CURRICULUM VITAE
Edmund Y. Yang

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Vanderbilt University Medical Center
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EDUCATION:

May 1984	A.B., Biology, Cornell University, Ithaca, NY
December 1992	Ph.D., Cell Biology, Vanderbilt University School of Medicine, Medical Scientist Training Program, Nashville, TN
May 1993	M.D., Vanderbilt University School of Medicine, Nashville, TN

CLINICAL TRAINING:

Internship	1993-1994, Department of General Surgery, University of California, San Francisco
Residency	1994-2000, Department of General Surgery, University of California, San Francisco
Chief Residency	2000-2001, Department of General Surgery, University of California, San Francisco
Fellowship	2001-2003, Department of Pediatric Surgery, Children's Hospital Boston

SCIENTIFIC RESEARCH EXPERIENCE

1995-1998	Postdoctoral Fellow, Children's Institute for Surgical Science, Children's Hospital of Philadelphia, Philadelphia, PA Principal investigator: N. Scott Adzick, M.D.
1987-1991	Predoctoral fellow, Department of Cell Biology, Vanderbilt University School of Medicine, Nashville, TN Principal investigator: Harold L. Moses, M.D.
1986-1987	Guest researcher, Cardiology Branch, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD Principal investigators: Stephen Epstein, M.D. and Ward S. Cassells, M.D.
1983-1984	Research assistant, Department of Biochemistry, Cornell University, Ithaca, NY Principal investigator: Bik Tye, Ph.D.
Summers	Research assistant, Department of Biochemical Virology, Johns Hopkins

1982, 1983 Oncology Center, Baltimore, MD
Principal investigator: Paula Pitha, Ph.D.

Summer 1979 Research assistant, Armed Forces Radiobiology Research Institute, Bethesda, MD
Principal investigator: Mark Smith, Ph.D.

ACADEMIC APPOINTMENTS

September 2003 Assistant Professor of Surgery
Department of Pediatric Surgery
Vanderbilt University

AWARDS

Farley Fellowship, Children's Hospital Boston, 2002
Von L. Meyer Fellowship Fund, Children's Hospital Boston, 2001
British Association of Pediatric Surgeons Award, July 1998
Medical Scientist Training Program award, 1987-1993, National Institute of General Medicine, NIH
Guest researcher award, 1986-1987, Cardiology Branch, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD

GRANTS

Cystic Fibrosis Foundation Award, "Development of Fetal Gene Therapy for Cystic Fibrosis", 1996-1997.
Cystic Fibrosis Foundation Award, "Biology of Fetal Intra-Muscular Gene Delivery", 1996-1998.

TEACHING EXPERIENCE

1989 Vanderbilt University School of Medicine
Course: Cell Biology
Lecture: "Heparin-binding Growth Factors"
1990 Vanderbilt University School of Medicine
Course: Developmental Biology
Lecture: "Neural Crest Cells"

PROFESSIONAL SOCIETIES AND BOARD CERTIFICATIONS

Diplomate of the National Board of Medical Examiners
Diplomate American Board of Surgery, 2002
Candidate Member of the American College of Surgeons
Member of the American Society of Gene Therapy
American Medical Association
American Association for the Advancement of Science
Certified in: Basic Life Support
Advanced Cardiac Life Support
Advanced Trauma Life Support

MEDICAL LICENSES
Pennsylvania
California
Tennessee

PUBLICATIONS
Book Chapters

1. **Yang, E.Y.** and Adzick, N.S. Fetal Surgery. In Gellis & Kagan's Current Pediatric Therapy 16. Edited by Fredric D. Burg, Julie R. Ingelfinger, Ellen R. Wald, and Richard A. Polin. (Philadelphia, PA, W.B. Saunders Company), 1999.

2. Moses, H.L., Barnard, J.A., Bascom, C.C., Beauchamp, R.D., Lyons, R.M., Miller, D.A., Pelton, R.W., Pietenpol, J.A., Sipes, N.J. and **Yang, E.** Regulation of fibroblastic and epithelial cell function by transforming growth factors. In: C. Etievant, J. Cros, Y.M. Rustum (eds.), New Concepts in Cancer, Metastasis, Oncogenes and Growth Factors, The Macmillan Press Ltd., London, pp. 218-230, 1990.

Papers:

1. Beauchamp, R.D., Lyons, R.M., **Yang, E.Y.**, Coffey, R.J., Jr. and Moses, H.L. Expression of and response to growth regulatory peptides by two human pancreatic carcinoma cell lines. *Pancreas* 5: 369-380, 1990.

2. **Yang, E.Y.** and Moses, H.L. Transforming growth factor β1-induced changes in cell migration, proliferation, and angiogenesis in the chicken chorioallantoic membrane. *Journal of Cell Biology* 111: 731-741, 1990.

3. Moses, H.L., **Yang, E.Y.** and Pietenpol, J.A. TGF-β stimulation and inhibition of cell proliferation: new mechanistic insights. *Cell* 63: 245-247, 1990.

4. Moses, H.L., **Yang, E.Y.** and Pietenpol, J.A. Regulation of epithelial proliferation by TGF-β. In: *Clinical Applications of TGF-ß; Ciba Foundation Symposium* 157, John Wiley & Sons, 1991, p. 66-80.

5. **Yang, E.Y.** 1991. Mechanisms of Transforming Growth Factor-β Function *In Vivo*. Vanderbilt University. Thesis.

6. Moses, H.L., Pietenpol, J.A., Münger, K., Murphy, C.S. and **Yang, E.Y.** TGFβ regulation of epithelial cell proliferation: Role of tumor suppressor genes. *Princess Takamatsu Symposium* 22:183-195, 1991.

7. Dagnino, L., Pietenpol, J.A., **Yang, E.Y.**, and Moses, H.L. Transforming growth factor regulation of keratinocyte growth. *Recent Results in Cancer Research* 128:15-29, 1993.

8. Cass, D.L., Bullard, K.M., Sylvester, K.G., **Yang, E.Y.**, Longaker, M.T., and Adzick, N.S. Wound size and gestational age modulate scar formation in fetal wound repair. *Journal of Pediatric Surgery* 32(3):411-5, 1997.

9. Cass, D.L., Sylvester, K.G., **Yang, E.Y.**, Crombleholme, T.M., and Adzick, N.S. Myofibroblast persistence in fetal sheep wounds is associated with scar formation. *Journal of Pediatric Surgery* 32(7):1017-21; discussion 1021-2, 1997.

10. Sylvester, K.L., **Yang, E.Y.**, Cass, D.L., Crombleholme, T.M., Adzick, T.M. Fetoscopic gene therapy for congenital lung disease. *Journal of Pediatric Surgery* 32(7):964-9, 1997.

11. Cass, D. L., Bullard, K. M., Sylvester, K. G., **Yang, E. Y.**, Sheppard, D., Herlyn, M., and Adzick, N. S. Epidermal integrin expression is upregulated rapidly in human fetal wound repair. *Journal of Pediatric Surgery* 33(2):312-6, 1998.

12. **Yang, E.Y.** and Adzick, N.S. Fetoscopy. *Seminars in Laparoscopic Surgery* 51:31-39, 1998.

13. Nakai, N., Herzog, R.W., Hagstrom, J.N., Walter, J., Kung, S.-H., **Yang, E.Y.**, Tai, S.J., Iwaki, Y., Kurtzman, G.J., Fisher, K.J., Colosi, P., Couto, L.B., High, K.A. Adeno-associated viral vector-mediated gene transfer of human blood coagulation factor IX into mouse liver. *Blood* 91:4600-4607, 1998.

14. Kim, H.B., Shaaban, A.F., **Yang, E.Y.**, Leichty, K.W., Flake, A.W. Microchimerism and tolerance after in utero bone marrow transplantation in mice. *Journal of Surgical Research* 77(1): 1-5, 1998.

15. Cass, D. L., Quinn, T. M., **Yang, E.Y.**, Liechty, K. W., Crombleholme, T. M., Flake, A. W., and Adzick, N. S. Increased cell proliferation and decreased apoptosis characterize congenital cystic adenomatoid malformation of the lung. *Journal of Pediatric Surgery* 33(7):1043-6; discussion 1047, 1998.

16. Lovvorn, H.N., Cass, D.L., Sylvester, K.G., **Yang, E.Y.**, Crombleholme, T.M., Adzick, N.S., and Savani, R.C. Hyaluronan receptor expression increases in fetal excisional skin wounds and correlates with fibroplasia. *Journal of Pediatric Surgery* 33(7):1062-9; discussion 1069-70, 1998.

17. Kitano, Y., **Yang, E.Y.**, von Allmen, D., Quinn, T.M., Adzick, N.S., Flake, A.W. Tracheal occlusion in the fetal rat: a new experimental model for the study of accelerated lung growth. *Journal of Pediatric Surgery* 33(12): 1741-1744, 1998.

18. Herzog, R. W., **Yang, E.Y.**, Couto, L. B., Hagstrom, J. N., Elwell, D., Fields, P. A., Burton, M., Bellinger, D. A., Read, M. S., Brinkhous, K. M., Podsakoff, G. M., Nichols, T. C., Kurtzman, G. J., and High, K. A. Long-term correction of canine hemophilia B by gene transfer of blood coagulation factor IX mediated by adeno-associated viral vector. *Nature Medicine* 5**:**56-63, 1999.

19. **Yang, E.Y.**, Cass, D.L., Sylvester, K.L., Wilson, J. M., and Adzick, N.S. BAPS Prize--1997. Fetal Gene Therapy: Efficacy, Toxicity, and Immunologic Effects of Early Gestation Recombinant Adenovirus. British Association of Paediatric Surgeons. *Journal of Pediatric Surgery* 34(2):235-41, 1999.

20. **Yang, E.Y.**, Kim, H.B., Shaaban, A.F., Milner, R., Adzick, N.S., Flake, A.W. Persistent postnatal transgene expression in both muscle and liver after fetal injection of recombinant adenovirus. *Journal of Pediatric Surgery* 34(5):766-72, 1999.

21. **Yang, E.Y.**, Flake, A.W., Adzick, N.S. Prospects for fetal gene therapy. *Seminars in Perinatology* 23(6):524-34, 1999.

22. Kitano, Y., Kanai, M., Davies, P., von Allmen, D., **Yang, E.Y.**, Radu, A., Kitano, Y., Adzick, N.S., Flake, A.W. BAPS prize-1999: Lung growth induced by prenatal tracheal occlusion and its modifying factors: a study in the rat model of congenital diaphragmatic hernia. *Journal of Pediatric Surgery* 36(2):251-9, 2001.

Oral Presentations:

1. "Fetal Gene Therapy", Resident Research Conference, Department of Surgery, University of Pennsylvania School of Medicine, April 16, 1996.

2. "Fetal Gene Therapy", Research Forum for David C. Sabiston, Department of Surgery, University of Pennsylvania School of Medicine, October 18, 1996.

3. "Fetal Liver-directed Gene Therapy", Neonatology Research Conference, Department of Neonatology, Children's Hospital of Philadelphia, December 12, 1996.

4. "Gene Therapy of the Developing Lung", NICHD site visit, Division of Neonatology, Children's Hospital of Philadelphia, February 4, 1997.

5. "Immunologic Anergy to Early Gestation Administration of Recombinant Adenovirus", 10th Annual Resident Research Day, Department of Surgery, University of California, San Francisco, February 28, 1997.

6. "Fetal Gene Therapy: Advances and Limitations", Grand Rounds, General Surgery, Children's Hospital of Philadelphia, May 15, 1997.

7. "Fetal Gene Therapy", Cystic Fibrosis Center, University of Pennsylvania School of Medicine, May 15, 1997.

8. "Early Gestational Gene Therapy Using Adenoviral Vectors", International Fetal Medicine and Surgery Society, Anchorage, Alaska, June 1-6, 1997.

9. "Fetal Gene Therapy: A Future Fetal Intervention", Philadelphia Perinatal Society, Philadelphia, Pennsylvania, September 10, 1997.

10. "Liver-directed Fetal Gene Therapy Using Recombinant Adenoviral Vectors: Successful Readministration in Mid-gestation Sheep Fetuses", 83rd Annual Clinical Congress, American College of Surgeons, Chicago, Illinois, October 12-17, 1997.

11. "Fetal Gene Transfer in Mice Using E1-Deleted Recombinant Adenovirus", 31st Annual Meeting, Association for Academic Surgery, Dallas, Texas, November 6-8, 1997.

12. "Fetal Gene Transfer in Mice Using E1-Deleted Recombinant Adenovirus", 11th Annual Resident Research Day, Department of Surgery, University of California, San Francisco, February 27, 1998.

13. "Fetal intramuscular delivery of recombinant adenovirus results in persistent postnatal transgene expression in both muscle and liver", 84th Annual Clinical Congress, American College of Surgeons, Orlando, Florida, October 25-30, 1998.

14. "Fetal Gene Therapy: Efficacy, Toxicity, and Immunologic Effects of Early Gestation Recombinant Adenovirus", British Association of Pediatric Surgeons, 1998.

15. "Genetic correction of hypertyrosinemia in c^{14cos} albino mice by fetal intramuscular delivery of recombinant adenovirus", In Utero Stem Cell and Gene Therapy Conference, Portland, Oregon, September 12-14th, 1998.

Abstracts/Poster Presentations:

1. **Yang, E.Y.**, Karasik, P., Epstein, S.E., Casscells, W. Basic fibroblast growth factor is increased by ex vivo myocardial ischemia/infarction. 60th Scientific Session of the American Heart Association, 1987. *Circulation* 76(4 part 2):IV-375, 1987.

2. **Yang, E.Y.**, Karasik, P.E., Sasse, J., Epstein, S.E., Casscells, W. Basic fibroblast growth factor immunoreactivity is increased by ex vivo myocardial ischemia/infarction. 44th Annual National Meeting of the AFCR, 1987. *Clin Res* 35(3):336A, 1987.

3. Casscells, W., Speir, E., Nguyen, D., **Yang, E.** Purification and characterization of heparin-binding polypeptide mitogens from human left ventricular myocardium. 44th Annual National Meeting of the AFCR, 1987. *Clin Res* 35(3):266A, 1987.

4. **Yang, E.Y.**, Casscells, W., Karasik, P., Bazoberry, F., Epstein, S. Myocardial acidosis releases basic fibroblast growth factor: a possible mechanism of ischemia induced angiogenesis. UCLA Symposium, Growth Factors and their Receptors: Genetic Control and Rational Application, 1988. *J of Cell Biochem* 12A:141, 1988.

5. Daniel, T.O., **Yang, E.**, Fen, Z. Transduction mechanisms independent of phosphoinositide turnover mediate agonist-induced changes in renal microvascular endothelial cell PDGF mRNA transcription. Meeting of the American Society of Nephrology, 1987. *Kidney Int* 33(1):153, 1988.

6. Yangs**, E.Y.** and Moses, H.L. Transforming growth factor type-β is a potent angiogenic factor. UCLA Symposium: Growth Regulation of Cancer II, 1989. *J Cell Biochem* 13B:159, 1989.

7. **Yang, E.Y.** and Moses, H.L. TGFβ1-induced mesenchymal accumulation and angiogenesis in the chicken chorioallantoic membrane: potential fibroblast and endothelial cell interactions. *J Cell Biochem* 15C:122, 1991.

8. **Yang, E.Y.**, Gorska, A., and Moses, H.L. Role of direct angiogenic factors in TGFβ1-induced angiogenesis. UCLA Symposium: FGF, Endothelial Cell Growth Factors, and Angiogenesis, 1991. *J Cell Biochem* 15F:245, 1991.

9. **Yang, E.Y.**, Cass, D.L., Sylvester, K.G., Flake, A.W., Wilson, J.M., and Adzick, N.S. Immunologic anergy to early gestation administration of recombinant adenovirus, Fellow's Research Poster Day, Children's Hospital of Philadelphia, February 7th, 1997.

10. **Yang, E.Y.**, Cass, D.L., Sylvester, K.G., Flake, A.W., Wilson, J.M., and Adzick, N.S. Immunologic anergy to early gestation administration of recombinant adenovirus, Cellular and Molecular Biology of Gene Therapy, Keystone Symposium, 1997.

11. **Yang, E.Y.**, Cass, D.L., Sylvester, K.G., Flake, A.W., Wilson, J.M., and Adzick, N.S. Efficacy and toxicity of adenoviral gene therapy vectors in fetal sheep lung. 28th Annual Meeting, American Pediatric Surgical Association, May 18-21, 1997.

12. Herzog, R., Hagstrom, J., Kung, S., **Yang, E.**, Couto, L., Kurztman, G., McQuiston, S., Colosi, P., Elwell, D., Nichols, T., Bellinger, D., Read, M., Brinkhous, K., Tai, S., and High, K. Absence of antibodies against factor IX following I.M. injection of an AAV vector encoding a species-specific transgene. 39th Annual Meeting, American Society of Hematology, San Diego, California, December 5-9, 1997.

13. Kim, H.B., Shaaban, A.F., **Yang, E.Y.**, Milner, R., Flake, A.W. Donor specific tolerance in a murine model of in utero stem cell transplantation requires hematopoietic microchimerism and is dependent on cell source. 39th Annual Meeting, American Society of Hematology, San Diego, California, December 5-9, 1997.

14. Kitano, Y., von Allmen, D., **Yang, E.Y.**, Quinn, T.M., Kanai, M., Adzick, N.S., Flake, A.W. Prenatal tracheal occlusion enhances lung growth in the nitrofen induced rat CDH model. 84th Annual Clinical Congress, American College of Surgeons, Orlando, Florida, October 25-30, 1998.

15. **Yang, E.Y.**, Kim, H.B., Shaaban, A.F., Milner, R., Adzick, N.S., Flake, A.W. Fetal intramuscular delivery of recombinant adenovirus results in persistent postnatal transgene expression in both muscle and liver. 84th Annual Clinical Congress, American College of Surgeons, Orlando, Florida, October 25-30, 1998.

16. Cass, D.L., Lovvorn, H.N., **Yang, E.Y.**, Sylvester, K.G., and Adzick, N.S. Regenerative

capabilities of the fetal vascular wall. 85th Annual Clinical Congress, American College of Surgeons, San Francisco, California, October 25-30, 1999.