

Principal Researcher	Masahiko Sisido			Number of Researchers	1	
Research Institution • Department • Title	Professor, Graduate School of Natural Sciences, Okayama University			Location of Institution	Okayama	
Title of Project	Chemical Extension of the Central Dogma towards Synthetic Microorganisms					
Abstract of Research Project	<p>Every living organisms on the earth are using the same 20 types of amino acids as constituents of their proteins. This research project is aimed to expand the types of amino acids to include those that carry side groups of artificial functions. Toward this goal, the protein biosynthesizing system, the central dogma, will be expanded to accept a variety of nonnatural amino acids and the biosynthesizing system will be introduced into a living cell to create “synthetic microorganisms” in which nonnatural amino acids with fluorophores and electron mediators, for example, play important roles. The research will find wide applications in the field of drug screenings by using fluorescent proteins or in the field of biosensors by using electron-mediating proteins.</p> <p>The whole research consists of four closely connected plans. (1) Creation of synthetic DNA analogs that bind more strongly to DNAs and RNAs than themselves. (2) Charging of a nonnatural amino acid to specific tRNA by using the DNA analogs as the tRNA recognizing agent. (3) Efficient expression of mutant proteins that contain nonnatural amino acids. (4) Introduction of the expanded biosynthesizing system to create “synthetic microorganisms”.</p>					
References	<p>T. Hohsaka and M. Sisido, Incorporation of non-natural amino acids into proteins, <i>Curr. Opinion Chem. Biol.</i> 6, 809-815 (2002).</p> <p>M. Sisido, Proteins containing Nonnatural Amino Acids, “<i>Biopolymers, Vol. 8,</i>”, Eds. A. Steinbuechel and Fahnestock, Wiley-VCH, Chapter 2. pp.26-49 (2002)</p>					
Term of Project	Fiscal years 2003-2007 . (5years)					
Budget Allocation (in thousand of yen)	FY2003	FY2004	FY2005	FY2006	FY2007	TOTAL
	24,500	13,800	13,800	13,800	13,800	79,700
Homepage Address	http://www.biotech.okayama-u.ac.jp/labs/sisido/sisido1.html					