

# **CURRICULUM VITAE**

## **Erkki Ruoslahti, M.D., Ph.D.**

Distinguished Professor

**BURNHAM INSTITUTE for MEDICAL RESEARCH (at UCSB)**

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University of California at Santa Barbara,  
Santa Barbara, CA 93106-9610

### **Education**

University of Helsinki, Finland - B.M. - 1961 - Medicine

University of Helsinki - M.D. - 1965 - Medicine

University of Helsinki - Ph.D. - 1967 - Immunology

### **Academic Positions**

2005–date Distinguished Professor, Biological Sciences, University of California, Santa Barbara

2005–date Distinguished Visiting Professor, University of Helsinki, Finland

2003–date Adjunct Professor, Dept. of Bioengineering, University of California, San Diego

**2002–date Distinguished Professor, Burnham Institute for Medical Research (at UCSB)**

1989–2001 President and CEO, The Burnham Institute, La Jolla, CA  
Director, NCI Cancer Center, The Burnham Institute

1980–2004 Adjunct Professor, Pathology Dept., University of California, San Diego

1989–2001 William H. Fishman Chair in Cancer Biology, The Burnham Institute

1982–1989 Vice President and Chief Operating Officer, The Burnham Institute

1980–1995 Scientific Director, The Burnham Institute

1979–1980 Associate Scientific Director, The Burnham Institute

1976–1979 Director, Immunobiology, Div. Immunology, City of Hope

1976–1976 Senior Research Scientist, Dept. Immunology, City of Hope

1975–1976 Professor of Bacteriology and Serology, University of Turku, Finland

1970–1975 Assistant Professor and Acting Associate Professor ('72 & '75),  
Department of Serology and Bacteriology, University of Helsinki, Finland

1968–1970 NIH Research Fellow at California Institute of Technology

1966–1968 Head of Blood Group Department, State Serum Institute, Helsinki

1964–1966 Research and Teaching Assistant, Department of Serology and Bacteriology, University of Helsinki

### **Editorial Boards**

*Science*, Reviewing Editor, 1989–2002

*Journal of Clinical Investigation*, 1995–2005

*Int. J. Cancer*, 1979–date

*Angiogenesis*, 1997–date

*Experimental Cell Research*, 1998–date

### **Academic Advisory Boards (current)**

- Haartman Institute, University of Helsinki, Finland – Scientific Advisory Board – 1998 to date
- Biomedicum, Helsinki, Finland – Chairman, Scientific Advisory Board – 2001 to date
- Joint Center for Structural Genomics – Scientific Advisory Board – 2001 to date
- Wellcome Trust Centre for Cell-Matrix Research – Scientific Advisory Board – 2001-2006
- Alliance for Cancer Gene Therapy – Scientific Advisory Council – 2002 to date
- University of Massachusetts Cancer Center in Worcester – External Advisory Board – 2002 to date

**Citizenship:** United States and Finland

The Japan Prize - 2005  
 The Jubilee Award - The British Biomedical Society - 2003  
 Member, Institute of Medicine of the U.S. National Academies - 2002  
 Innovator Award, DOD Army Breast Cancer Research Program - 2002  
 Member, European Molecular Biology Organization - 2001  
 Member, U.S. National Academy of Sciences - 1999  
 Jacobaeus International Prize - 1998  
 Gairdner Foundation International Award - 1997  
 Nobel Fellow, Karolinska Institute, Stockholm - 1995  
 Nobel Forum Lecture, Karolinska Institute, Stockholm - 1995  
 Abbott Award, International Society for Oncodevelopmental Biology and Medicine - 1995  
 Knight, Order of the White Rose of Finland - 1994  
 Fellow, American Academy of Arts and Sciences - 1993  
 Leila Gruber Cancer Research Award of the American Academy of Dermatology - 1993  
 The Walter Hubert Lecture, 33rd Annual Meeting, British Association for Cancer Research - 1992  
 Robert J. and Claire Pasarow Foundation Award - 1991  
 Honorary Doctor of Medicine, University of Lund - 1991  
 Outstanding Investigator Award, National Cancer Institute - 1986 - 1993  
 G.H.A. Clowes Award and Lecture - American Association for Cancer Research - 1990  
 Member, Societas Scientiarum Fennica (Finnish Academy of Sciences) - 1989  
 Harvey Society Lecture - 1988

## Grant support

### ACTIVE

effort	<b>5 R01 CA102153</b> (Ruoslahti) NIH/NCI Angiogenesis Inhibitors: A Mechanism Of Action	09/01/03 – 08/31/07	8%
	<b>N01-CO-37117</b> (Ruoslahti) NCI-NASA Contract Fundamental Technologies for Development of BioMolecular Sensors (Program) Nanodevice for Exponentially Amplifying <i>in Vivo</i> Targeting	09/30/03 – 09/29/06	5% effort
	<b>N01-CO-37007</b> NCI Contract Molecular imaging and therapy of solid tumors with a novel $\alpha\beta3$ -directed nanoparticle targeted to the neovasculature Principal Investigator: Dr. Gregory Lanza (Washington Univ.) Subcontract PI: Ruoslahti	09/30/03 – 09/29/06	5% effort
	<b>5 R01 CA098162</b> (Ruoslahti) NIH/NCI Regulation of Apoptosis by Integrins	04/01/04 – 03/31/08	5% effort
	<b>5 P01 CA102583</b> NIH/NCI Signaling Interactions in Cell Survival and Invasion Program Director: Dr. Elena Pasquale (The Burnham Institute) Project 3: Regulation Of Apoptosis By Integrins (Ruoslahti, PI)	09/22/04 – 08/31/09	8% effort

<b>U01 HL 080718</b> NIH/NHLBI Programs of Excellence in Nanotechnology Nanotherapy for Vulnerable Plaques Project Director: Dr. Jeff Smith (The Burnham Institute) Project 1: Targeting Elements (Ruoslahti)	04/01/05 – 03/30/2010	2% effort
<b>P01 CA104898</b> NIH/NCI Targeting Vessels in Tumors Program Director: Dr. Jan Schnitzer (Sidney Kimmel Cancer Center) Project 3: Homing Peptides for the Vasculature in Prostate Cancer (Ruoslahti, PI)	05/01/05 – 04/30/2010	5% effort
<b>1 R01 CA115410-01</b> (Ruoslahti) NIH/NCI Molecular Specialization of Tumor Lymphatics	08/01/05 – 05/31/2009	10% effort
<b>1 U54 CA 119335-01</b> (Project.1) NIH/NCI (Project 2) Centers of Cancer Nanotechnology Excellence (P.I. Dr. Sadik Esener, UCSD) Project Title: Center of Nanotechnology for Treatment, Understanding, and Monitoring of Cancer Project 1: Nanoparticle routing <i>in vivo</i> : Interactions with cells and tissues Project 2: Targeted <i>in vivo</i> silicon Microplatform for Nano devices (PI: Sadik Sedner, UCSD) Subcontract PI, Project 1: Ruoslahti Subcontract Co-PI, Project 2: Ruoslahti	09/01/05 – 08/31/10	10% effort 8% effort
<b>U54 CA 119349</b> NIH/NCI Centers of Cancer Nanotechnology Excellence (P.I. Dr. Robert Langer, MIT) Project 2: Treatment of Cancer with siRNA delivered by nanoparticles (PI: Sharp, Philip, MIT) Subcontract Co-PI: Ruoslahti	09/01/05 – 08/31/10	2% effort
<b>RFA-CA-05-026</b> NIH/NCI Detecting Cancer Early with Targeted Nano Probes for Vascular Signatures Principal Investigator: Douglas Hanahan (UCSF) Subcontract Co-PI: Ruoslahti	09/01/05 – 8/31/10	5% effort
<b>BC051724</b> (Ruoslahti) DOD Targeting Therapy-Resistant Tumor Vessels	12/01/05 – 11/30/07	10% effort
<b>1R01CA124427-01</b> NIH Engineering Multifunctional Nanoparticles	12/1/06 – 11/30/11	10% effort

## Publications

1 Ruoslahti E. Measurement of soluble blood group substances using lectins. *Ann Med Exp Fenn*

41:565-570 (1963).

2. Tallberg, T., Ruoslahti, E., and Ehnholm, C. Immunological studies in human placental proteins and the purification of human placental lactogen. *Ann. Med. Exp. Fenn.* **43**:67-71 (1965).
3. Ruoslahti, E. Further polymorphism in Gc system. Evidence for the occurrence of subgroups. *Ann. Med. Exp. Fenn.* **43**:213-214 (1965).
4. Ruoslahti, E., and Tallberg, T. Studies on the purification of the human serum group specific component. *Ann. Med. Exp. Fenn.* **44**:1-5 (1966).
5. Ruoslahti, E., Tallberg, T., and Seppala, M. Origin of protein in amniotic fluid. *Nature* **212**:841-842 (1966).
6. Tallberg, T., Kosunen, T.U., Ruoslahti, E., and Ehnholm, C. Detection of an organ specific protein in the human thymus. *Ann. Med. Exp. Fenn.* **44**:221-226 (1966).
7. Raunio, V., Ruoslahti, E., and Krause, U. Determination of the Gc groups by disc electrophoresis. *Acta Path. Microbiol. Scand.* **67**:424-428 (1966).
8. Seppala, M., Ruoslahti, E., and Tallberg, T. Genetical evidence for maternal origin of amniotic fluid proteins. *Ann. Med. Exp. Fenn.* **44**:6-7 (1966).
9. Seppala, M., Ruoslahti, E., and Makela, O. Inheritance and genetic lineage of Gc and Tf groups. *Acta Genet.* **17**:47-54 (1967).
10. Ruoslahti, E. Studies on the molecular basis of Gc polymorphism. *Ann. Med. Exp. Fenn.* **45**:1-13 (1967).
11. Seppala, M., Ruoslahti, E., and Seppala, I.J.T. Transferrin system in paternity cases. An immunological verification test for heterozygosity. *Ann. Med. Exp. Fenn.* **45**:14-15 (1967).
12. Makela, O., Kostainen, E., Koponen, T., and Ruoslahti, E. The timing and quality of IgA, IgG and IgM responses in rabbits immunized with a hapten. *in Nobel Symposium 3. Gamma Globulins. Structure and Control of Biosynthesis.* J. Killander, ed., Alqvist & Wiksell, Stockholm, pp. 505-516 (1967).
13. Ruoslahti, E., Ehnholm, C. and Makela, O. A weak blood group (B<sub>v</sub>) in a Finnish family. *Vox. Sang.* **13**:511-515 (1967).
14. Ruoslahti, E., Seppala, I.J.T., Simons, K., and Seppala, M. Identity of transferrin D<sub>Chi</sub> from the Chinese and from the Finns. *Nature* **220**:480-481 (1968).
15. Makela, O., Kostainen, E., Koponen, T., and Ruoslahti, E. "Immunoglobulin classes in a specific anti-hapten response" in *Radiation and the Control of Immune Response.* Int. Atomic Energy Agency, Vienna, pp. 7-12 (1968).
16. Seppala, I.J.T., Ruoslahti, E., Eriksson, A., and Makela, O. Regular inheritance of Gc groups in 169 families and 184 mother-child combinations. *Human Heredity* **19**:71-73 (1969).
17. Makela, O., Ruoslahti, E., and Seppala, I.J.T. Differing affinities of IgM and IgG anti-hapten antibodies in the same serum sample. *Behring Inst. Mitt.* **49**:S 195 (1969).
18. Makela, O., Cross, A.M., and Ruoslahti, E. "Similarities between the cellular receptor antibody and the secreted antibody" in *Cellular Recognition.* R.T. Smith and R.A. Good, (eds.), Appleton-Century-Crofts, New York, pp. 287-294 (1969).

- specific antibodies. *J. Immunol.* **102**:763-771 (1969).
20. Tillikainen, A., Ruoslahti, E., Seppala, M., Martensson, L., and van Loghem, E. Low frequency of genetic factors Gm(s) and Di(a) in Finland. *Human Heredity* **19**:180-184 (1969).
  21. Seppala, M., and Ruoslahti, E. Serum concentration of human placental lactogenic hormone (HPL) in pregnancy complications. *Acta Obstet. Gynecol. Scand.* **49**:143-147 (1970).
  22. Seppala, M., Ruoslahti, E., Soikkeli, S., and Tukiainen, P. Effect of cyclo-phosphamide on serum immunoglobulin level in patients with tumors of the genital tract. *Ann. Med. exp. Fenn.* **48**:131-134 (1970).
  23. Makela, O., Ruoslahti, E., and Seppala, I.J.T. Affinity of IgM and IgG antibodies. *Immunochemistry* **7**:917-932 (1970).
  24. Ruoslahti, E., and Seppala, I.J.T. Purification and some properties of rabbit serum group-specific protein. *Ann. Med. Exp. Fenn.* **48**:221-225 (1970).
  25. Laico, M.T., Ruoslahti, E., Papermaster, D.S., and Dreyer, W.J. Isolation of the fundamental polypeptide subunits of biological membranes. *Proc. Natl. Acad. Sci. USA* **67**:120-127 (1970).
  26. Ruoslahti, E., Simons, K., and Ehnholm, C. Immunological purification and chemical characterization of the group specific proteins (Gc) of human serum. *Eur. J. Immunol.* **1**:45-48 (1971).
  27. Ruoslahti, E., and Seppala, M. Studies of carcino-fetal proteins: Physical and chemical properties of human  $\alpha$ -fetoprotein. *Int. J. Cancer* **8**:283-288 (1971).
  28. Ruoslahti, E., Seppala, M., Pihko, H., and Vuopio, P. Studies of carcino-fetal proteins. II. Biochemical comparison of  $\alpha$ -fetoprotein from human fetuses and patients with hepatocellular cancer. *Int. J. Cancer* **8**:283-288 (1971).
  29. Ruoslahti, E., and Seppala, M. Studies of carcino-fetal proteins. II Development of a radioimmunoassay for  $\alpha$ -fetoprotein. Demonstration of  $\alpha$ -fetoprotein in serum of healthy human adults. *Int. J. Cancer* **8**:374-383 (1971).
  30. Ruoslahti, E., and Seppala, M.  $\alpha$ -fetoprotein in normal human serum. *Nature* **235**:161-162 (1972).
  31. Seppala, M., and Ruoslahti, E. Radioimmunoassay of maternal serum  $\alpha$ -fetoprotein during pregnancy and delivery. *Amer. J. Obstet. Gynec.* **112**:208-212 (1972).
  32. Seppala, M., and Ruoslahti, E.  $\alpha$ -fetoprotein in normal and pregnancy sera. *Lancet* **i**:375-376 (1972).
  33. Seppala, M., Aho, I., Widholm, O., and Ruoslahti, E. Alpha-fetoprotein in uterine hemorrhage during pregnancy and delivery. *Amer. J. Obstet. Gynec.* **113**:323-328 (1972).
  34. Seppala, M., and Ruoslahti, E. Alpha-fetoprotein in amniotic fluid: An index of gestational age. *Amer. J. Obstet. Gynec.* **114**:595-598 (1972).
  35. Ruoslahti, E., and Seppala, M. "Properties and occurrence of alpha-fetoproteins in serum of healthy adults and patients with hepatitis and cancer of the liver", in *Proc. 2nd Conf. and Workshop of Embryonic Antigens in Cancer*. N.G. Anderson, J.G. Coggin, Jr., and J.W. Holleman, (eds.), Oak Ridge Natl. Labs., Oak Ridge, Tennessee, pp. 345-350 (1972).
  36. Ruoslahti, E., Seppala, M., Vuopio, P., Saksela, E., and Peltokallio, P. Radioimmunoassay of  $\alpha$ -fetoprotein in primary and secondary cancer of the liver. *J. Natl. Cancer Inst.* **49**:623-630 (1972).

37. Vaheri, A., Ruoslahti, E., and Nordling, S. Neuraminidase stimulates division and sugar uptake in density-inhibited cell cultures. *Nature New Biol.* **238**:211-212 (1972).
38. Ruoslahti, E., and Seppala, M. Normal and increased  $\alpha$ -fetoprotein in neoplastic and non-neoplastic liver disease. *Lancet* **ii**:278-279 (1972).
39. Seppala, M., Bagshawe, K., and Ruoslahti, E. Radioimmunoassay of  $\alpha$ -fetoprotein: A contribution to the diagnosis of choriocarcinoma and hydatidiform mole. *Int. J. Cancer* **10**:478-481 (1972).
40. Seppala, M., Aho, I., Tissari, A., and Ruoslahti, E. Radioimmunoassay of oxytocin in amniotic fluid, fetal urine and meconium during late pregnancy and delivery. *Amer. J. Obstet. Gynec.* **114**:788-795 (1972).
41. Seppala, M., and Ruoslahti, E. Alpha-fetoprotein in abortion. *Brit. Med. J.* **4**:769-771 (1972).
42. Seppala, M., Aho, I. and Ruoslahti, E. "Regulation of the fetus of amniotic fluid oxytocin concentration during delivery and fetal distress." in *Perinatal Medicine*, Third European Congress of Perinatal Medicine, Lausanne. H. Bossart, J.M. Cruz, A. Huber, L.-A. Prodhom, and J.Sistek, (eds.), Hans Huber, Bern, pp. 316-318 (1972).
43. Seppala, M., and Ruoslahti, E. Alpha-fetoprotein in maternal serum: A new marker for detection of fetal distress and intrauterine death. *Amer. J. Obstet. Gynec.* **115**:48-52 (1973).
44. Ruoslahti, E., Seppala, M., Rasanen, J.A., Vupio, P., and Helske, T. Alpha-fetoprotein and hepatitis B antigen in acute hepatitis and primary cancer of the liver. *Scand. J. Gastroenterol.* **8**:197-202 (1973).
45. Pihko, H., Lindgren, J., and Ruoslahti, E. Rabbit  $\alpha$ -fetoprotein: Immunochemical purification and partial characterization. *Immunochemistry* **10**:381-385 (1973).
46. Seppala, M., and Ruoslahti, E.  $\alpha$ -fetoprotein in antenatal diagnosis. *Lancet* **i**:155 (1973).
47. Ruoslahti, E., Vaheri, A., Estola, T., and Sandelin, K. Antibodies against avian RNA tumor viruses. *Int. J. Cancer* **11**:595-603 (1973).
48. Suni, J., Vaheri, A., and Ruoslahti, E. Radioimmunoassay of avian RNA tumor virus group-specific antigen. *Intervirology* **1**:119-126 (1973).
49. Vaheri, A., Ruoslahti, E., Hovi, T., and Nordling, S. Stimulation of density-inhibited cell cultures by insulin. *J. Cell. Physiol.* **81**:355-363 (1973).
50. Seppala, M., and Ruoslahti, E. Alpha-fetoprotein: Physiology and pathology during pregnancy and application to antenatal diagnosis. *J. Perinat. Med.* **1**:104-113 (1973).
51. Pihko, H., and Ruoslahti, E. High level of alpha-fetoprotein in sera of adult mice. *Int. J. Cancer* **12**:354-360 (1973).
52. Vaheri, A., and Ruoslahti, E. Expression of the major group-specific antigen (GS-A) of avian type-C viruses in normal chicken cells and tissues. *Int. J. Cancer* **12**:361-367 (1973).
53. Vaheri, A., Ruoslahti, E., Hovi, T., and Nordling, S. "Cell surface and initiation of proliferation." in *Biology of the Fibroblast*. Sigrid Juselius Foundation Symposium, 1972, Turku, Finland, pp. 267-272 (1973).
54. Ruoslahti, E., Vaheri, A., Kuusela, P., and Linder, E. Fibroblast surface antigen: A new serum protein. *Biochim. Biophys. Acta* **322**:352-358 (1973).
55. Ruoslahti, E., and Nordling, S. "Cell surface and initiation of proliferation." in *Biology of the Fibroblast*. Sigrid Juselius Foundation Symposium, 1972, Turku, Finland, pp. 267-272 (1973).

- for Detection of Cancer*. The Folksam Symposium 1972, Bonniers, Stockholm pp. 45-48 (1973).
56. Seppala, M., and Ruoslahti, E. Alpha-fetoprotein in Rh-immunized pregnancies. *Obstet. Gyn.* **42**:701-706 (1973).
  57. Laurence, K.M., Turnbull, A.C., Harris, R., Jennison, R.F., Ruoslahti, E., and Seppala, M. Antenatal diagnosis of spina bifida. *Lancet* **ii**:860 (1973).
  58. Vaheri, A., Ruoslahti, E., Sarvas, M., and Nurminen, M. Mitogenic effect by lipopolysaccharide and pokeweed lectin on density-inhibited chick embryo fibroblasts. *J. Exp. Med.* **138**:1356-1364 (1973).
  59. Vaheri, A., Ruoslahti, E., and Hovi, T. "Cell surface and growth control of chick embryo fibroblasts in culture." in *Control of Proliferation in Animal Cells*. B. Clarkson and R. Baserga, (eds.), Cold Spring Harbor Conferences on Cell Proliferation, Vol. 1, pp. 305-312 (1974).
  60. Ruoslahti, E., Pihko, H., Vaheri, A., Seppala, M., Virolainen, M., and Kontinen, A. Alpha-fetoprotein: "Structure and expression in man and inbred mouse strains under normal conditions and liver injury." in *The Role of Immunological Factors in Viral and Oncogenic Processes*. R.F. Beers, R.C. Tilghman, and E.G. Basset, (eds.), The John Hopkins University Press, Baltimore, MD, pp. 249-255 (1974).
  61. Pihko, H., and Ruoslahti, E. "Alpha-fetoprotein production in normal and regenerating liver." in *Colloques de L'INSERM*. R. Masseyeff, Ed., pp. 333-336 (1974).
  62. Seppala, M., and Ruoslahti, E. "Alpha-fetoprotein and fetal development." in *Colloques de L'INSERM*. R. Masseyeff, Ed., pp. 387-391 (1974).
  63. Ruoslahti, E., Pihko, H., and Seppala, M. Alpha-fetoprotein: Immunochemical purification and chemical properties. Expression in normal state and in malignant and non-malignant liver disease. *Transplantation\_Reviews* **20**:38-60 (1974).
  64. Ruoslahti, E., Salaspuro, M., Pihko, H., Andersson, L., and Seppala, M. Serum  $\alpha$ -fetoprotein: Diagnostic significance in liver disease. *Brit. Med. J.* **393**:527-529 (1974).
  65. Ruoslahti, E., and Vaheri, A. Novel human serum protein from fibroblast plasma membrane. *Nature* **248**:789-791 (1974).
  66. Vaheri, A., and Ruoslahti, E. Disappearance of a major cell-type specific surface glycoprotein antigen (SF) after transformation of fibroblasts by rous sarcoma virus. *Int. J. Cancer* **13**:579-586 (1974).
  67. Harris, R., Jennison, R.F., Barson, A.J., Laurence, K.M., Ruoslahti, E., and Seppala, M. Comparison of amniotic fluid and maternal serum  $\alpha$ -fetoprotein levels in the early antenatal diagnosis of spina bifida and anencephaly. *Lancet* **i**:429-433 (1974).
  68. Lindgren, J., Vaheri, A., and Ruoslahti, E. Identification and isolation of  $\alpha$ -fetoprotein in the chicken. *Differentiation* **2**:233-236 (1974).
  69. Wartiovaara, J., Linder, E., Ruoslahti, E., and Vaheri, A. Distribution of fibroblast surface antigen. Association with fibrillar structures of normal cells and loss upon viral transformation. *J. Exp. Med.* **140**:1522-1533 (1974).
  70. Sandelin, K., Estola, T., Ristimaki, S., Ruoslahti, E., and Vaheri, A. Radioimmunoassay of the group-specific antigen in detection of avian leukosis virus infection. *J. Gen. Virol.* **25**:415-420 (1974).
  71. Vaheri, A., Ruoslahti, E., Hovi, T., Keski-Oja, J., Koistinen, U., Kuusela, P., Saksela, O., Linder, E., and Wartiovaara, J. Membrane glycoproteins in growth control and transformation of chick fibroblasts. *Behring Inst. Mitt.* **55**:276-281 (1974).

72. Seppala, M., and Ruoslahti, E. "Radioimmunoassay of alpha-fetoprotein: Application to the study of normal and pathological pregnancies." in *Recent Progress in Obstetrics and Gynecology Proceedings*. VII World Congr. Obst. and Gyn. Moscow, Persianinov, Chervakova, and Presl, (eds.), Excerpta Medica, Amsterdam, pp. 449-462 (1974).
73. Ruoslahti, E., Pihko, H., Becker, M., and Makela, O. Rabbit  $\alpha$ -fetoprotein: Normal levels and breakage of tolerance with haptened homologous  $\alpha$ -fetoprotein. *Eur. J. Immunol.* **5**:7-10 (1975).
74. Kuusela, P., Ruoslahti, E., and Vaheri, A. Polypeptides of a glycoprotein antigen (SF) present in serum and surface of normal but not of transformed chicken fibroblasts. *Biochim. Biophys. Acta.* **379**:295-303 (1975).
75. Ruoslahti, E., and Vaheri, A. Interaction of soluble fibroblast surface antigen with fibrinogen and fibrin. Identity with cold insoluble globulin of human plasma. *J. Exp. Med.* **141**:497-501 (1975).
76. Seppala, M., Pihko, H., and Ruoslahti, E. Carcinoembryonic antigen and  $\alpha$ -fetoprotein in malignant tumors of the female genital tract. *Cancer* **35**:1337-1381 (1975).
77. Linder, E., Vaheri, A., Ruoslahti, E., and Wartiovaara, J. Distribution of fibroblast surface antigen in the developing chick embryo. *J. Exp. Med.* **142**:41-49 (1975).
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79. Vaheri, A., and Ruoslahti, E. Fibroblast surface antigen produced but not retained by virus-transformed human cells. *J. Exp. Med.* **142**:530-535 (1975).
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82. Seppala, M., and Ruoslahti, E. "Role of  $\alpha_1$ -fetoprotein as a marker in fetal distress." in *The Mammalian Fetus - Comparative Biology and Methodology*, E.S.E.Hafez, Ed., Charles C. Thomas, Springfield, Ill., pp. 236-247 (1976).
83. Ruoslahti, E. Antigen-antibody interaction, antibody affinity and dissociation of immune complexes. *Scand. J. Immunol.*, Suppl. 3, E. Ruoslahti, Ed., pp. 3-7 (1976).
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86. Vaheri, A., Ruoslahti, E., Westermarck, B., and Ponten, J. A common cell-typespecific surface antigen in cultured human glial cells and fibroblasts: Loss in malignant cells. *J. Exp. Med.* **143**:64-72 (1976).
87. Vaheri, A., Ruoslahti, E., Linder, E., Wartiovaara, J., Keski-Oja, Kuusela, P., and Saksela, O. Fibroblast surface antigen (SF): Molecular properties, distribution *in vitro* and *in vivo*, and altered expression in transformed cells. *J. Supramolec. Struct.* **4**:63-70 (1976).
88. Keski-Oja, J., Vaheri, A., and Ruoslahti, E. Fibroblast surface antigen (SF): The external glycoprotein lost in proteolytic stimulation and malignant transformation. *Int. J. Cancer* **17**:261-269

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91. Ruoslahti, E., Pihko, H., Jalanko, H., Lindgren, J., Engvall, E., and Seppala, M. "Alpha-fetoprotein: Diagnostic use in human cancer and production of auto-antibodies in animals." in *Scandia International Symposia, Health Control in Detection of Cancer*. H. Bostrom, T., Larsson, and N. Ljungstedt, (eds.), Almqvist and Wiksell Int'l., Stockholm, pp. 85-100 (1976).
92. Ruoslahti, E., and Terry, W.D.  $\alpha$ -fetoprotein and serum albumin show sequence homology. *Nature* **260**:804-805 (1976).
93. Seppala, M., Aula, P., Rapola, J., Karjalainen, O., Huttunen, N.-P., and Ruoslahti, E. Congenital nephrotic syndrome: Prenatal diagnosis and genetic counselling by estimation of amniotic fluid and maternal serum  $\alpha$ -fetoprotein. *Lancet* **ii**:123-128 (1976).
94. Ruoslahti, E., and Sjogren, H.O. Specific anti-fibroblast cytotoxicity of antibodies to fibroblast surface antigen. *Int. J. Cancer* **18**:375-378 (1976).
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