Faculty Member Profile

Xiangzhong (Jerry) Yang

Professor and Director of Center for Regenerative Biology

Phone number 860-486-6023

XIANGZHONG.YANG@uconn.edu

Background:

Xiangzhong Yang, known as Jerry to his friends, was born and raised in a rural Chinese village. Upon his graduation from high school, he joined the labor force in his poor village initially as a herdsman, a "bear-foot" veterinarian and later as the deputy mayor. Upon the re-instatement of the national entrance examination for college education in 1977, he was admitted to the Department of Animal Science, Beijing Agricultural University in 1978. With a prestigious national fellowship, he came to the United States in 1983 and received his MS and Ph.D. degrees at Cornell University in 1986 and 1990 respectively. Following a short postdoctoral training at Cornell University in the areas of animal biotechnology in 1991, Jerry was offered a research scientist position as a principal investigator and program director in the Cornell's Department of Animal Science with the responsibility to develop a vibrant extramurally funded animal biotechnology program. In June 1996, Jerry joined the faculty of the University of Connecticut as Associate Professor of Animal Science and Head of the Biotechnology Center's Transgenic Animal Facility. In 2000, he was promoted to the rank of full professor. In 2001, the University of Connecticut made an unprecedented decision to create a new center (the Connecticut Center for Regenerative Biology) for Jerry with five new faculty lines for a total investment of over $20,000,000 along with five new faculty lines and Jerry was appointed as the founding director of this new center (see http://web.uconn.edu/crb). Jerry's achievements in cloning have caused a media sensation around the globe including coverage and profiles by all the major news media including the CNN Headline News, ABC, CBS and BBC News as well as The New York Times, The Washington Post, The Wall Street Journal and the US News & World Report etc. Jerry became a celebrity scientist in his field with a strong record of productivity and leadership. He has attracted over $10 million extramural funding to his research program and has published over 200 papers including over 100 in top peer-reviewed scientific journals. His contributions to science is further acknowledged by more than 150 invited speeches in the last 5 years (about 30/year) as keynote speaker at scientific conferences or symposia or seminar speaker in over a dozen countries. He is an honorary or visiting professor in numerous institutions in China, Taiwan, Japan and Korea as well as several European countries. Jerry has been an advisor and reviewer for numerous federal and international funding agencies and he has organized or co-organized numerous national or international scientific conferences or workshops.

Courses Taught:

ANSC 397 Animal Science Seminar
ANSC 300 Frontiers in Agriculture Biotechnologies (1 credit)

Research Interests:

To visit Center for Regenerative Biology website click here

Pre-implantation Development and Embryo Biotechnology/Cloning

Dr. Yang's research has involved both the basic reproductive biology and the practical animal biotechnology such as transgenesis and animal cloning. His specific research interests include the study of mammalian oocyte maturation, activation, fertilization and early embryonic development. He is particularly well known in his field for his contributions to the development of various embryo genetic manipulation techniques including his high-profile research on animal cloning.

His achievements in cloning research include:

- Produced first male clones from breeding bull in the world in Japan in 1998. These clones were selected by the Guinness World Records as the largest clones in the world (published as a cover paper in the Proceedings of the National Academy of Sciences, USA);
- Produced the first clone (cow) of an adult farm animal (known as Amy, the calf) in the United States in June, 1999, which was called "cloning milestone";
- First to report that cloned animals have normal telomere lengths and have normal genetic age (published in Nature Genetics);
- First to document that adult clones can reproduce normally;
- First to report abnormal expression of X-linked genes in cloned animals which may contribute to the neonatal death of clones (published in Nature Genetics);
- First to report clones of first and second generations appear healthy and have normal telomere lengths (published in Nature Biotechnology).

These achievements have resulted in extensive, world-wide media coverage. Both the research and Dr. Yang have been profiled by all the major news media including the CNN Headline News, BBC News as well as The New York Times, The Washington Post, The Wall Street Journal and the US News & World Report etc. Dr. Yang has also been profiled by numerous people and in news documentaries in the US, UK, France, Germany, Korea and China.

Recent Publications:

Yang X, Tian XC, Kubota C, Page R, Xu J, Cibelli J, and Seidel G Jr. 2007. Risk assessment of meat and milk from cloned animals. Nature Biotech 25:79-83.

Yang X, Smith SL, Tian XC, Lewin HA, Renard JP, and Wakayama T. 2007. Nuclear reprogramming of cloned embryos and its implications for therapeutic cloning. Nature Genetics 39:295-302.

Yang X, Cheng T, Sung LY, Gao S, Shen H, Yu H, Song YF, Smith SL, Tuck DP, Inoue K, Weissman SM. 2007. Reply to "On the cloning of animals from terminally differentiated cells" Nature Genetics 39, 137 - 138 (01 Feb 2007)

Jiang L, Lai L, Samuel M, Prather RS, Yang X, and Tian XC. 2007. Expression of X-linked Genes in Deceased Neonates and Surviving Cloned Female Piglets. Mol Reprod Dev (accepted)

Sung LY, Shen PC, Jeong BS, Xu J, Chang CC, Cheng WT, Wu JS, Lee SN, Broek D, Faber D, Tian XC, Yang X, and Du F. 2007. Premature Chromosome Condensation Is Not Essential for Nuclear Reprogramming in Bovine Somatic Cell Nuclear Transfer. Biol Reprod 76:232-240 (Cover of Biol Reprod 2007 Jan issue)

Guo XM, Wang CY, Tian XC, Yang X. Engineering cardiac tissue from embryonic stem cells. Methods Enzymol. 2006;420:316-38. PMID: 17161704 [PubMed - in process]

Yang X, Guo XM, Wang CY, Tian XC. Cardiomyocytes. Methods Enzymol. 2006;418:267-83. PMID: 17141041 [PubMed - indexed for MEDLINE]

Roach M, Wang L, Yang X and Tian XC. 2006. Bovine Embryonic Stem Cells. In: Methods Enzymol: 418:21-37.

Sung L-Y, Gao S, Shen H, Yu H, Song Y, Smith SL, Chang C-C, Inoue K, Kuo K, Lian J, Li A, Tian XC, Tuck DP, Weissman SM, Cheng T, and Yang X. 2006. Cloned mouse pups can be derived from adult stem cells as well as terminally differentiated somatic cells. Nature Genetics 38:1323-8.

Chang C-C, Nagy ZP, Abdelmassih R, Liu J-L, Yang X, and Tian XC. 2006. Meiotic spindle formation and function following insertion of mitotic chromosomes into GV stage mouse oocytes. RMBonline 12:213-221.

Nedambale TL, Du F, Xu J, Chaubal SA, Dinnyes A,Groen W, Faber D, Dobrinsky JR, Yang X, and Tian XC. 2006. Prolonging bovine sperm-oocyte incubation in modified medium 199 improves embryo development rate and the viability of vitrified blastocysts. Theriogenology 66:1951-1960.

Chaubal SA, Molina JA, Ohlrichs CA, Ferre LB, Faber DC, Bols PEJ, Riesen J, Tian XC, and Yang X. 2006. Different transvaginal ovum pick-up techniques in cows to optimize oocyte retrieval and embryo production over a fixed period of time. Theriogenology 66:1631-1648.

Suteevan T, Smith S, Muentaisong S, Yang X, Parnpai R, and Tian XC. 2006. Anomalous mRNA levels of chromatin remodeling genes in swamp buffalo (Bubalus bubalis) cloned embryos. Theriogenology 65:1704-1715.

Nedambale TL, Du FL, Yang X, ad Tian XC. 2006. Effects of culture media on the development of in vitro-derived bovine embryos, and of ß-mercaptoethanol on post-vitrification survival. Anim Reprod Sci 93:61-75.

Yang X, Eggan, K, Seidel, Jr. G, Jaenisch, R, and Melton, D. 2006. A simple system of checks and balances to cut fraud. Nature 439:782.

Guo XM, Zhao YS; Chang HX, Wang CY, E LL, Zhang XL, Duan CM, Dong LX, Jiang H, Li J, Song Y, and Yang X. 2006. Creation of Engineered Cardiac Tissue in vitro from Mouse Embryonic Stem Cells. Circulation 113:2229-2237.

Yang X. 2006. Hwang's fraud adds impetus to ES cell research. Nature Biotech 24:393.

Xu J, Guo S, Sung L, Nedambale TL, Zhang, J, Schenk, J. Moreno JF, Dinnyes A, Tian XC, and Yang X, and F. Du. 2006. Developmental Potential of Vitrified Holstein Cattle Embryos Fertilized In Vitro with Sex-Sorted Sperm. J. Dairy Science 89:2510-2518.

S.A. Chaubal, J.A. Molina, C.L. Ohlrichs, L.B. Ferre, D.C. Faber, P.E.J. Bols, J.W. Riesen, X. Tian, X. Yang, Comparison of different transvaginal ovum pick-up protocols to optimize oocyte retrieval and embryo production over a 10-week period in cows, Theriogenology (in press), 2006

Yang X., Eggan, K., Seidel, Jr. Gl, Jaenishch, R., Melton D. A simple system of checks and balances to cut fraud. Nature 439:782. 2006

Guo XM, Zhao YS; Chang HX, Wang CY, E LL, Zhang XL, Duan CM, Dong LX, Jiang H, Li J, Song Y, Yang X. Creation of Engineered Cardiac Tissue in vitro from Mouse Embryonic Stem Cells. Circulation 113:2229-2237. 2006

Tian XC, Yang X and Wang L. Bovine Embryonic Stem Cells. Invited chapter for Methods in Enzymology: Embryonic Stem Cells. Lanza R (ed). 2006.

Yang X., Wang CY, Guo XM and Tian X. Cardiovascular tissue engineering with embryonic stem cells derived cardiomyocytes. Methods in Enzymology: Embryonic Stem Cells. Lanza R (ed). 2006.

Chang C-C, Nagy ZP, Abdelmassih R, Liu J-L, Yang X, and Tian XC. Meiotic spindle formation and function following insertion of mitotic chromosomes into GV stage mouse oocytes. RMBonline 2006.

Suteevun T, Parnpai R, Smith SL, Chang C-C, Muenthaisong S, Yang X, and Tian XC. Epigenetic Characteristics of Cloned and In Vitro fertilized Swamp Buffalo Embryos. J Anim Sci 2006.

Yang X. Hwang's fraud adds impetus to ES cell research. Nature Biotech 24:393, 2006

Sung L-Y, Gao S, Shen H, Song Y, Yu H, Chang C-C, Tian XC, Yang X, and Cheng T. Births of cloned mice from terminally-differentiated granulocytes following one-step nuclear transfer. Nature Genetics 2006.

Du F, Shen P, Xu J, Sung L-Y, Jeong B-S, Riesen J, Tian XC, Cheng WTK, Lee S-N, and Yang X. agglutination agent, phytohemagglutinin-L, improves the efficiency of somatic nuclear transfer cloning in cattle (Bos taurus).Theriogenology 2006 Feb;65(3):642-57. Epub 2005 Jul 19.

Suteevan T, Smith S, Muentaisong S, Yang X, Parnpai R, and Tian XC. Temporal Expression of Chromatin Remodeling Genes in Single Swamp Buffalo (Bubalus bubalis) Cloned and In Vitro Fertilized Embryos. Theriogenology 65:1704-1715.

Li Wang, Enkui Duan, Li-ying Sung, Xiangzhong Yang and X Cindy Tian. 2005. Generation and characterization of pluripotent putative stem cells from cloned bovine embryos. Biol Reprod 73: 149-155 (Biol Reprod 2005, 10.1095/biolreprod.104.037150) (with news release).

Enright BP, Sung LY, Chang CC, Yang X, Tian XC. 2005. Methylation and Acetylation Characteristics of Cloned Bovine Embryos from Donor Cells Treated with 5-aza-2'-deoxycytidine. Biol Reprod 72:944-948.

Sung LY, Du F, Xu J, Chang W, Nedambale TL, Zhang J, Jiang S, Tian XC, Yang X. 2005. The effect of albumin and sodium citrate on the development of in vitro produced bovine embryos under different oxygen tension. Reprod Nutr Dev 44:551-64.

Chang CC, Ma YH, Jacobs S, Tian XC, Yang X, Rasmussen T. 2005. Histone macroH2A1 expression

dynamics during material to embryonic transition. Dev Biol 278:367-380.

Smith S, Everts R, Tian XC, Du F, Sung L, Rodriguez-Zae S, Jeong BS, Renard JP, Lewin HA, Yang X, Global gene expression profiles reveal significant nuclear reprogramming by the blastocyst stage after cloning. Proc Natl Acad Sci USA 102, 17582-17587. 2005

Jyh-Cherng Ju, Shie Jiang, Jung-Kai Tseng, John E. Parks, Xiangzhong, Yang, Heat shock reduces developmental competence and alters spindle configuration of bovine oocytes, Theriogenolgy 64: 1677-1689, 2005

Tian, XC, Kubota C, Sakashita K, Izaike Y, Okano R, Tabara N, Curchoe C, Jacob L, Zhang Y, Smith S, Bormann C, Andrew S, Yang X. 2005. Meat and Milk Compositions of Bovine Clones Compared with Matched Controls. Proc Natl Acad Sci USA 102: 6261-6266. (with worldwide press release by PNAS. Top news attention of the year)

TL Nedambale, Fuliang Du, Xiangzhong Yang; XC Tian. 2005. Higher survival rate of vitrified and thawed in vitro produced bovine blastocysts following re-culture in defined medium supplemented with ß-mercaptoethanol. Anim Reprod Sci (accepted).

Yang L, Chavatte-Palmer P, Kubota C, O'Neill M, Taneja M, Hoagland T, Renard J-P, Yang X, Tian XC. 2005. Expression of imprinted genes is aberrant in deceased newborn cloned calves and relatively normal in surviving adult clones. Mol Reprod Dev (in press).

Yang, X, XC Tian, W Fodor. 2004. Cattle call for gene targeting. Nature Genetic 36: 671-672.

Zhang, S, Kubota C, Yang L, Zhang Y, Page R, O'Neill M, Yang X, Tian XC. Genomic imprinting of H19 in naturally reproduced and cloned cattle. Biol Reprod 2004; 71:1540-1544 (10.1095/biolreprod.104.031807).

Chang CC, Nagy P, Abdelmassih R, Yang X, Tian XC. Morphology of the G2/M nuclei during somatic cell haploidization by GV stage mouse oocytes. Biol Reprod 2004; 70:752-758.

Kubota C, Tian XC, and Yang X. Differential fertility in second and third generation clones of a prize breeding bull. Nature Biotechnology, 22:693-694 June issue 2004

Nedambale, T.L., Dinnyes, A., Groen, W. Dobrinsky, J.R., Tian, X.C. and Yang, X. Comparison on in vitro fertilized bovine embryos cultured in KSOM or SOF and Cryopreserved by slow freezing or vitrification. Theriogenology (advanced publication online, Feb, 2004), 2004.

Chang CC, Nagy P, Abdelmassih R, Yang X, Tian XC. Nuclear and microtubule dynamics of G2/M somatic nuclei during haploidization in germinal vesicle-stage mouse oocytes. Biol Reprod 70:752-758, 2004.

Lee, J.W., Tian, X-C. and Yang, X., Optimization of parthenogenetic activation protocol in porcine. Mol Reprod Dev 68: 51-57, 2004.

Lee, J.W., Tian, X-C. and Yang, X., Factors affecting fertilization of porcine oocytes following intracytoplasmic injection of sperm. Mol Reprod Dev 68: 96-102, 2004.

Liu, J.L., Kusakabe, H., Chang, CC, Suzuki, H., Schmidt, D.W., Julian, M., Pfeffer, R., Bormann, C.,

Tian, X-C, Yanagimachi, R., and Yang, X.. Freeze-dried sperm fertilization led to term development in rabbits. Biol Reprod 70:1776-1781, 2004. (with world-wide press release and Sciencedaily news)

Liu, J.L., Sung, L.Y. Du, F., Julian, M., Jiang, S. Barber, M., Xu, J, Tian, X-C. and Yang, X. Differential development of rabbit embtyos derived from parthenogenesis and nuclear transfer. Mol Reprod Dev 68:58-64, 2004.

Yang, X. An embryonic nation. Nature 428: 210-212, 2004 (with worldwide release by Nature).

Nedambale TL, Dinnyés A, Yang X, Tian XC. Bovine blastocyst development in vitro: Timing, sex and viability following vitrification. Biol Reprod 71:1671-1676, 2004

Xu, J. and Yang, X. Science, technology and potential applications of therapeutic cloning. Engineering in Medicine and Biology Magazine (in press), 2004.

Yang, X. Reproductive versus therapeutic cloning: Science, application and policies. Engineering in Medicine and Biology Magazine (in press), 2004.

Tian XC, Kubota C, Enright B, Yang X. Cloning animals by somatic cell nuclear transfer - biological factors. Reprod Biol Endocrinol 1:98-104, 2003.

Jiang, L., Carter, D.B., Xu, J., Yang, X., Prather, RS and Tian, X-C. Telomere Lengths in Cloned Transgenic Pigs. Biol Reprod 70: 1589-1593, 2004.

Enright BP, Kubota C, Yang X, Tian XC. Epigenetic characteristics of donor cells treated by Trichostatin A or 5-aza-2' -deoxycytidine and development of embryos cloned from treated donor cells. Biol Reprod 69:896-901, 2003.

AF Savage, J Maull, XC Tian, M Taneja, L Katz, M Darre and X Yang. Behavioral Observations of Adolescent Holstein Heifers Cloned from Adult Somatic Cells. Theriogenology 60:1097-1110. 2003.

Lee J, Wu S-C, Tian X, Barber M, Hoagland T, Riesen J and Yang X. Production of Cloned Pigs by Whole Cell Intracytoplasmic Microinjection. Biol Reprod 69:995-1001, 2003 (BOR press release, featured by a Nature science online news feature article).

Lee, JW, Tian, XC, and Yang X. Failure of male pronuclear formation is the major cause for the lack of fertilization and embryo development in pig ICSI oocytes. Biol Reprod 68:1341-1347. 2003.

Suzuki H, Saito Y, Kagawa N, and Yang X. In vitro fertilization and polyspermy in the pig: Factors affecting fertilization rates and cytoskeletal reorganization of the oocyte. Scan Elec Micros 61:327-334, 2003

Xu J and Yang X. Will Cloned Animals Suffer Premature Aging - The Story at the End of Clones' Chromosomes. Reprod Biol Endo 1: 105-110, 2003

Tian XC, Kubota C, Enright B, Yang X. Cloning animals by somatic cell nuclear transfer - biological factors. Reprod Biol Endo 1: 98-104, 2003.

Yang X (forum editor). Toward therapeutic cloning and regenerative biology forum: To clone or not to clone. Reprod Biol Endo 1: 97 (4 pages), 2003

Enright, BP., Jeong, BS., Yang, X. and Tian, X-C. Epigenetic Characteristics of Bovine Donor Cells for Nuclear Transfer: Levels of Histone Acetylation. Biol Reprod 69:1525-1530, 2003.

Enright, BP., Kubota, C., Yang, X. and Tian, X-C. Epigenetic Characteristics of Donor Cells treated by Trichostatin A or 5-Aza-2'-deoxycytidine and development of embryos cloned from treated donor cells. Biol Reprod 69:896-901, 2003.

Enright, B.P., Jeong, B.S., Yang, X., Tian, X.C. Epigenetic Characteristics of in vitro Cultured Donor Cells for Nuclear Transfer: Levels of Histone Acetylation. *Biol Reprod* (accepted) 2003.

Lee, J.W., Wu, S.C., Tian, X.C., Barber, M., Hoagland, T., Riesen, J., Yang, X. Production of Cloned Pigs by Whole Cell Intracytoplasmic Microinjection. *Biol Reprod* (in press) 2003.

Lee, J., Wu, S-C, Tian, X-C, Barber, M., Hoagland, T., Riesen, J. and Yang, X.. Production of Cloned Pigs by Whole Cell Intracytoplasmic Microinjection. Biol Reprod 69:995-1001, 2003. (with world-wide press release and Nature online news commentary)

Lee, J.W., Tian, X.C., Yang, X. Failure of male pronucleus formation is the major cause for the lack of fertilization and embryo development in pig ICSI oocytes. *Biol Reprod* 68:1341-1347. 2003.

Lee, J.W., Tian, X.C., Yang, X. Optimization of Parthenogenetic Activation Protocol in Porcine. Mol Reprod Dev (in press). 2003.

Savage, A.F., Maull, J., Tian, X-C, Taneja, M., Katz, L., Darre, M. and Yang, X.. Behavioral Observations of Adolescent Holstein Heifers Cloned from Adult Somatic Cells. Theriogenology 60:1097-1110, 2003.

Savage, A.F., Maull, J., Tian, X.C., Taneja, M., Katz, L., Darre, M., Yang, X. Reproductive Characteristics of Cloned Heifers Derived from Adult Somatic Cells. *Theriogenology 60* (3) (in press) 2003.

Dinnyes, A., Tian, X.C., Yang, X. Cloning of Rabbits (Chapter 17). In: Principles of Cloning. Eds. JB Cibelli, RP Lanza, KHS Campbell and MD West. Academic Press, San Diego, CA. pp. 344-366, 2002.

Du, F., Sung, L-Y., Tian, X.C. and Yang, X. Differential Cytoplast Requirement for Embryonic and Somatic Cell Nuclear Transfer in Cattle. Mol Reprod Dev (accepted) 2002.

Enright, B., Taneja, M., Schreiber, D., Riesen, J., Tian, X-C., Fortune, J.E. and Yang, X. Reproductive Characteristics of Cloned Heifers Derived from Adult Somatic Cells. Biol. Reprod. 66:291-296, 2002.

Govoni, K.E., Tian, X.C., Kazmer, G.W., Taneja, M., Enright, B., Rivard, A.L., Yang, X., Zinn, S.A. Age-related changes of the somatotropic axis in cloned Holstein calves. Biol Reprod 66:1293-1298 2002.

Liu, J.L., Sung, L.Y., Barber, M., Yang, X. Hypertonic Medium Treatment for Localization of Nuclear Material in Bovine Metaphase II Oocytes. Biol. Reprod. 66:1342-1349. 2002.

Liu, J.L., Sung, L.Y., Tian, X.C., Yang, X. Hypertonicity-Induced Projections Reflect Cell Polarity in Mouse MII Oocytes: Involvement of Microtubules, Microfilaments, and Chromosomes. *Biol Reprod* 67:1853-1863 2002.

Liu, L., Deng, M., Tian, X.C., Yang, X. Chapter 17. Principles of Practice of oocyte activation in mammals. In: Introduction to Mammalian Reproduction. Daulat R.P. Tulsiani, Kluwer Academic Publishers, MA, USA, pp 319-345.

Liu, J.L., Sung, L.Y., Barber, M., Yang, X. Hypertonic Medium Treatment for Localization of Nuclear Material in Bovine Metaphase II Oocytes. *Biol. Reprod.* 66:1342-1349. 2002.

Tian, X.C., Lonergan, P., Jeong, B.S., Evans, A.E.O., Yang, X. Association of MPF, MAPK and nuclear progression dynamics during activation of young and aged bovine oocytes. *Mol Reprod Dev* 62:132-138. 2002.

Xue, F., Tian, X-C, Kubota, C, Du, F., Taneja, M., Dinnyes, A., Dai, Y., Lewin, H., Pereira, L-V. and Yang, X. Aberrant patterns of X-Chromosome inactivation in bovine clones. Nature Genetics 31:216-220, 2002. (with world-wide press release)

Xue, F., Tian, X.C, Kubota, C, Du, F., Taneja, M., Dinnyes, A., Dai, Y., Lewin, H., Pereira, L.V. and Yang, X. Aberrantpatterns of X-Chromosome inactivation in bovine clones. Nature Genetics 31:216-220, 2002.

Deng, M.Q. and Yang, X. Full Term Development of Rabbit Oocytes Fertilized by intracytoplasmic Sperm Injection. Mol. Reprod. Dev. 58:1-6, 2001.

Dinnyes, A., Liu, L., Dai, Y., Barber, M., Xu, J., Zhou, P. and Yang, X. Development of cloned embryos from adult rabbit fibroblast cells. Biol. Reprod. 64:257-263, 2001.

Xu, J. and Yang, X. Telomerase activity in early bovine embryos derived from parthenogenetic activation and nuclear transfer. Biol. Reprod. 64:770-774, 2001.

Kubota, C., Yamakuchi, H., Todoroki, J., Mizoshita, K., Tabara, N., Barber, M. and Yang, X. Six Cloned Calves Produced from Adult Fibroblast Cells After Long-Term Culture. PNAS 97:990-995. 2000. (Cover paper with commentary - Capecchi, M.R. PNAS 97:956-957. 2000.) (with world-wide press release)

Tian, X-C., Xu, J. and Yang, X. Normal telomere lengths found in cloned cattle. Nature Genetics 26:272-273, 2000. (with world-wide press release)

Xu, J. and Yang, X. Telomerase activity in bovine embryos during early development. Biol. Reprod. 63:1124-1128, 2000.

Hobbies or Non-Academic Interests:

Travel and international culture.

Favorite Links:

- Center for Regenerative Biology website
- Office of International Affairs