

June 3, 2013

## TOSHIHIRO AKAIKE



Professor  
Graduate School of Bioscience and Biotechnology,  
Tokyo Institute of Technology  
4259 Nagatsuta-cho, Midori-ku, Yokohama 226-8501, Japan

Tel: +81-45-924-5146  
Fax: +81-45-924-5790  
e-mail: takaike@bio.titech.ac.jp

EDUCATION: 1975 Ph.D. Synthetic Chemistry. Graduate School of Engineering, The University of Tokyo, Japan “The Stereochemistry of the Polymerization of N-Carboxy  $\alpha$ -Amino Acid Anhydride.”  
1972 M.A. Faculty of Engineering, The University of Tokyo, Japan,  
1965 B.A. Faculty of Engineering, The University of Tokyo, Japan,

### DISTINCTIONS

Tokyo Tech Award for the Best Teacher (2007)  
Fellow, Biomaterials Science and Engineering, The International Union of Societies for Biomaterials Science and Engineering (2004)  
Jorge Heller Journal of Controlled Release/CRS Outstanding Paper Award (1997)  
Scientific Achievement Award (1989) The Japanese Society for Biomaterials

### EXPERIENCE

Professor emeritus Professor of Donated Chair  
Donated Chair of Biomaterials Design for Regenerative Engineering 2012- present  
Professor, Frontier Reserch Center & Graduate School of Bioscience and Biotechnology,  
Tokyo Institute of Technology, Japan, 2009-2012  
Visiting Professor, School of Medicine, Tsinghua University, China, 2009-present  
Visiting Professor, Nankai University, China, 2009-present  
Visiting Professor, School of Medicine, Showa University, Japan, 2007  
Professor, Graduate School of Bioscience and Biotechnology, Dept. of Bio- molecular  
Engineering, Tokyo Institute of Technology, Japan, 1990-2009  
Professor, Graduate School of Medicine, Shinshu University, Nagano, Japan, 2000-2003  
Visiting Professor, Harbin Medical University (China) 2000  
Visiting Professor, T University of Paris XIII (France), 1989, 1996  
Project Leader, Akaike Project “High-functional Membrane for Molecular Recognition”,  
Kanagawa Academy of Sci. & Tech., 1989-1995  
Associate Professor, Dept of Material Systems Engineering, Faculty of Engineering, Tokyo  
University of Agriculture and Technology, 1980-1990

Research Associate, Dept. of Surgical Science, The Heart Institute of Japan, Tokyo  
Women's Medical College (Presently University) Japan, 1989-1994

#### RESEARCH INTEREST

Tissue Engineering and Regenerative Medicine, Biomedical Polymers (Blood-compatible Polymers, Cell-Matrix Engineering for Liver and ES cells), Hybrid Artificial Organs (Liver, Pancreas), Cell Biology (Cytokines, Adhesion Molecules, Apoptosis, Extracellular Matrix), Hepatology (Liver Cells Pathology & Physiology), Drug, RNA, DNA and gene Delivery Systems (Polymers & Apatite Derivatives), Cell-recognizable biomaterials for ES/iPS Cells, (Proliferation and Differentiation).

#### ACTIVITIES:

The Japanese Society of Regenerative Medicine ;Director  
The Japanese Society of Tissue Engineering; Director  
The Japanese Society for Biomaterials; Vice President, Director

#### List of Publications

1. Kim SJ, Ise H, Goto M, Akaike T. Interactions of vimentin- or desmin-expressing liver cells with N-acetylglucosamine-bearing polymers. *Biomaterials*. 33, 2154-64. (2012)
2. Minato A, Ise H, Goto M, Akaike T. Cardiac differentiation of embryonic stem cells by substrate immobilization of insulin-like growth factor binding protein 4 with elastin-like polypeptides. *Biomaterials*. 33, 515-23.(2012)
3. Meng Q., Haque A, Hexing B. Akaike T.,The differentiation and isolation of mouse embryonic stem cells toward hepatocytes using galactose-carrying substrata. *Biomaterials*, 33, 1414-27, (2012)
4. A. Haque, X-S. Yue, A. Motazedian, Y.Tagawa, T. Akaike Characterization and neural differentiation of mouse embryonic and induced pluripotent stem cells on cadherin-based substrata. *Biomaterials*, 33, 5094-106, (2012)
5. Komura K, Ise H, Akaike T. Dynamic behaviors of vimentin induced by interaction with GlcNAc molecules. *Glycobiology*. 22, 1741-59, (2012)
6. Ise H, Goto M, Komura K, Akaike T. Engulfment and clearance of apoptotic cells based on a GlcNAc-binding lectin-like property of surface vimentin. *Glycobiology*, 22, 788-805. (2012)
7. Y.K. Kim, H.L. Jiang, D.D. Guo, Y.J. Choi, M.H. Cho, T. Akaike, C.S. Cho, Chemical Modification for Delivery of DNA and siRNA. *Chitosan-Based Systems for Biopharmaceuticals. Delivery, Targeting and Polymer Therapeutics*, B. Sarmiento and J. Neves eds. John Wiley & Sons Ltd. Pub. 255-273 (2012)
8. C.S. Cho H.L. Jiang, T. Hoshiba, T. Akaike, Design of Biomimetic Scaffold for Liver Tissue Engineering. *The Handbook of intelligent Scaffold for Regenerative Medicine*, G. Khang ed. Pan Stanford Publishing Pte. Ltd. 400-415 (2012)
9. 赤池敏宏、長岡正人 細胞認識性バイオマテリアル設計からカドヘリンマトリックス工学を展望して。再生医療 11 (4) 338-359, (2012)
10. Ishihara T, Kano A, Obara K, Saito M, Chen X, Park TG, Akaike T, Maruyama A. Nuclear localization and antisense effect of PNA internalized by ASGP-R-mediated endocytosis with protein/DNA conjugates. *J. Control. Release.*, 10, 34-9. (2011)
11. Haque A, Nagaoka M, Yue X-S, Duncan S.A., Akaike T. Artificial Acellular Feeder Layer: An Advanced Engineered Extracellular Matrix for Stem Cell Culture. *Methodological Advances in the Culture, Manipulation and Utilization of Embryonic Stem Cells for Basic and Practical*

- Applications. Edt. Craig S. Atwood. ISBN 978-953-307-197-8. Chapter 4 (page 61-74) INTECH (2011)
12. Kim B-S, Park I-K, Hoshiya T., Jiang Hu-L, Choi Y-J, **Akaike T.**, Cho C-S., Design of artificial extracellular matrices for tissue engineering. *Progress in Polymer Science*, 36, 238-268, (2011)
  13. Kim SJ, Ise H, Goto M, Komura K, Cho CS, **Akaike T.** Gene delivery system based on highly specific recognition of surface-vimentin with N-acetylglucosamine immobilized polyethylenimine. *Biomaterials*, 32, 3471-80, (2011)
  14. Cho C-S, Jiang H-L., Hoshiya T. Kim S-H, **Akaike T.**, Extracellular Matrices for Hepatic Tissue Engineering. *Methods in Bioengineering*, A. Soto-Gutierrez et.al. ed. ARTECH HOUSE (2011)
  15. A. Haque, B. Hexig, Q. Meng, S. Hossain, M. Nagaoka, **T. Akaike** The effect of recombinant E-cadherin substratum on the differentiation of endoderm-derived hepatocyte-like cells from embryonic stem cells. *Biomaterials* 32, 2032-42.( 2011)
  16. S. Hossain, A. Stanislaus, M.J. Chua, S. Tada, Y. Tagawa, E.H. Chowdhury, **T. Akaike**, Carbonate apatite-facilitated intracellularly delivered siRNA for efficient knockdown of functional genes. *J. Control. Release* 147 , 101–108, 2010
  17. Yue XS, Murakami Y., Tamai T., Nagaoka M., Cho CS., ItoY., **Akaike T.**, A Fusion on Cell Features. *Biomaterials* 31, 5287-5296, (2010)
  18. Azuma K, Nagaoka M, Cho CS, Akaike T. An artificial extracellular matrix created by hepatocyte growth factor fused to IgG-Fc. *Biomaterials*,31, 802-809, (2010)
  19. Tada S, Chowdhury EH, Cho CS, Akaike T., pH-sensitive carbonate apatite as an intracellular protein transporter. *Biomaterials*, 31, 1453-1459, (2010)
  20. T. Hoshiya, H. Nagahara, C-S.Cho, Y. Tagawa, **T. Akaike** Primary hepatocyte survival on non-integrin-recognizable matrices without the activation of Akt signaling. *Biomaterials* 28 1093-1104, (2007)
  21. Nagaoka, M., Koshimizu, U., Yuasa, S., Hattori, F., Chen, H., Tanaka, T., Okabe, M., Fukuda, K., and **Akaike, T.** E-cadherin-coated plates maintain pluripotent ES cells without colony formation. *PLoS ONE*, 1, e15, (2006).
  22. Chowdhury, E.H., Maruyama, A., Kano, A., Nagaoka, M., Hirose, S., Kunou, M., and **Akaike, T.** pH-sensing nano-crystals of carbonate apatite: Effects on intracellular delivery and release of DNA for efficient expression into mammalian cells. *Gene*, 376, 87-94, (2006)
  23. Kim, S-H., Hoshiya, T., and **Akaike T.** Hepatocyte behavior on synthetic glycopolymer matrix: inhibitory effect of receptor-ligand binding on hepatocyte spreading. *Biomaterials*, 25, 1813-1823, (2004)
  24. Ise, H., Nikaido, T., Negishi, N., Sugihara, N., Suzuki, F., **Akaike T.**, and Ikeda, U. Effective hepatocyte transplantation using rat hepatocytes with low asialoglyco protein receptor expression. *Am. J. Pathol.*, 165, 501-510, (2004)
  25. Kim, W.J., Sato, Y., **Akaike, T.**, and Maruyama, A. Cationic comb-type copolymers for DNA analysis. *Nat. Mater.*, 2, 815-820, (2003)

Over 800 publications, 45 patents