BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
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NAME	POSITION TITLE
Yuji Mishina	Section Head, Molecular Developmental Biology Section
eRA COMMONS USER NAME ymishina	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Tokyo, Tokyo, Japan	B. S.	1981	Biology
University of Tokyo, Tokyo, Japan	M. S.	1983	Molecular Biology
University of Tokyo, Tokyo, Japan	Ph. D.	1986	Molecular Biology

NOTE: The Biographical Sketch may not exceed four pages. Items A and B (together) may not exceed two of the four-page limit. Follow the formats and instructions on the attached sample.

A. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

Positions and Employment

1986-1992 Research Associate, Institute for Biological Research, Yokohama City Univ., Yokohama, Japan
1992-1998 Postdoctoral Fellow, The University of Texas, M.D. Anderson Cancer Center, Houston, Texas
1998-Date Section Head, Laboratory of Reproductive and Developmental Toxicology, National Institute of Environmental Health Sciences, National Institutes of Health, Research Triangle Park, NC

Other Experience and Professional Memberships

1990 Part-time lecturer, University of Tokyo, Faculty of Agricultural Sciences, Tokyo, Japan
1992 Part-time lecturer, The Kitazato University, Faculty of Hygiene Sciences, Kanagawa, Japan
1996 Assistant, The mouse molecular embryology course, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY
1997 Instructor, The Workshop: Production of Mutant Mice in Specific Genes by Homologous Recombination in Stem Cells. Instituto de Biotecnologia, Universidad Nacional Autonoma de Mexico, Cuenavaca, Mor., Mexico
1999 Course Lecture, Extracellular Matrix Biology Course 250 (Fall 1999), University of North Carolina Dental School, Chapel Hill, North Carolina
2004 Course Lecture, Extracellular Matrix Biology Course 250 (Spring 2004), University of North Carolina Dental School, Chapel Hill, North Carolina

Honors

1984 Foreign Travel Award of University of Tokyo, Japan
1992 Kihara Memorial Yokohama Foundation for the Advancement of Life Sciences, Travel Award
1992 Kohmoto Award for Foreign Travel
1997 Young Investigator Award, Texas Mineralized Tissues Society
2005 OADR/AADR William J. Gies Award

B. Selected peer-reviewed publications (in chronological order). Do not include publications submitted or in preparation.

1. Mishina, Y., Mark C. Hanks, M.C., Miura, S., Tallquist, M.D., and Behringer, R.R.: Generation of *Bmpr*/*Alk3* conditional knockout mice. Genesis. 32: 66-72, 2002.
2. Gaussin, V., Van de Putte, T., Mishina, Y., Hanks, M. C., Zwijsen, A., Huylebroeck, D., Behringer, R. R., and Schneider, M.D. Endocardial cushion and myocardial defects after cardiac myocyte-specific conditional deletion of the bone morphogenetic protein receptor ALK3. Proc. Natl. Acad. Sci. USA. 99: 2878-2883, 2002.
3. Takeda, H., Takami, M., Oguni, T., Tsuji, T., Yoneda, K., Sato, H., Mishina, Y., Ihara, N., Itoh, T., Morimoto, Y., Sugimoto, Y., and Kunieda, T. Positional cloning of the gene LIMBIN responsible for bovine chondrodysplastic dwarfism. Proc. Natl. Acad. Sci. USA. 99: 10549-10554, 2002.
4. Hebert, J.M., Mishina, Y., and McConnell, S.K.: BMP signaling required locally to pattern the dorsal telencephalic midline. Neuron 35: 1029-1041, 2002.
5. Jamin, S.P., Arango, N.A., Mishina, Y., Hanks, M.C., and Behringer, R.R. Requirement of Bmpr1a for Müllerian duct regression during male sexual development. Nat. Genet. 32: 408-410, 2002.
6. Takeuchi, A., Mishina, Y., Miyaishi, O., Hasegawa, T., and Isobe, K-I.: Heterozygosity with respect to Zfp 148 causes complete loss of fetal germ cells during mouse embryogenesis. Nat. Genet. 33: 172-176, 2003.
7. Miura, S., and Mishina, Y.: Whole embryo in vitro culture of E5.5 mouse embryos: development to the mid-late streak stage. Genesis. 37:38-43, 2003.
8. Soshnikova, N., Zechner, D., Huelsken, J., Mishina, Y., Behringer, R.R., Taketo, M.M., Crenshaw III, E.B., and Birchmeier, W.: Genetic interaction between Wnt/b-catenin and BMP receptor signaling during formation of the AER and the dorsal-ventral axis in the limb. Genes Dev. 17: 1963-1968, 2003.
9. Feng, J. Q., Huang, H., Lu, Y., Ye, L., Xie, Y., Tsutsui, T. W., Kunieda, T., Castranio, T., Scott, G., Bonewald, L. B., and Mishina, Y.: The Dentin Matrix Protein 1 (Dmp1) is specifically expressed in mineralized, but not soft, tissues during development. J. Dent. Res. 82: 776-780, 2003.
10. Zhang, J., Niu, C., Huang, H., Ye, L., He, X., Haug, J., Johnson, T., Feng, J. Q., Mishina, Y., and Li, L.: Identification of the haematopoietic stem cell niche and control of the niche size. Nature. 425: 836-841, 2003.
11. Oh, H., Bradfute, S.B., Gallardo, T.D., Nakamura, T., Gaussin, V., Mishina, Y., Pocius, J., Michael, L.H., Behringer, R.R., Garry, D.J., Entman, M.L., Schneider, M.D.: Cardiac progenitor cells from adult myocardium: homing, differentiation, and fusion following infraction. Proc. Natl. Acad. Sci. USA. 100: 12313-12318, 2003.
12. Suzuki, K., Bachiller, D., Chen, Y. P., Kamikawa, M., Ogi, H., Haraguchi, R., Ogino, Y., Minami, Y., Mishina, Y., Ahn, K., Crenshaw III, E. B., and Yamada, G.: Regulation of out growth and apoptosis for the terminal appendage, external genitalia, development by concerted function of Bmp signaling. Development. 130: 6209-6220, 2003.
13. Jamin, S. P., Arango, N. A., Mishina, Y., Hanks, M. C., and Behringer, R. R.: Genetic sdudies of the AMH/MIS signaling pathway for Müllerian duct regression. Mol. Cell. Endocrinol. 211: 15-19, 2003.
14. Yuhki, M., Yamada, M., Kawano, M., Iwasato, T., Itohara, S., Yoshida, H., Ogawa, M., and Mishina, Y.: BMP receptor IA signaling is necessary for follicle cycling and hair shaft differentiation. Development. 131: 1825-1833, 2004.
15. Stottmann, R. W., Choi, M., Mishina, Y., Meyers, E. N., and Klingensmith, J.: BMP receptor IA is required in mammalian neural crest cells for development of the cardiac outflow tract and ventricular myocardium. Development. 131: 2205-2218, 2004.
16. Andl, T., Ahn, K., Kairo, A., Chu, E. Y., Wine-Lee, L., Reddy, S. T., Croft, N. J., Cebra-Thomas, J. A., Metzger, D., Chambon, P., Lyons, K. M., Mishina, Y., Seykora, J. T., Crenshaw III, E. B., and Millar, S. E.: Epitherial Bmpr1a regulates differentiation and proliferation in postnatal hair follicles and is essential for tooth development. Development. 131: 2257-2268, 2004.
17. Ye, L., MacDougall, M., Zhang, S., Xie, Y., Li, Z., Zhang, J., Lu, Y., Fisher, L. W., Mishina, Y., and Feng, J. Q.:Deletion of Dentin Matrix Protein-1 Leads to a Partial failure of maturation of predentin into dentin, hypomineralization and expanded cavities of pulp and root canals during postnatal tooth development. J. Biol. Chem. 279: 19141-19418, 2004**.**
18. Qi, X., Li, T. G., Hao, J., Hu, J., Wang, J., Simmons, H., Miura, S., Mishina, Y., and Zhao, G. Q.: BMP4 supports self-renewal of embryonic stem cells by inhibiting extracellular receptor kinase (ERK) and p38 mitogen-activated protein kinase (MAPK) pathways. Proc. Natl. Acad. Sci. USA. 101: 6027-6032, 2004**.**
19. Mishina, Y., Starbuck, M.W., Gentile, M. A., Fukuda, T., Seedor, G. J., Hanks, M.C., Amling, M., Harada, S., Pinero, G. J., and Behringer, R.R.: BMP type IA receptor signaling regulates postnatal osteoblast function and bone remodeling. J. Biol. Chem. 279:27560-27566, 2004.
20. Davis, S., Miura, S., Hill, C., Mishina, Y., and Klingensmith, J.: BMP receptor IA is required in the mammalian embryo for endodermal morphogenesis and ectodermal patterning. Dev. Biol. 270: 47-63, 2004.
21. Stumpo, D. L., Phillips, R. S., Maronpot, R. R., Castranio, T., Byrd, N., Meyers, E. N., Mishina, Y., and

Blackshear, P. J.: Chorioallantoic fusion defects and embryonic lethality resulting from disruption of *Zfp36L1*, a gene encoding a CCCH tandem zinc finger protein of the tristetraprolin family. Mol. Cell. Biol. 24: 6445-6455, 2004.

22. Kishigami, S., Yoshikawa, S., Castranio, T., Okazaki, K., Furura Y., and Mishina, Y. BMP signaling through ACVRI is required for left-right patterning in the early mouse embryo. Dev. Biol. 276:185-193, 2004.
23. He, X., Zhang, J., Tong, W. G., Tawfik, O., Ross, J., Scoville, D. H., Tian Q., Zeng, X., He, X., Wiedemann, L. M., Mishina, Y., and Li, L.: BMP signaling inhibits intestinal stem cell self-renewal through suppression of Wnt-beta-catenin signaling. Nat. Genet. 36:1117-1121, 2004.
24. Rountree, R.B., Schoor, M., Chen, Hao, Marks, M. E., Mishina, Y., and Kingsley, D. M.: BMP receptor signaling is required for postnatal maintenance of articular cartilage. PLoS Biology. 2:1815-1827, 2004.
25. Wine-Lee, L., Ahn, K. .J, Richardson, R. D., Mishina, Y., Lyons, K. M., and Crenshaw III, E. B. Signaling through BMP type 1 receptors is required for development of interneuron cell types in the dorsal spinal cord. Development. 131:5393-5403, 2004.
26. Ye, L*, Mishina, Y.*, Chen, D., Huang, H., Dallas, S., Dallas, M., Kunieda, T., Tsutsui, T. W., Boskey, A. L., Bonewald L. F. and Feng, J. Q.:Dmp1-Deficient Mice Display Severe Defects in Cartilage Formation and a Chondrodysplasia-like Phenotype. J. Biol. Chem. 280:6197-6203, 2005. *Equally contributed.
27. Murali, D., Yoshikawa, S., Corrigan, R., Plas, D. J., Crair, M. C., Oliver, G. C., Lyons, K. M., Mishina, Y., and Furuta, Y.: Distinct developmental programs that require differential levels of BMP signaling during mouse retinal development. Development. 132:913-923, 2005.
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32. Eblaghie, M. C., Reedy, M., Oliver, T., Mishina, Y., and Hogan, B.L. M. Evidence that autocrine signaling through Bmpr1a regulates the proliferation, survival and behavior of distal ling epithelial progenitors. Dev. Biol. 291:67-82, 2006. (Published online January 13, 2006)
33. Fukuda, T., Komatsu, Y., Scott, G., Araya, R., Kawano, M., Ray, M. R., Yamada, M., and Mishina, Y.: Generation of a mouse with conditionally activated signaling through the BMP receptor, ALK2. genesis 44:159-167, 2006.
34. Ovchinnikov, D. A., Selever, J., Wang, Y., Chen, Y. T., Mishina, Y., Martin, J. F., Behringer, R.R.: BMP receptor type IA in limb bud mesenchyme regulates distal outgrowth and patterning. Dev. Biol. 295:103-115, 2006. (Published online Apr. 19, 2006)
35. Park, C., Mishina, Y., Lavine, K., Deng, C-X., Ornitz, D. M., and Choi K. BMP signaling in hematopoietic and vascular development. Development. 133:3473-3484, 2006. (Published online Aug. 3, 2006)
36. Miura, S., Davis, S., Klingensmith, J. and Mishina, Y.: BMP signaling in the epiblast is required for proper recruitment of the prospective paraxial mesoderm and development of the somites. Development. 133:3767-3775, 2006. (Published on line Aug. 30, 2006)
37. Zhang, J., He, X. C., Tong., W. G., Johnson, T., Wiedemann, L. M., Mishina, Y., Feng, J. Q., and Li, L.: BMP signaling inhibits hair follicle anagen induction by restricting epithelial stem/progenitor cell activation and expansion. Stem Cells 24:2826-2839, 2006. (Published online Sep. 7, 2006).
38. Yoon, B. S., Pogue, R., Ovchinnikiv, D. A., Yoshii, I., Mishina, Y., Behringer, R. R., and Lyons, K. M.: BMPs regulate multiple aspects of growth-plate chondrogenesis through opposing actions on FGF pathways. Development. 133:4667-4778, 2006. (Published on line Oct. 25, 2006)
39. Komatsu, Y., Scott, G., Nagy, A., Kaartinen, V., and Mishina, Y.: BMP type I receptor ALK2 is essential for proper mesoderm patterning at late gastrulation during mouse embryogenesis. Dev. Dyn. 236:512-517, 2007.
40. Khalil, I. A., Kogure, K., Futaki S., Hama S., Akita H., Ueno M., Kishida H., Kodoh M., Mishina Y., Kataoka, K., Yamada M., and Harashima, H. Octaarginine-modified multifunctional envelope-type nanoparticles for gene delivery. Gene Therapy. 14:682-689, 2007. (Published on line Feb. 1, 2007)
41. Goulley, J., Dahl, U., Baeza, N, Mishina, Y., and Edlund, H.: BMP4-BMPRIA signaling in beta-cells is required for and augments glucose stimulated insulin secretion. Cell Met. 5:207-209, 2007.
42. Miura, S., and Mishina, Y.: Anterior visceral endoderm at E5.5 is required for anterior-posterior axis development and later for proper primitive streak formation. Dev. Dyn. 236:1602-1610, 2007.
43. Auclair, B., Yannick D. Benoit, Y., Mishina, Y., and Perreault, N.: Bone morphogenetic protein signaling is

essential for proper terminal differentiation of the intestinal secretory cell lineage in mice. Gastroenterology. 133:887-896, 2007.
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45. Samanta, J., Burk, G., Pisarek, A. J., Nolan, B. A., McGuire, T., Mishina, Y., and Kesseler, J. A.: BMPRIA signaling determines numbers of oligodendrocytes and calbindin expression interneurons in the cortex. J. Neurosci. 27:7397-7407, 2007.
46. Shun, J., Liu, Y. H., Chen, H., Nguyen, M. P., Mishina, Y., Upperman, J. S., Ford, H., Shi, H.: Deficient Alk3-mediated BMP signaling causes prenatal omphalocele-like defect. Biochem. Biophys. Comm. Res. 360:238-243, 2007.
47. Di-Gregorio, A., Sancho, M., Vella, F., Godwin, J., Mishina, Y., and Rodriguez, T.: BMP signaling via Bmpr1a is required to prevent neural differentiation of the epiblast and to maintain trophoblast stem cell identity. Development. 134:3359-3369, 2007.
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49. Okada, Y., Scott, G., Ray, M. K., Mishina, Y., and Zhang, Y.: Histone demethylase JHDM2A is critical for Tnp1 and Prm1 transcription and spermatogenesis. Nature 450:119-123, 2007.
50. Feng, J.Q., Scott, G., Guo, D., Jiang, B., Ward, T., Ray, M., Bonewald, L., Harris, S. E., and Mishina, Y.: Generation of a conditional null allele for Dmp1 in mouse. Genesis 46:87-91, 2008.
51. O'Bryan, M. K., Takada, S., Kennedy, C., Scott, G., Harada, S., Dai, Q., Kretser, D. M., Eddy, E. M., Koopman, P., and Mishina, Y.: Sox8 is a critical regulator of adult Sertoli cell function and male fertility. Dev. Biol. 316:359-370, 2008.
52. Singh, A. P., Castranio, T., Scott, G., Guo, D., Harris, M. A., Ray, M., Harris, S. E. and Mishina, Y.: Influence of reduced expression of Bone morphogenetic protein 2 on mouse embryonic development. Sexual Dev. In press
53. Inagaki, M., Komatsu, Y., Scott, G., Ray, M.K., Yamada, G., Ninomiya-Tsuji, J. and Mishina, Y.: Generation of a conditional mutant allele for Tab1 in mouse. genesis In press

C. Research Support. List selected ongoing or completed (during the last three years) research projects (federal and non-federal support). Begin with the projects that are most relevant to the research proposed in this application. Briefly indicate the overall goals of the projects and your role (e.g. PI, Co-Investigator, Consultant) in the research project. Do not list award amounts or percent effort in projects.

Ongoing Research Support

The Intramural Research Program of the NIH, National Institute of Environmental Health Sciences (ES071003-10).

Completed Research Support

National Institute for Environmental Health Sciences, Interdisciplinary Research Award (IRA), with Drs. J. Goldstein and D. Zeldin: Arachidonic acid metabolism by murine CYP2Cs: Structure-function relationships and biological significance.
Grant Period: 08/30/99-08/29/02
Role: Co-Investigator

National Institute for Environmental Health Sciences, Interdisciplinary Research Award (IRA), with Dr. P. Blackshear: Creation of chimeric mice to study the effect of MARCKS and MLP on radial neuron migration during forebrain development.
Grant Period: 10/06/00-10/05/03
Role: Co-Investigator

Brain Science Institute, RIKEN, Conditional gift. Functional Analysis of BMP Signaling in the Neural Crests Development using Tissue-Specific Disruption of BMP Type IA Receptor.
Grant Period: 11/01/01-10/31/04
Role: PI

Brain Science Institute, RIKEN, Conditional gift. Understanding the role of BMP Signaling in Glia-Neuron Intercellular Crosstalking. Grant Period: 04/01/05-03/31/07
Role: PI