Principal Researcher	Kozo Kaibuchi	**Number of Reserchers**	2
Research Institution • Department • Title	Professor, Graduate School of Medicine, Nagoya University	**Location of Institution**	Nagoya

Title of Project	Molecular mechanism of regulation of cell polarity and scattering
Abstract of Research Project	The various cells including migrating cells acquire polarity in order to exert their specific functions. Inflammatory cells, fibroblasts, and endothelial cells become ‘ migrating cells ’ upon the stimulation by various external signals. When the cells are stimulated with the signals, actin polymerization is accelerated beneath cell membranes, followed by the formation of the leading edge toward the signals. Microtubules are then reoriented and subsequently targeted to the actin filaments in the leading edge, which results in reorientation of MTOC and in establishment of cell polarity. Various proteins and vesicles are transported along the microtubules. However, the mechanism underlying the cell polarity of migrating cells is largely unknown. Neurons also have the cell polarity. Neurons usually extend a single axon and several dendrites from the cell body. Neurons receive signals from dendrites and transmit signals through an axon. Axon and dendrites are differentiated from the common immature neurites during development. However, it is not clear how neuronal cells make a fate decision of axon or dendrites among immature neurites to establish neuronal polarity. The Rho family GTPases are known to control cytoskeletons, adhesions, and vesicle transport. The Rho family GTPases are thought to regulate cell polarity through the regulation of cytoskeletons, adhesions, and vesicle transport. However, it remains to be clarified how the Rho family GTPases regulate the cell polarity. The first purpose of this project is to clarify the extracellular signals which control the cell polarity of inflammatory cells, fibroblasts, endothelial cells, and neuronal cells, and their signal transduction acting on the Rho family GTPases. The second purpose of the research is to understand the control mechanism underlying the microtubule dynamics and vesicle transport by the Rho family GTPases. The result obtained in this research will shed light not only on cell biology, but also on medical research for better understanding of the causes of various diseases including arteriosclerosis, neuro-degenerative diseases, and cancer cell invasion.
References	Rac1 and Cdc42 Capture Microtubules through IQGAP1 and CLIP-170, Masaki Fukata et al., Cell, 109, 873-885, 2002; CRMP-2 binds to tubulin heterodimers to promote microtubule assembly, Yuko Fukata et al., Nature Cell Biology, 4, 583-591, 2002
Term of Project	Fiscal years 2003-2007 . (5years)

Budget Allocation (in thousand of yen)	FY2003	FY2004	FY2005	FY2006	FY2007	TOTAL
	18,000	17,000	17,000	17,000	17,000	86,000

Homepage Address	http://www.med.nagoya-u.ac.jp/Yakuri/