike, Micellar Behavior of Sugar-Carrying Polystyrene in Aqueous Solution . <i>Macromol. Chem. Phys.</i>, 202, 1161-1165 (2001)</p>					
Term of Project	Fiscal years 2003-2006 . (4years)					
Budget Allocation (in thousand of yen)	FY2003	FY2004	FY2005	FY2006	FY2007	TOTAL
	33,300	21,600	24,300	13,500		92,700
Homepage Address	http://www.akaike-lab.bio.titech.ac.jp					