

CURRICULUM VITAE

Kevin Owen Lillehei, M.D.

Personal Data:

Birthplace: Minneapolis, Minnesota
Citizenship: United States

Office Address/Telephone: Department of Neurosurgery
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University of Colorado
Health Sciences Center
Denver, Colorado 80262
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Education:

High School: Marshall-University High School,
Minneapolis, Minnesota 1968-1971

Undergraduate College: Cornell University, Ithaca, New York
Double major - Physics and Chemistry
1971-1975

Medical School: University of Minnesota Medical School
975-1979

Harvard Medical School - Peter Bent Brigham Hospital
Boston, Massachusetts, Cardiology
elective 7/1/78-8/1/78

Royal Free Hospital, London, England
Medicine elective 3/20/79-5/20/79

Postgraduate Education:

Internship	Straight Surgery, University of Michigan Medical Center, Ann Arbor, Michigan, 1979-1980
Neurosurgery Residency Training	University of Michigan Medical Center, Ann Arbor, Michigan, 1980-85

Academic Appointments:

Assistant Professor of Surgery Department of Neurosurgery University of Colorado Health Sciences Center Denver, Colorado	1985-1993
Staff Physician Division of Neurosurgery Denver General Hospital Denver, Colorado	1985-present
Staff Physician Division of Neurosurgery Veteran's Administration Medical Center Denver, Colorado	1985-present
Director, Neurosurgical Intensive Care Unit Denver General Hospital, Denver, Colorado	1986-1987
Chief, Division of Neurosurgery Veteran's Administration Medical Center Denver, Colorado	1987-1990
Chief, Section of Neuro-Oncology Department of Neurosurgery University of Colorado Health Sciences Center Denver, Colorado	1990-present
Program Leader Surgical Oncology Program University of Colorado Cancer Center Denver, Colorado Co-Director	1991-1995

Clinical Investigations Core University of Colorado Cancer Center Denver, Colorado	1992- 2000
Co-Director Adult Clinical Oncology Program University of Colorado Cancer Center Denver, CO	1995- 1999
Associate Professor of Surgery Division of Neurosurgery University of Colorado Health Sciences Center Denver, Colorado	1993 – 2000
Professor of Neurosurgery Department of Neurosurgery University of Colorado Health Sciences Center Denver, Colorado	2000 – present
Vice Chair of Clinical Affairs Department of Neurosurgery University of Colorado health Sciences Center Denver, Colorado	2001- 2004
Interim Chair Department of Neurosurgery University of Colorado Health Sciences Center Denver, Colorado	8/18/2004 – 3/31/06
Chair Department of Neurosurgery University of Colorado health Sciences Center Denver, Colorado	4/1/2006 - present
Recipient of Endowed Chair, Ogsbury-Kindt Chair in Neurosurgery	4/1/2006 - present

Certification:

National Board of Medical Examiners	1980
Deputy Medical Examiner -Washtenaw County Health Dept.	1983
Diplomate American Board of Neurological Surgeons	Sept 1989

Licensure:

State of Michigan-License (#043851)	1981-1988
State of Colorado-License (#26670)	1985-present

Hospital Staff Appointments:

Denver General Hospital, Denver, Colorado
University Hospital, Denver, Colorado
Veteran's Administration Hospital, Denver, Colorado
The Children's Hospital, Denver, Colorado
St. Anthony's Central Hospital, Denver, Colorado
Exempla Lutheran Medical Center, Wheat Ridge, Colorado

Honors and Awards:

Marshall-University High School (graduated with honors)	1971
Cornell University, B.A. Degree, cum laude in Physics	1975
Dean's Honor List, Cornell University	1974-1975
Captain of the Wrestling Team, Cornell University	1974-1975
Invited Participant, Interleukin-2 Seminar, The Preuss Foundation for Brain Tumor Research Dallas, Texas	June 1987 and Sept 1988
Second Place Award, Neuro-Oncology Poster Session American Association of Neurological Surgeons	April 1990
Letter of Commendation, Moscow State University, Moscow, USSR. Treatment of patient Darya Grebenshekova.	Sept. 1990
First Gene Therapy Research Trial in Colorado, with treatment of first patient with Gene Therapy in Colorado (Malignant Glioma).	1996
"The Best Doctors in America, - Neurological Surgery" Best-Doctors, Inc., Aiken,S.C.	1996-1997, 1997-1998,2001-2002, 2005-6
Honorable Mention for Rubinstein Award - Co-author of abstract submitted to the American Assoc of Neuropathologist Annual Meeting, Pittsburgh, PA	1997
Honored Professor - Match Day Celebration, University of Colorado School of Medicine - Class of 1997	March 17, 1997
Listed in the "Top Doctors in Denver Region - Neurosurgery" in <u>5280 Magazine</u>	1998, 2000, 2002, 2004, 2005, 2006, 2007, 2008
President of the Colorado Neurosurgical Society (Two year term)	June 1999 – June 2001
Letter of Appreciation “for the recruitment, support and encouragement offered to able students entering the field of medicine” from the University of Colorado School of Medicine Class of 2002.	Dec 16, 1999
President-elect of the Rocky Mountain Neurosurgical Society, Inc.	1999 – 2000

Invited Topic Editor, Neurosurgical Focus (On-line Journal) "Immunotherapy of Brain Tumors"	Dec. 2000
Selected as Guest Examiner, Oral Neurosurgical Board Examinations, American Board of Neurological Surgery, Houston, Tx. Nov. 2000	2000
President of the Rocky Mountain Neurosurgical Society, Inc. Listed in "Guide to Top Doctors-2002" Center for the Study of Services Washington, D.C.	2000 – 2001 2002
Listed in "Guide to America's Top Surgeons- Neurosurgery" Consumers' Research Council of America, 2002-2003 Edition	2002, 2003, 2007
Honored Lifetime Listing in "Strathmore's Who's Who" Westbury, NY	2002-2003, 2003-2004
Listed in "The Best Doctors in America". Best Doctors, Inc. Aiken, S.C.	2003-2004
Listed in Marquis' "Who's Who in America"	2002, 2003, 2004, 2005, 2006, 2007
Listed in Marquis' "Who's Who in American Education"	2003
Listed in Marquis' "Who's Who in the World"	2004
International Health Professional of the Year International Biographical Centre of Cambridge, England	2004
Listed in Marquis' "Who's Who in Medicine and Healthcare"	2004-2005, 2006-2007
Listed in Academic Keys Who's Who in Medical Science Education	2005
Selected as Guest Examiner, Oral Neurosurgical Board Examinations, American Board of Neurological Surgery, Houston, Tx. Nov. 2006	2006
Selected as Visiting Professor, U. of Texas Southwestern	March 2006

Society Memberships:

American Medical Association	1986-present
Denver Medical Society	1986-present
Colorado Medical Society	1986-present
Colorado Neurosurgical Society	1986-present
Secretary/Treasurer	1995-1998
President	1999-2001
Congress of Neurological Surgeons	1988-present
American Association of Neurological Surgeons	1990-present
The Denver Academy of Surgery	1990-present
The Rocky Mountain Neurosurgical Society, Inc.	1990-present
Secretary	1995-1998
President-elect	1999 – 2000
President	2000 - 2001
American College of Surgeons, Fellow	1991-present
The Pituitary Society	1993-present
American Association for Cancer Research	1995 – present
Society for Neuro-Oncology	1996-present
Cancer League of Colorado	1998-present
American Association for the Advancement of Science	2000 -present
Society of Neurological Surgeons (elected lifetime position)	2006 -present
American Society of Peripheral Nerve (elected lifetime position)	2006 -present

Committee Appointments

Institutional

Cerebral Death Committee, Univ. of Michigan	1982-1983
Intensive Care Unit Committee, Denver General Hosp.	L1985-1987
Chairman, Intensive Care Unit Committee, Denver General Hospital	L1986
Member, Management Committee, Univ. of Colorado Cancer Center	1988-present
Member of the Hormones and Cancer Program, Univ. of Colorado Cancer Center	1988-1998
Member of the Surgical Oncology Program, Univ. of Colorado Cancer Center	1988-1995

Pharmacy and Therapeutics Committee, Veteran's Administration Hospital Denver, Colorado	1989-1990
Department of Surgery Research Committee, Univ. of Colorado	1990-present
Program Leader, Surgical Oncology Program, Univ. of Colorado Cancer Center	1991-1995
Representative to the University System Faculty Council University of Colorado	1991-1993
Co-director, Clinical Investigations Core, University of Colorado Cancer Center	1992-1995
Chairman, Protocol Review Committee, University of Colorado Cancer Center	1992-2000
Dean's Advisory Committee, University of Colorado Health Sciences Center	1993-1994
Co-director, Adult Clinical Oncology Program, University of Colorado Cancer Center	1996-1999
University Physicians, Inc.- Contract Committee University Hospital	2000-present
University of Colorado Hospital "Operative and Other Procedures" Committee	2002-2004
UPI Board of Directors	2004 – present
University of Colorado Hospital Medical Board	2004 – present
UCHSC School of Medicine Executive Committee	2004 – present
Secretary/Treasurer, University Physicians, Incorporated	2007 - present
Chair, Financial/Audit Committee, University Physicians, Incorporated	2007 - present
Executive Committee, University Physicians, Incorporated	2007 - present

Regional and National

Am Assoc of Neurological Surgeon / Congress of Neurological Surgeons

Scientific Program Subcommittee-Congress of Neurological Surgeons	1985
Membership Committee-Congress of Neurological Surgeons	1990-1992
Member, Joint Section on Tumors, American Assoc. of Neurological Surgeons and Congress of Neurological Surgeons	1990-present
Chairman of the Membership Committee, Joint Section on Tumors, Am Assoc of Neurological Surgeons/ Congress of Neurological Surgeons	1995-1997
Program Moderator-Joint Section on Tumors Special Symposium	10/4/96
Program Committee - Joint Section on Tumors.	1996-present
Nominated for the Executive Committee - Member-at-large Congress of Neurological Surgeons	1997
Program Chairman - Special Symposium "Innovative Strategies for Treatment of Gliomas", Joint Section on Tumors, Am Assoc of Neurological Surgeons Annual Meeting, Philadelphia, PA.	April 1998

Program Chairman – Tumor Section Special Symposium “The role of surgery in the treatment of high grade gliomas and metastatic brain tumors: An update for the Neurosurgeon on the front line.” CNS Annual Meeting – Denver, CO	October 2003
Membership Committee-Rocky Mountain Neurosurgical Society	1990-1993
Scientific Program Chairman, The Rocky Mountain Neurosurgical Society Inc. Twenty-Fifth Annual Meeting	June 1990
Sports Medicine Committee-Colorado Medical Society	1990-1992
Member-at-Large, Executive Committee, Rocky Mountain Neurosurgical Society	1992-1993
Neurosurgery Advisory Group - Valley Lab Inc., Boulder, CO	1994-1996
Secretary, Rocky Mountain Neurosurgical Society	1995-present
Secretary/Treasurer, Colorado Neurosurgical Society	1995-present
Scientific Program Chairman, The Rocky Mountain Neurosurgical Society, Inc - Thirtieth Annual Meeting	June 1995
Scientific Program Chairman, The Rocky Mountain Neurosurgical Society, Inc - Thirty-third Annual Meeting	June 1998
Gliomas Outcome (GO) Project Advisory Board	1998 – 2004
Scientific Advisory Board – Cancer League of Colorado	1998 – present
Brain Tumor Organ Site Committee, American College of Surgeons Oncology Group	1999 – 2002
Nominating Committee, Rocky Mountain Neurosurgical Society	2001 - 2004
Site Selection Committee, Society for Neuro-Oncology	2001 - 2004

International

GLI 328 International Advisory Board Meeting Novartis Pharmaceuticals Corporation, Zurich, Switzerland.	December 1997
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JOURNAL EDITORIAL BOARDS AND REVIEWS

Editorial Board <i>Surgical Neurology</i>	February 2005 - present
Ad Hoc Reviewer for: Cancer	
Surgical Neurology	
Journal of Neuro-Oncology	
Neurosurgery	
IEEE Transactions on Biomedical Engineering	

PATENTS

#1 “Surgical Cannual” The Denver Corridor - A minimally invasive retraction system for access to deep seated intraparenchymal brain lesions. Kevin O. Lillehei, M.D. U.S. Patent #PCT/US04/16462. Filed May 26, 2004

PUBLICATIONS

Journal Articles – Peer Reviewed

1. Chandler, WF, Knake, JE, MCGillicuddy, JE, **Lillehei, KO**, Silver, TM: Intraoperative Use of Real-time Itrasonography in Neurosurgery. *J Neurosurg* 57:157-163, 1982
2. **Lillehei, KO**, Chandler, WF, Knake JE: Real-time Ultrasound Characteristics of the Acute Intracerebral Hemorrhage as Studied in the Canine Model. *Neurosurgery* 14:48-51, 1984
3. **Lillehei, KO**, Hoff, JT: Advances in the Management of Closed Head Injury. *Ann Emerg Med* 14:789-795, 1985
4. **Lillehei, KO**, Tranmer, BI, Kindt, GW: The Role of Colloid Volume Expansion in the Treatment of Cold Induced Vasogenic Edema. *Surgical Forum* 37: 517-519, 1986
5. **Lillehei, KO**, Head Trauma: Evaluation and Admission Criteria. *Critical Decision in Emergency Medicine Vol 3, Lesson 15*, pp 1-7, 1988
6. Nichol JS, **Lillehei KO**: Nerve injury associated with acute vascular trauma. *Surg Clin NA* 6: 837-852, 1988
7. Samuels MH, Wood WM, Gordon DF, Kleinschmidt-DeMasters BK, **Lillehei KO**, Ridgway EC: Clinical and Molecular Studies of a Thyrotropin-Secreting Pituitary Adenoma. *J Clin Endocrinol Metab* 68(6):1211-1215, 1989.
8. Kruse CA, Mitchell DH, **Lillehei KO**, Johnson SJ, McCleary EL, Moore GE, Mitchell DH, Waldrop S, Mierau G: Interleukin-2 activated lymphocytes from brain tumor patients. A comparison of two preparations generated in vitro. *Cancer* 64: 1629-1637, 1989.
9. **Lillehei KO**, Kruse, CA, Mitchell DH, Johnson SJ, McCleary EL: Adoptive immunotherapy of recurrent glioma using Interleukin-2 stimulated lymphocytes. *Surgical Forum* 40: 493-495, 1989.
10. **Lillehei KO**, Nichols JS, Kindt, GW: Emergency management of neurotrauma, Is there a place for Intracranial Pressure Monitoring in the Emergency Department? *Top Emerg Med* 11:84-87, 1990.
11. Samuels MH, **Lillehei KO**, Kleinschmidt-DeMasters BK, Stears J, Ridgway EC: Patterns of Pulsatile Pituitary Glycoprotein Secretion in Central Hypothyroidism and Hypogonadism. *J Clin Endocrinol Metab* 70: 391-395, 1990.
12. Kruse CA, **Lillehei KO**, Mitchell DH, Kleinschmidt-DeMasters BK, Bellgrau D: Analysis of Interleukin-2 and various effector cell populations in adaptive immunotherapy of rat 9L gliosarcoma: Allogeneic cytotoxic T lymphocytes prevent tumor take. *Proc. Natl Acad of Sci USA*, 87: 9577-9581. 1990.
13. **Lillehei KO**, Mitchell DH, Johnson SD, McCleary EL, Kruse CA: Long-term follow-up of recurrent glioblastoma patients treated with adjuvant adoptive immunotherapy. *Neurosurgery*, 28: 16-23, 1991.
14. Samuels MH, Henry P, Kleinschmidt-DeMasters BK, **Lillehei KO**, Ridgway EC: Pulsatile glycoprotein hormone secretion in glycoprotein producing pituitary tumors. *J Clin Endocrinol Metab* 73:1281-1288, 1991.

15. Samuels MH, Henry R, Kleinschmidt-DeMasters BK, **Lillehei KO**, Ridgway EC: Pulsatile prolactin secretion in hyperprolactinemia due to presumed pituitary stalk interruption. *J Clin Endocrinol Metab* 73:1289-1293, 1991
16. Kelly JP, Nichols JS, Filley CM, **Lillehei KO**, Rubinstein D, Kleinschmidt-DeMasters BK: Concussion in Sports: Guidelines for the Prevention of Catastrophic Outcome. *JAMA* 266:2867-2869, 1991.
17. Reusch JEB, Kleinschmidt-DeMasters BK, **Lillehei KO**, Ruppe D, Gutierrez-Hartmann A: Pre-operative Diagnosis of Lymphocytic Hypophysitis (Adenohypophysis) unresponsive to short course Dexamethasone-Case Report. *Neurosurgery* 30:268-272, 1992
18. Kruse CA, Mitchell DH, Kleinschmidt-DeMasters BK, Morse FW, Spector E, **Lillehei KO**: Characterization of Continuous Human Glioma Cell Line DBTRG-O5MG: Growth Kinetics, Karyotype, Receptor Expression, and Tumor Suppressor Gene Analyses. *In Vitro Cell Dev. Biol.* 28A:609-614, 1992
19. Kruse CA, Mitchell DH, Kleinschmidt-DeMasters BK, Bellgrau D, Eule JM, Parra JR, Kong Q, **Lillehei, KO**: Systemic Chemotherapy Combined with Local Adoptive Immunotherapy Cures Rats Bearing 9L Gliosarcoma. *J. Neuro-Oncology*, 15:97-112, 1993.
20. Hazuka MB, Bursleson WD, Stroud DN, Leonard CE, **Lillehei KO**, Kinzie JJ: Multiple Brain Metastases Are Associated With Poor Survival In Patients Treated With Surgery and Radiotherapy. *J Clin Oncol* 11:369-373,1993.
21. **Lillehei KO**, Kleinschmidt-DeMasters BK, Mitchell DH, Spector EB, Kruse CA: Alveolar Soft Part Sarcoma: Unusually Long Interval Between Presentation and Brain Metastasis. *Hum Pathol* 24:1030-1034,1993.
22. Doran SE, Papadopoulos SM, Ducker TB, **Lillehei KO**: MRI Documentation of Coexistent Traumatic Locked Facets of the Cervical Spine and Disc Herniation. *J Neurosurg* 79:341-345, 1993.
23. **Lillehei KO**, Johnson SD, McLeary EL, Mitchell DH, Schiltz PM, Kruse CA: Adjuvant Adoptive Immunotherapy for Pediatric Recurrent Brain Tumors [Letter]. *Online J Curr Clin Trials [Serial Online]* 1993. December 29; 1993. (Doc No 111)
24. **Lillehei KO**, Robinson MN: A Critical Analysis of the Fatal Injuries Suffered in the Continental Flight 1713 Airline Disaster: Evidence in Favor of the Need for Improved Passenger Restraint Systems. *J Trauma* 37(5): 826-830, 1994.
25. Levy AS, **Lillehei KO**, Rubenstein D, Stears J: Subarachnoid Neurocysticercosis with Occlusion of Major Intracranial Arteries: Case Report. *Neurosurgery* 36:183-188, 1995.
26. Hart, MJ, **Lillehei KO**: Management of Posterior Cranial Fossa Meningiomas. *Annals of Otolaryngology and Rhinology and Laryngology* 104(2):105-116, 1995.
27. Kleinschmidt-DeMasters BK, **Lillehei KO**: Radiation Induced Meningioma with 63 Year Latency Period Case Report *J. Neurosurg.* 82:487-488, 1995.
28. Kleinschmit DeMasters BK, **Lillehei KO**: Intraneural Neurothekeoma: Case Report. *Neurosurgery* 37:333-335, 1995.
29. Crawford TS, Kleinschmidt-DeMasters BK, **Lillehei KO**: Primary Intraosseous Meningioma: Case Report and Review of the Literature. *J Neurosurgery* 83:912-915, 1995.
30. Kleinschmidt-DeMasters BK, Conway D, Franklin WA, **Lillehei KO**, Kruse CA: Neural Cell Adhesion Molecule Expression In Human Pituitary Adenomas. *J. Neuro-Oncology* 25:205-213, 1995.
31. Kleinschmidt-DeMasters BK, **Lillehei KO**, Stears JC: The Pathologic, Surgical and and MR Spectrum of Rathke Cleft Cysts. *Surg. Neurol* 44:19-27, 1995.

32. **Lillehei KO**, Kleinschmidt-DeMasters B, Crawford TS: Response: Interosseous Meningioma-Letter to the Editor. *JNS* 85:363, 1996
33. **Lillehei KO**: A Review of the Management of Peripheral Nerve Entrapment Syndromes. *Neurosurgical Quarterly* 6(4): 225-250, 1996.
34. **Lillehei KO**, Kong Q, Kleinschmidt-DeMasters BK, Withrow SJ: Efficacy of Intralesional Cisplatin Impregnated Biodegradable Polymer for the Treatment of 9L Gliosarcoma in the Rat. *Neurosurgery* 39(6): 1191-1199, 1996.
35. Kleinschmidt-DeMasters BK, Markham N, **Lillehei, KO**, Shroyer KR: Differential Telomerase Expression in Human Primary Intracranial Tumors. *Am J Clin Pathol* 107(5):548-554, 1997.
36. Kong Q, Kleinschmidt-DeMasters BK, **Lillehei, KO**: Intralesionally Implanted Cisplatin Cures Primary Brain Tumors in Rats. *J Surg Onc.* 64:268-273, 1997.
37. Kruse CA, Cepeda L, Owens B, Johnson SD, Stears J, **Lillehei KO**: Treatment of recurrent glioma with intracavitary alloreactive cytotoxic T lymphocytes and interleukin-2. *Cancer Immunol Immunother* 45: 77-87, 1997
38. Kleinschmidt-DeMasters BK, Mierau GW, Sze C, Breeze RE, Greffe B, **Lillehei KO**, Stephens JK: Unusual dural and skull-based mesenchymal neoplasms: A report of four cases. *Human Pathol* 29:240-245, 1998.
39. Kleinschmidt-DeMasters BK, Hashizumi T, Sze Chun-I, **Lillehei KO**, Shroyer KR. Telomerase expression shows differences across multiple regions of oligodendroglioma versus high grade astrocytomas but shows correlations with Mib-1 labeling. *J Clin Pathol* 51(4): 284-293, 1998.
40. Kong Q, **Lillehei KO**: Antioxidant Inhibitors for Cancer Therapy. *Medical Hypotheses* 51:405-409, 1998.
41. Duke BJ, Levy AS, **Lillehei KO**: Cavernous Angiomas of the Cauda Equina: Case Report and Review of the Literature. *Surg Neurol* 50:442-445, 1998
42. Watters MR, Stears JC, Osborn AG, Turner GE, Burton BS, **Lillehei KO**, Yuh WTC, Transdural Spinal Cord Herniation: Imaging and Clinical Spectra. *AJNR* - 19:1337-1344, 1998
43. **Lillehei KO**, Liu Y, Kong Q: Brain tumor immunology. *Contemporary Neurosurgery* 20(14): 1-8, 1998.
44. **Lillehei KO**, Kirschman DL, Kleinschmidt-DeMasters BK, Ridgway EC: Reassessment of the role of radiation therapy in the treatment of endocrine inactive pituitary macroadenomas. *Neurosurgery* - 43:432-439, 1998
45. Kleinschmidt-DeMasters BK, **Lillehei KO**: Pathological correlates of pituitary adenomas presenting with apoplexy. *Hum Pathol* 29:1255-1265, 1998.
46. Casey SO, Rubinstein D, **Lillehei KO**, Alberico RA, Ozsvath RR, Cajade-Law AG, Weprin BE, Michel E, Truwit CL: Integral and shell-MIP display algorithms in MR and CT three-dimensional methods of the brain surface. *Am J Neuroradiol* 19:1513-1521,1998.
47. Kong Q, DeMasters BK, **Lillehei KO**: Intralesionally implanted cisplatin plus systemic carmustine for the treatment of brain tumor in rats. *J Surg Oncology* 69:76-82, 1998.
48. McDermott MT, Haugen BR, Gordon DF, Wood WM, Brown NS, Bauer CA, Garrity MJ, Kleinschmidt-DeMasters BK, **Lillehei KO**, Samuels MH, Bright TM, Ridgway EC: Reverse transcription polymerase chain reaction analysis of pituitary hormone, Pit-1 and steroidogenic factor-1 messenger RNA expression in pituitary tumors. *Pituitary* 2:217-224, 1999.

49. **Lillehei KO**, Liu Y, Kong Q: Current perspectives in immunotherapy. *Ann Thorac Surg* 68:S28-33, 1999.
50. Ng K, Liu Y, Kong Q, **Lillehei K**: Latest advances in the understanding of active-specific immunotherapy for brain tumors. *Polymer Preprints* 40: 279-280, 1999
51. Kong Q, Beel JA, **Lillehei KO**: A threshold concept for cancer therapy. *Medical Hypotheses* 55:29-35, 2000.
52. Kleinschmidt-DeMasters BK, Pflaumer SM, Mulgrew TD, **Lillehei KO**: Sinonasal teratocarcinoma (“mixed olfactory neuroblastoma – craniopharyngioma”) presenting with syndrome of inappropriate secretion of antidiuretic hormone. *Clin Neuropathol.* 19:63-69, 2000.
53. Liu Y, Ng K, **Lillehei KO**: Time course analysis and modulating effects of established brain tumor on active-specific immunotherapy. *Neurosurg Focus* 9(6): 1-9, 2000.
54. Liu Y, Cho C, Yan X, Henthorn TK, **Lillehei KO**, Cobb WN, Ng KY: Ultrasound-induced hyperthermia increases cellular uptake and cytotoxicity of P-glycoprotein substrates in multi-drug resistant cells. *Pharm Res.* 18(9): 1255-1261, 2001.
55. Liu Y, **Lillehei KO**, Cobb WN, Christians U, Ng KY: Overcoming MDR by ultrasound-induced hyperthermia and P-glycoprotein modulation. *Biochem Biophys Res Commun* 289:62-68, 2001.
56. Cho CW, Liu Y, Cobb WN, Henthorn TK, **Lillehei KO**, Christians U, Ng KY: Ultrasound-induced mild hyperthermia as a novel approach to increase drug uptake in brain microvessel endothelial cells. *Pharm Res.* 19(8): 1123-1129, 2002.
57. Liu Y, Ng K, **Lillehei KO**: Cell-mediated immunotherapy: A new approach to the treatment of malignant gliomas. *Cancer Control* 10(2): 138-147, 2003.
58. Kleinschmidt-DeMasters BK, Heinz D, McCarthy PJ, Bobak JB, **Lillehei KO**, Schroyer KR: Survivin in glioblastomas. Protein and messenger RNA expression and comparison with telomerase levels. *Arch Pathol Lab Med.* 127: 826-833, 2003.
59. Chang SM, Parney IF, McDermott M, Barker FG 2nd, Schmidt MH, Huang W, Laws ER Jr, **Lillehei KO**, Bernstein M, Brem H, Sloan AE, Berger M and the Glioma Outcomes Investigators: Perioperative complications and neurological outcomes of first versus second craniotomy among patients enrolled in the Glioma Outcomes (GO) Project. *J Neurosurg.* 98(6):1175-1181, 2003.
60. Filley CM, Kleinschmidt-DeMasters BK, **Lillehei KO**, Damek DM, Harris JG: Gliomatosis cerebri: neurobehavioral and neuropathological observations. *Cogn Behav Neurol.* 16(3):149-159, 2003
61. Kleinschmidt-DeMasters BK, **Lillehei KO**, Breeze RE: Neoplasms involving the Central Nervous System in the older old. *Human Path* 34:1137-1147, 2003.
62. Laws ER, Parney IF, Huang W, Anderson F, Morris AM, Asher T, **Lillehei KO**, Bernstein M, Brem H, Sloan A, Berger MS, Chang S, and the Glioma Outcomes Investigators: Survival following surgery, and prognostic factors for newly diagnosed malignant glioma: data from the Glioma Outcomes Project. *J Neurosurg.* 99(3):467-473, 2003.
63. Escott E, Kleinschmidt-DeMasters BK, Brega K, **Lillehei KO**: Proximal nerve root spinal hemangioblastomas: Presentation of three cases, MR appearance, and literature review. *Surg Neurol* 61: 262-273, 2004.
64. Lopez JA, Kleinschmidt-DeMasters BK, Sze CI, Woodmansee WW, **Lillehei KO**: Silent corticotroph adenomas: Further clinical and pathological observations. *Human Path* 35(9): 1137-1147, 2004.
65. **Lillehei KO**, Simon J, Gaspar L, Damek DM. Non-small-cell lung cancer with brain metastasis. *Oncology* 18(14):1725-1728, 2004

66. Chang SM, Parney IF, Huang W, Anderson FA Jr, Asher AL, Berstein M, **Lillehei KO**, Brem H, Berger MS, Laws ER: Glioma Outcomes Project Investigators. Patterns of care for adults with newly diagnosed malignant glioma. *JAMA* 293(5): 557-564, 2005.
67. Kleinschmidt-DeMasters BK, **Lillehei KO**, Varella-Garcia M: Glioblastomas in the older old. *Arch Pathol Lab Med* 129: 624-631, 2005.
68. Kang J, **Lillehei KO**, Kleinschmidt-DeMasters: Proximal nerve root capillary hemangioma presenting as a lung mass with bandlike chest pain: a case report and review of the literature. *Surg Neurol* 2006; 65(6):584-9.
69. Grupka NL, Seinfeld J, Ryder J, **Lillehei KO**, Kleinschmidt-DeMasters: Secondary CNS involvement by follicular lymphoma: Case report and review of the literature. *Surg Neurol* 2006; 65(6):590-4.
70. Kleinschmidt-DeMasters BK, Kang JS, **Lillehei KO**: The burden of radiation-induced CNS tumors – A single institution’s experience. *J Neuropath and Exp Neurol.* 2006;65(3):204-16.
71. Seinfeld J, Kleinschmidt-DeMasters BK, Tayal S, **Lillehei KO**. Desmoid-type fibromatoses involving the brachial plexus: Update on treatment options and assessment of c-KIT mutational status. *J Neurosurg* 2006; 104(5):749-56.
72. Iranmanesh R, Durairaj VD, **Lillehei KO**: Giant epidermoid cyst as an unusual presentation of hypoglobus and ptosis. *Ophthalmic Plastic and Reconstructive Surgery* 2006; 22:221-222.
73. Kleinschmidt-DeMasters BK, Meltesen L, McGavran L, **Lillehei KO**. Characterization of Glioblastomas in Young Adults. *Brain Pathol* 2006; 16(4):273-286
74. Shorts-Cary L, Xu M, Ertel J, Kleinschmidt-DeMasters BK, **Lillehei KO**, Matsuoka I, Nielsen-Preiss S, Wierman ME: Bone morphogenic protein and retinoic acid inducible neural specific protein-3 (BRINP3) is expressed in gonadotrope pituitary tumors and induces proliferation, migration and invasion. *Endocrinology* 2007; 148(3):967-975.
75. Liu Y, Wang Q, Kleinschmidt-DeMasters BK, Franzusoff A, Ng K, **Lillehei KO**: TGF-B2 inhibition augments the effect of tumor vaccine and improves the survival of animals with pre-established brain tumors. *J Neuro-Onc.* 81(2):149-162, 2007.
76. Kleinschmidt-DeMasters BK, Lovell MA, Donson AM, Wilkinson CC, Madden JR, Addo-Yobo SO, **Lillehei KO**, Foreman NK. Molecular array analysis of 51 pediatric tumor shows overlap between malignant intracranial ectomesenchymoma and MPNST but not medulloblastoma or atypical teratoid rhabdoid tumor. *Acta Neuropathologica (Berl).* 2007; 113(6):695-703.
77. Gildea J, **Lillehei KO**, Kleinschmidt-DeMasters: Benign cylindroma causing transcalvarial invasion in a patient with familial cylindromatosis. *Clinical Neuropathology* 2007; 26:125-130
78. Chiocca, A., Smith, K.M., McKinney, B., Palmer, C.A., Rosenfeld, S., **Lillehei, K.**, Hamilton, A., DeMasters, B.K., Judy, K., and Kirn, D. A Phase I Trial of Ad.hIFN- β Gene Therapy for Glioma. *Mol. Ther.* 2008; 163, 618–626.
79. Schwer AL, Damek DM, Kavanagh BD, Gaspar LE, **Lillehei K**, Stuhr K, Chen C: A phase I dose-escalation study of fractionated stereotactic radiosurgery in combination with gefitinib in patients with recurrent malignant gliomas. *Int J. Radiation Oncology Biol. Phys.* 2008; 70(4):993-1001.
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Non-Peer Reviewed

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Book Chapters

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2. **Lillehei, KO** "Neurosurgical Approach to Pituitary Adenomas" in, Contemporary Endocrinology, Vol 3: Disease of the Pituitary: Diagnosis and Treatment. Ed, ie by ME Wierman: Humana Press, Totowa, NJ, 1997.
3. Owens B, **Lillehei K.** "Brain Tumors" in Oncology Nursing Secrets Gates R, Fink R (eds), Hanley and Belfus, Inc., Philadelphia, PA., 1997, pp 135-141.
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 66. Breeze RE, **Lillehei KO**, Silber RM. Practice Plan Income Distribution: A unique approach for academic medicine. Academic practice Assembly, April 17-19, 2005, New York, NY.
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 69. Shorts-Cary L, Ertel J, Li H, Xu M, DeMasters BK, **Lillehei KO**, Nielsen-Preiss, Wierman ME. Identification of Novel Candidates for Pituitary Tumorigenesis. Department of Medicine's Research Day, Nov. 5, Denver, CO, 2006.
 70. Kleinschmidt-DeMasters BK, Meltesen L, McGavran L, **Lillehei KO**. Characterization of glioblastoma in young adults. 16th International Congress of Neuropathology, Sept. 10-15, 2006, San Francisco, CA
 71. **Lillehei KO**, Kleinschmidt-DeMasters BK. Radiation-induced meningiomas: the UCHSC experience. Society for Neuro-oncology, Nov. 2006, Orlando Fla.
 72. Kleinschmidt-DeMasters BK, Lovell MA, Donson AM, Wilkinson CC, Madden JR, Addo-Yobo SO, **Lillehei KO**, Foreman NK. Molecular array analysis of 51 pediatric tumor shows overlap between malignant intracranial ectomesenchymoma and MPNST but not medulloblastoma or atypical teratoid rhabdoid tumor. Society for Neuro-oncology, Nov. 2006, Orlando Fla.
 73. **Lillehei, K.O.**, Kleinschmidt-DeMasters, B.K., Radiation-induced meningiomas: the UCHSC experience. Society for Neuro-Oncology, Orlando, Oct. 2006
 74. Kleinschmidt-DeMasters, B.K., Lovell, M., Donson, A., Addo-Yobo, S. **Lillehei, K.O.**, Foreman, N. Molecular and gene array analyses of rare pediatric mesenchymal tumors: malignant ectomesenchymoma compared to malignant peripheral nerve sheath tumor and rhabdomyosarcoma, Society for Neuro-Oncology, Orlando, Oct. 2006

75. Kleinschmidt-DeMasters, B.K., Donson, A.M., Foreman, N.K., **Lillehei, K.O.** Cytogenetic and Molecular gene array analyses of radiation-induced meningiomas. AANP/ASIP/Experimental Biology 2007, Washington, D.C., April 2007
76. Kleinschmidt-DeMasters, B.K., Shorts-Cary, L.; Xu, M., **Lillehei, K.**, Weirman, M.E. Growth Factor Amplification by Upregulation of Epidermal Growth Factor Substrate (Eps8) in Human Pituitary Tumors. International Pituitary Congress, Chicago, June 2007
77. Gildea J.H., Lillehei, K.O., Golitz, L.E., Kleinschmidt-DeMasters, B.K. Benign cylindroma causing transcalvarial invasion in a patient with familial cylindromatosis. Clin Neuropathology 26:3/2007, 125-130.

Invited Lectures

Local

PITUITARY CUSHING'S DISEASE. Endocrinology Grand Rounds, UCHSC November, 1985, Denver, Colorado.

DIAGNOSIS AND TREATMENT OF PITUITARY PROLACTINOMAS. Neurology Neurosurgery Grand Rounds, UCHSC January 22, 1986, Denver, Colorado.

NEUROLOGICAL MANAGEMENT OF ACUTE HEAD INJURIES. Surgery Grand Rounds, UCHSC July 19, 1986, Denver, Colorado.

INTRACRANIAL PRESSURE MANAGEMENT. Colorado Trauma Care Resource Institute - Second Annual Trauma Symposium August 9, 1986, Vail, Colorado.

PEDIATRIC HEAD INJURIES. 1987 Current Challenges in Pediatric Nursing May 13, 1987, Denver, Colorado.

THE ALPHA AND BETA SUB-UNIT GLYCOPROTEIN MARKER IN THE NON-SECRETING PITUITARY ADENOMA. Rocky Mountain Neurosurgical Society. Twenty-First Annual meeting June 26, 1987, Keystone, Colorado.

SURGICAL APPROACH TO PROLACTIN SECRETING TUMORS "THE PITUITARY IN ASPEN" review course. July, 1987, Aspen, Colorado.

EVALUATION OF HEAD INJURIES - 1st Annual Sports Medicine Symposium University of Colorado August 22, 1987.

EXTINCTION OF THE PITUITARY CHROMOPHOBE ADENOMA "Neurosurgery in the Rockies" Conference - Univ. of Colorado, March 8, 1988, Vail, Colorado.

IMMUNOTHERAPY FOR BRAIN TUMORS: Swedish Hospital Neuroscience Conference Sept, 1988.

SPORTS RELATED CLOSED HEAD AND BRACHIAL PLEXUS STRETCH INJURIES. Guest Lecturer to the student trainers. University of Colorado Athletic Program, November 15, 1988, Boulder, Colorado.

IMMUNOTHERAPY FOR BRAIN TUMORS: A New Era: Neurology-Neurosurgery Grand Rounds, University of Colorado Health Sciences Center November 30, 1988.

A TWO-YEAR FOLLOW-UP ON THE USE OF INTRACAVITARY INTERLEUKIN-2 AND ACTIVATED T-LYMPHOCYTES IN THE TREATMENT OF MALIGNANT ASTROCYTOMAS University of Colorado "NEUROSURGERY IN THE ROCKIES" CONFERENCE March 8, 1989.

NEUROSURGICAL ANALYSIS OF THE CONTINENTAL FLIGHT 1713 DISASTER. American Association of Neuroscience Nurses-Rocky Mountain Chapter, Denver, Colorado. January 9, 1990.

UNUSUAL PARASELLAR LESIONS. Neurology-Neurosurgery Grand Rounds, University of Colorado Health Sciences Center, Denver, Colorado, January 31, 1990.

INITIAL ASSESSMENT OF A PATIENT WITH A NEUROVASCULAR DISORDER-PHYSICIAN ASSESSMENT. Neuroscience Nursing in the Rockies Conference March 5, 1990, Vail, Colorado.

NORMAL PRESSURE HYDROCEPHALUS - A PANEL DISCUSSION. Geriatric Grand Rounds Denver Veterans Administration Hospital, June 4, 1990.

EXPERIENCE WITH PETROSAL SINUS SAMPLING IN THE DIAGNOSIS AND TREATMENT OF CUSHING'S DISEASE. Twenty-Fifth Annual Meeting of the Rocky Mountain Neurosurgical Society, Inc., Vail, Colorado, June 18, 1990.

BRAIN TUMORS. St. Anthony's Hospital Basic Neuro Core Curriculum, Denver, Colorado, July 9, 1990.

DIAGNOSIS AND TREATMENT OF UPPER EXTREMITY AND BRACHIAL PLEXUS INJURIES. Neurology-Neurosurgery Grand Rounds, University of Colorado Health Sciences Center, November 28, 1990.

COMPLICATIONS ASSOCIATED WITH HALO VEST APPLICATION FOR CERVICAL SPINE FRACTURES CURRENT TECHNIQUES IN HALO APPLICATION WORKSHOP, University of Colorado Health Sciences Center, Denver, Colorado, September 17, 1991.

DIAGNOSIS AND MANAGEMENT OF CHIARI MALFORMATIONS. 1991 Annual Conference of the American Association of Neuroscience Nurses-Rocky Mountain Chapter, October 4, 1991. Denver, Colorado.

A NEUROSURGICAL ANALYSIS OF THE CONTINENTAL AIRLINE DISASTER. Emergency Medicine Grand Rounds. University of Colorado Health Sciences Center, Denver, Colorado, December 4, 1991.

CHIARI I MALFORMATION: IS THERE AN ASSOCIATION WITH SCOLIOSIS? 2nd Annual Colorado Spine Symposium, Aurora, Colorado, November 15, 1991.

CUSHING'S SYNDROME: UNIVERSITY OF COLORADO HEALTH SCIENCES CENTER EXPERIENCE AND NEW INSIGHTS INTO MECHANISMS OF DISEASE AND DIAGNOSIS. Endocrinology Grand Rounds, University of Colorado Health Sciences Center, Denver, Colorado, June 10, 1992.

CUSHING'S DISEASE: THE UNIVERSITY OF COLORADO HEALTH SCIENCES CENTER EXPERIENCE. Neurology-Neurosurgery Grand Rounds, University of Colorado Health Sciences Center, Denver, Colorado, August 12, 1992.

CENTRAL NERVOUS SYSTEM TUMORS: APPROACH TO DIAGNOSIS AND TREATMENT. Valleylab Surgical Symposium, Boulder, Colorado, November 20, 1992.

LOCAL SUSTAINED RELEASE OF CISPLATIN FROM BIODEGRADABLE POLYMER FOR TREATMENT OF INTRACRANIAL GLIOMA. University of Colorado "Neurosurgery in the Rockies" Meeting. Vail, Colorado, March 9, 1993.

BRAIN TUMOR THERAPY: PAST, PRESENT AND FUTURE (KEYNOTE SPEAKER). Brain Tumors: Team Up for Triumph Symposium. Lakewood, Colorado, May 1, 1993.

NEW APPROACHES TO AN OLD TUMOR: THE NON-SECRETORY PITUITARY MACROADENOMA. Neurology-Neurosurgery Grand Rounds. University of Colorado Health Sciences Center, Denver, Colorado, June 2, 1993.

PERIPHERAL NEUROFIBROMAS: SYMPTOMS AND MANAGEMENT. Neurofibromatosis Pre-Symposium Seminar. The Denver Children's Hospital, Denver, Colorado, October 15, 1993.

CUSHING'S DISEASE: A MULTISPECIALTY APPROACH TO A COMPLEX PROBLEM. Medicine Grand Rounds, University of Colorado Health Sciences Center, Denver, Colorado, December 15, 1993.

BRAIN TUMOR THERAPY: PAST, PRESENT AND FUTURE. Grand Rounds, Lutheran Medical Center, Lakewood, Colorado, January 25, 1994.

MOLECULAR BIOLOGY OF GLIOMAS AND IMPLICATIONS FOR FUTURE RESEARCH. "Malignant Gliomas: Challenges of Patient Management" - Nursing Conference. University of Colorado Health Sciences Center, Denver, Colorado, January 28, 1994.

PITUITARY TUMORS. "Neuroscience Nursing in the Rockies" - Nursing Conference, Vail, Colorado, March 7, 1994.

ACUTE NECK TRAUMA; FROM WHIPLASH TO PARALYSIS. 18th Annual Primary Musculoskeletal Care Conf. Breckenridge, CO, August 22, 1994.

THE CRASH OF CONTINENTAL 1713:: LESSONS IN POLY-TRAUMA. 18th Annual Primary Musculoskeletal Care Conf., Breckenridge, Colorado, August 22, 1994.

NEW DIRECTIONS IN THE TREATMENT OF HIGH GRADE GLIOMAS. Neurology-Neurosurgery Grand Rounds, University of Colorado Health Sciences Center, Denver, Colorado, November 2, 1994.

IMMUNOTHERAPY: PAST, PRESENT AND FUTURE. Brain Tumors: New Frontiers Symposium. Colorado Neurological Institute Denver, Colorado, May 29, 1995.

IDIOPATHIC SPINAL CORD HERNIATION; AN UNUSUAL CASE REPORT. University of Colorado "Neurosurgery in the Rockies" Meeting. Vail, Colorado, February 28, 1996.

NEUROSURGICAL APPROACH TO NEUROFIBROMATOSIS. NEUROFIBROMATOSIS SUPPORT GROUP- Colorado Chapter of the National Neurofibromatosis Foundation, Inc., October 19, 1996.

NEUROFIBROMATOSIS REVISITED. Dept. of Neurology Grand Rounds. University of Colorado Health Sciences Center, Denver, Colorado. October 30, 1996.

NEUROSURGICAL APPROACH TO NEUROFIBROMATOSIS. NEUROFIBROMATOSIS SUPPORT GROUP- Colorado Chapter of the National Neurofibromatosis Foundation, Inc., October 19, 1996.

PERIPHERAL NERVE INJURY ASSOCIATED WITH SURGERY OF THE PROSTATE University of Colorado "Horizons in Surgery" Meeting, Breckenridge, CO. March 10, 1997.

TREATMENT OF LOW GRADE GLIOMAS: ROLE OF AGGRESSIVE SURGICAL RESECTION. Dept of Neurology Grand Rounds, University of Colorado Health Sciences Center, Denver, CO. November 12, 1997.

NEUROSURGICAL TREATMENT OF BRAIN TUMORS. Third Biennial Team Up for Triumph Patient & Family Brain Tumor Conference. Denver, CO. October 17, 1997.

GENE THERAPY. Third Biennial Team Up for Triumph Patient & Family Brain Tumor Conference. Denver, CO. October 17, 1997.

VACCINE THERAPY FOR BRAIN TUMORS. University of Colorado Cancer Center Community Advisory Board Meeting. Denver, CO. February 18, 1998.

BRACHIAL PLEXUS INJURY. Orthopedic Hand and Upper Extremity Grand Rounds. Dept of Orthopedics, University of

Colorado Health Sciences Center, Denver, CO. February 27, 1998.

IMMUNOTHERAPY: Past and Present. University of Colorado "Neurosurgery in the Rockies" Meeting. Vail, Colorado. March 5, 1998.

NEW FRONTIERS OF TUMOR THERAPY: IMMUNOTHERAPY AND GENE THERAPY. University of Colorado Brain Tumor Patient & Family Support Group. Denver, CO. April 1, 1998.

USE OF FRAMELESS STEREOTACTIC GUIDANCE FOR TREATMENT OF LOW GRADE GLIOMAS Special Symposium-Memorial Hospital, Colorado Springs, CO. April 9, 1998.

UNUSUAL PARASELLAR LESIONS: Department of Neurology Grand Rounds, University of Colorado Health Sciences Center, Denver, Colorado, February 3, 1999.

TUMOR VACCINES FOR BRAIN TUMORS: University of Colorado Cancer Center Community Advisory Board Meeting, Denver, Colorado, February 17, 1999.

UTILITY OF RADIATION THERAPY IN THE TREATMENT OF PITUITARY TUMORS: Division of Endocrinology, Metabolism and Diabetes Grand Rounds, University of Colorado Health Sciences Center, Denver, Colorado, April 7, 1999.

CURRENT MANAGEMENT OF BRAIN TUMORS AT COLORADO UNIVERSITY: 1999 Meeting of the Society of Neurological Surgeons, Colorado Springs, Colorado, May 16, 1999.

UNUSUAL PARASELLAR LESIONS: Basic Neurosciences Lecture Series, Department of Neurology, University of Colorado Health Sciences Center, Denver, Colorado, July 14, 1999.

CURRENT STATUS OF TUMOR VACCINES: 1999 Macromolecular Drug Delivery Conference, Breckenridge, Colorado, July 17, 1999.

GENE THERAPY: St Mary's Academy Senior High Molecular Biology Course, Englewood, Colorado, December 7, 1999.

TREATMENT OF BRACHIAL PLEXUS INJURIES. University of Colorado, Department of Orthopedics Hand Conference. March 24, 2000.

SURGICAL TREATMENT OF MALIGNANT GLIOMAS: PAST, PRESENT AND FUTURE. The Fourth Biennial Rocky Mountain Brain tumor Conference, "Team Up for Triumph". Arvada, Colorado. May 5, 2000.

PERSPECTIVES ON IMMUNOTHERAPY FOR THE TREATMENT OF MALIGNANT GLIOMA. Neurology Grand Rounds. Department of Neurology, University of Colorado Health Sciences Center, Denver, Colorado, March 15, 2000.

STRATEGIES FOR TREATMENT OF ENDOCRINE ACTIVE PITUITARY ADENOMAS: Neurosurgery Grand Rounds, Department of Neurosurgery, University of Colorado health Sciences Center, Denver, Colorado. July 18, 2000.

DIAGNOSIS AND TREATMENT OF PERIPHERAL NERVE INJURIES. Neurology Grand Rounds. Department of Neurology, University of Colorado Health Sciences Center, Denver, Colorado, March 27, 2002.

NOVEL TREATMENT FOR HIGH GRADE GLIOMAS. University of Colorado Cancer Center Community Advisory Board. University of Colorado Health Sciences Center. July 17, 2002.

NEW HORIZONS IN TREATMENT FOR PATIENTS WITH GLIOBLASTOMA MULTIFORME. Neuro-ICU Nursing Teaching Conference, .University of Colorado Health Sciences Center. June 8, 2004

MINIMAL INVASIVE CRANIAL NEUROSURGERY. 51st Annual Family Practice Review. Nov. 4, 2005.

WHAT IS HAPPENING IN THE WORLD OF BRAIN TUMORS? Premedica 32nd Annual Symposium, Colorado State University, Fort Collins, Feb. 18, 2006.

SURGICAL TREATMENT OF PITUITARY TUMORS. University of Colorado Health Sciences Center "Pituitary Patient Education Day." Aurora, CO. November 11, 2006.

THE SUPRA-ORBITAL MINIMALLY-INVASIVE SKULL BASE APPROACH. The first annual Department of Neurosurgery Skull Base dissection Course. University of Colorado Health Sciences Center, Aurora, CO. January 13, 2007.

Invited Lectures

National

INTRAOPERATIVE ULTRASONOGRAPHIC IDENTIFICATION OF ACUTE INTRACEREBRAL HEMORRHAGE: AN EXPERIMENTAL MODEL IN THE DOG. 14th Annual Edgar A. Kahn Neurosurgical Society Meeting. October 1982, Ann Arbor, Michigan.

ALTERNATIVE METHODS OF TREATMENT FOR MIDLINE SUPRASELLAR ARACHNOID CYST. Michigan Association of Neurological Surgeons, June 1984, Grand Rapids, Michigan.

AUTOLOGOUS STIMULATED LYMPHOCYTES - IMMUNOTHERAPY FOR BRAIN TUMORS. Thirteenth Annual Richard Lende Winter Neurosurgery Conference February 4, 1987, Snowbird, Utah.

THE EXTINCTION OF THE PITUITARY CHROMOPHOBE ADENOMA Fourteenth Annual Richard Lende Winter Neurosurgery Conference Feb. 4, 1988, Snowbird, Utah.

CONTINENTAL FLIGHT 1713: ANALYSIS OF A DISASTER FROM A NEUROSURGICAL PERSPECTIVE. The 20th annual Edgar A. Kahn Society Neurosurgical Meeting, University of Michigan, October 21, 1988, Ann Arbor, Michigan.

A TWO-YEAR FOLLOW-UP ON THE USE OF INTRACAVITARY INTERLEUKIN-2 AND ACTIVATED T-LYMPHOCYTES IN THE TREATMENT OF MALIGNANT ASTROCYTOMAS Fifteenth Annual Richard Lende Winter Neurosurgery Conference February 9, 1989, Snowbird, Utah.

EXPERIENCE WITH PETROSAL SINUS SAMPLING IN THE DIAGNOSIS AND TREATMENT OF CUSHING'S DISEASE. Annual Meeting of the Western Neurosurgical Society, Kawaihae, Hawaii, September 11, 1990.

A NEW CRANIOFACIAL APPROACH TO MIDLINE FRONTAL SKULL BASE LESIONS. Twenty-sixth Annual Meeting of the Rocky Mountain Neurosurgical Society, Inc., Jackson Hole, Wyoming, June 27, 1991.

MANAGEMENT OF CLOSED BRACHIAL PLEXUS INJURIES. Congress of Neurological Surgeons, 41st Annual Meeting. Orlando, Florida, October 29, 1991.

SURGICAL ANATOMY OF THE MUSCULOCUTANEOUS AND RADIAL NERVES. Congress of Neurological Surgeons. 42nd Annual Meeting. Washington D.C., November, 1, 1992.

LOCAL SUSTAINED RELEASE OF CISPLATIN FROM BIODEGRADABLE POLYMER CAN CURE 9L GLIOSARCOMA IN THE RAT. Annual Meeting of the Rocky Mountain Neurosurgical Society, Bigfork, Montana, June 15, 1993.

HOW EFFECTIVE ARE LOWER EXTREMITY NERVE REPAIRS AND CAN RECONSTRUCTIVE PROCEDURES

COMPLIMENT NEURAL REPAIR? Postgraduate Course: Surgery of the Peripheral Nerves System. Annual Clinical Congress of the American College of Surgeons. San Francisco, California, October 12, 1993.

MANAGEMENT OF PERIPHERAL NERVE LESIONS AND ENTRAPMENT SYNDROMES. Breakfast Seminar. American Association of Neurological Surgeons. San Diego, California, April 11, 1994.

RADIATION THERAPY AS AN ADJUNCT TO THE TREATMENT OF THE PITUITARY MACROADENOMA. IS IT ALWAYS NECESSARY? The American Academy of Neurological Surgery - 55th Annual Meeting. Litchfield Park, Arizona, October 30, 1993.

RADIATION THERAPY AS AN ADJUNCT TO THE TREATMENT OF THE PITUITARY MACROADENOMA. IS IT ALWAYS NECESSARY? Rocky Mountain Neurosurgical Society, Inc., Twenty-Ninth Annual Meeting. Snowmass, Colorado, June 14, 1994.

COMPLICATIONS OF THORACIC OUTLET SURGERY. Luncheon Seminar. Congress of Neurologic Surgeons- San Francisco, California. October 27, 1995.

IMAGE GUIDED CRANIAL SURGERY: AN APPLICATION OF VIRTUAL REALITY. The 13th Conference on Computer Applications in Radiology- Am Coll of Radiology/Soc for Computer Applications in Radiology. Denver, Colorado. June 9, 1996.

IDIOPATHIC SPINAL CORD HERNIATION: A TREATABLE CAUSE OF THE BROWN-SEQUARD SYNDROME WITH A DISTINCTIVE RADIOGRAPHIC PRESENTATION. Rocky Mountain Neurosurgical Society, Inc., Thirty-First Annual Meeting, Telluride, Colorado, June 17, 1996.

TIBIAL AND PERONEAL NERVE INJURIES. The Section on Disorders of the Spine and Peripheral Nerves- AANS/CNS- 13th Annual Meeting, Newport Beach, California, February 20, 1997.

COMPLICATIONS OF THORACIC OUTLET SURGERY. American Association of Neurological Surgeons - 65th Annual Meeting, Denver, Colorado, April 25, 1997.

CLINICAL CASE REVIEWS OF PRIMARY BRAIN TUMORS, PITUITARY TUMORS AND PERIPHERAL NERVE INJURIES. Neurosurgery Mock Oral Review, Osler Institute, Houston, TX November 8-11, 1997.

CURRENT MANAGEMENT OF BRAIN TUMORS AT COLORADO UNIVERSITY. The Society of Neurological Surgeons: 90th Annual Meeting. Colorado Springs, Colorado, May 16, 1999..

PERI-OPERATIVE COMPLICATIONS OF BIOPSY AND CRANIOTOMY IN TREATMENT OF MALIGNANT GLIOMA: DATA FROM THE GLIOMA OUTCOME PROJECT (Oral Abstract). 49th Annual Meeting of the Congress of Neurological Surgeons, Boston, Massachusetts, November 3, 1999.

LOWER EXTREMITY NERVE INJURIES AND ENTRAPMENTS. Resident Practical Clinic #016, The Annual Meeting of the Association of Neurological Surgeons, San Francisco, CA, April 8, 2000.

PERI-OPERATIVE COMPLICATIONS OF BIOPSY AND CRANIOTOMY IN TREATMENT OF MALIGNANT GLIOMAS: AN ANALYSIS OF DATA FROM THE GLIOMA OUTCOME PROJECT, Rocky Mountain Neurosurgical Society, 35th Annual Meeting, Alyeska, Alaska. June 26, 2000.

IMMUNOTHERAPY AS AN ADJUNCT TO SURGERY IN THE TREATMENT OF BRAIN TUMORS. "State of the Art" lecture, 2001 Annual Meetings of the Western Societies (WAP, WSCI, WAFMR), Carmel, California. February 10, 2001.

CONTROVERSIES IN THE TREATMENT OF LOW-GRADE GLIOMAS. Second Annual Upper Midwest Brain Tumor Symposium (Sponsored by the University of Minnesota Dept of Neurosurgery), Bloomington, Minnesota. March 23, 2001.

CONTROVERSIES IN THE TREATMENT OF LOW-GRADE GLIOMAS. Rocky Mountain Neurosurgical Society, 36th Annual Meeting, Steamboat Springs, Colorado. June 18, 2001.

BRAIN TUMOR IMMUNOTHERAPY: FACT OR FICTION. Rocky Mountain Neurosurgical Society, 36th Annual Meeting, Steamboat Springs, Colorado. June 18, 2001.

MANAGING FOOT DROP IN THE PATIENT WITH PERONEAL AND SCIATIC NERVE DISORDERS:TENDON TRANSFER IS SUPERIOR. 18th Annual Meeting: Section on Disorders of the Spine and Peripheral Nerves: AANS/CNS. Orlando, Florida, February 28, 2002.

SURFACE ANATOMY FOR COMMON NERVE OPERATIONS. 18TH Annual Meeting: Section on Disorders of the Spine and Peripheral Nerves: AANS/CNS. Orlando, Florida, March 2, 2002.

LOWER EXTREMITY NERVE INJURIES AND ENTRAPMENTS. Practical Clinic #003. American Association of Neurological Surgeons-Annual Meeting, Chicago, Illinois. April 6, 2002.

TREATMENT UPDATES – SURGERY. The 7th National Brain Tumor Conference – The National Brain Tumor Foundation. Denver, CO/Phoenix AZ/San Francisco Bay Area, CA – September 21, 2002.

GLIOMAS: CLINICAL ADVANCES – IMMUNOTHERAPY. Neuro-Oncology 2003: Current Concepts. The Cleveland Clinic Brain Tumor Institute and the Department of Neurosurgery. Orlando, FL., January 12, 2003.

OVERCOMING THE BLOOD-BRAIN BARRIER USING CONVECTION ENHANCED DELIVERY: METHODS, OUTCOMES, AND IMPLICATIONS FOR PATIENT CARE. Oncology Nursing Society Annual Meeting – Neuro-oncology Special Interest Group. Denver, CO May 1, 2003.

CHALLENGES IN TREATING PATIENTS WITH LUNG CANCER AND BRAIN METASTASIS. American Society of Clinical Oncology (ASCO) Annual Meeting. Chicago, IL. June 1, 2003 and June 3, 2003 (Lecture given twice)

THE “DENVER CORRIDOR”, A MINIMALLY INVASIVE DEVICE FOR ACCESS TO DEEP-SEATED INTRACRANIAL TUMORS. The 38th Annual Meeting of the Rocky Mountain Neurosurgical Society, Big Sky, Montana. June 22, 2003.

CHALLENGES IN MANAGEMENT OF LUNG CANCER PATIENTS WITH BRAIN METASTASIS. Second Annual Atlanta Lung Cancer Symposium. Atlanta, Georgia. March 27, 2004.

NOVEL TREATMENT FOR BRAIN TUMORS: THE GOOD, THE BAD, AND THE UGLY. The 39th Annual Meeting of the Rocky Mountain Neurosurgical Society, Squaw Valley, California. June 16, 2004.

MANAGEMENT OF LUNG CANCER PATIENTS WITH BRAIN METASTASIS. 2004 Symposium on Diagnosis and Treatment Strategies in Lung Cancer. Omaha, Nebraska. October 1, 2004.

RATIONALE AND TECHNIQUES FOR USE OF DURAGEN, NEURAGEN, AND ENDURA IN NEUROSURGICAL CASES. Integra National Meeting. Fort Lauderdale, FL, Feb. 10, 2005

BUILDING THE COMPREHENSIVE NEUROSCIENCE PROGRAM AT UNIVERSITY OF COLORADO HEALTH SCIENCES CENTER. ACI'S 5th National Conference on Developing and Operating Neuroscience Centers of Excellence For Hospitals and health Systems. Orlando, FL February 24-25, 2005

RADIATION-INDUCED MENINGIOMAS. 40th Annual Rocky Mountain Neurosurgical Society Meeting. Whistler, BC, June 2005.

CURRENT STATUS OF BRAIN TUMOR IMMUNOTHERAPY. Aspen Symposium in Brain Tumor Immunotherapy, Aspen, CO. Aug. 7, 2005.

MANAGEMENT OF LOW GRADE GLIOMAS. University of Texan Southwestern Medical School. Visiting Professorship. Department of Neursurgery. Dallas, Tx, March 26, 2006.

IMMUNOTHERAPY IN THE TREATMENT OF BRAIN TUMORS. University of Texan Southwestern Medical School. Visiting Professorship. Department of Neursurgery. Dallas, Tx, March 26, 2006.

M. STEPHEN MAHALEY, Jr., M.D., Ph. D. THE FATHER OF BRIAN TUMOR IMMUNOTHERAPY. Aspen Symposium in Brain Tumor Immunotherapy, Aspen, CO. August 7, 2006.

LOCAL TGF-Beta 2 INHIBITION vs. AN ADJUNCT TO SYSTEMIC TUMOR VACCINE THERAPY IN THE TREATMENT OF MALIGNANT GLIOMA: PROOF OF PRINCIPLE. Society for Neuro-Oncology Annual Meeting, Orlando, FL Nov. 16, 2006

Invited Lectures

International

LOCAL SUSTAINED RELEASE OF CISPLATIN FROM BIODEGRADABLE POLYMER FOR THE TREATMENT OF INTRACRANIAL GLIOMA IN THE RAT. The Tenth International Conference on Brain Tumor Research and Therapy. Stalheim, Norway, September 8, 1993.

REASSESSMENT OF THE ROLE OF RADIATION THERAPY IN THE TREATMENT OF ENDOCRINE INACTIVE PITUITARY MACROADENOMAS. Joint Section on Tumors AANS/CNS, Montreal, Canada. October 4, 1996.

CURRENT STATUS OF POLYMER INPLANTS FOR TREATMENT OF BRAIN TUMORS - GLI 328 International Advisory Board Meeting. Zurich, Switzerland. December 13, 1997.

IMMUNOTHERAPY FOR BRAIN TUMOR. The 358th Shinshu Neurosurgical Seminar. Shinshu University School of Medicine, Matsumoto, Japan. October 7, 1999.

PRINCIPLES AND TECHNIQUES OF PERIPHERAL NERVE SURGERY. Resident Review Course, American Association of Neurological Surgeons Annual Meeting. Toronto, Canada. April 21, 2001.

EVALUATION AND MANAGEMENT OF PERIPHERAL NERVE ENTRAPMENT SYNDROMES. Breakfast Seminar, American Association of Neurological Surgeons Annual Meeting, Toronto, Canada. April 24, 2001

RESEARCH ACTIVITIES

Research Grants, Contracts and Agreements

Ongoing Research Support:

Private Donations

Plachy-Rubin "Race for Research" Fund

Supports brain tumor research at the University of Colorado Cancer Center. Approx \$20,000 annually to the Department of Neurosurgery Neuro-oncology Program

Sapiro Family Brain Tumor Donation

One time donation of \$50,000 in 2006 to support the Department of Neurosurgery Brain tumor Immunotherapy Research.

Grills Family Foundation

One time donation of \$10,000 in 2007 to the Department of Neurosurgery Neuro-oncology Research Fund.

Industry Supported

Xenova, Inc (KS Biomedix Ltd.), Lillehei (PI) 2005-2008

A Phase III multicenter study of intratumoral/interstitial therapy with TransMID compared to best standard of care in patients with progressive and/or recurrent, non-resectable glioblastoma multiforme.

Role: PI

Biogen, Inc., Kevin O. Lillehei (PI) 06/01/02-5/31/05

A Multi-Center, open label, two part, dose escalation Phase I study to determine the tolerability of Interferon-beta gene transfer (BG00001) in the treatment of recurrent or progressive Glioblastoma Multiforme.

This is Phase I clinical trial to determine the tolerability of stereo injected interferon-beta gene via an adenovirus vector into patients with recurrent or progressive Glioblastoma Multiforme.

Role: PI

NeoPharm Pharmaceuticals, Lillehei (PI) 07/01/02-06/31/05

Pre-operative IL13-PE38QQR infusion in patients with recurrent or progressive supratentorial malignant glioma: a Phase I/II study.

Phase I/II clinical trial examining the tolerability of pseudomonas endotoxin linked to IL-13, which is targeted to the IL-13 receptor on recurrent high-grade gliomas. The drug is infused using convection-enhanced delivery over 4-7 days prior to surgical resection.

Role: PI

NeoPharm Pharmaceuticals, Lillehei (PI) 07/01/04-06/31/06

Phase III randomized evaluation of convection enhanced delivery of IL13-PE38QQR compared to Gliadel wafer with survival endpoint in glioblastoma multiforme patients at first recurrence. (Protocol # IL13PEI-301).

Phase III clinical trial examining the benefit to survival of patients treated with pseudomonas endotoxin linked to IL-13 (which is targeted to the IL-13 receptor on glioblastoma multiforme) over treatment with Gliadel wafers alone. The drug is infused post-operatively using convection-enhanced delivery over 4 days.

Role: PI

Completed Research Support

ABC2 Foundation Alex Franzusoff (PI) 6/02-5/03

Development of novel brain tumor vaccines

The goals of this project are to test a novel yeast-based cancer vaccine for use against brain cancer.

Role: Co-Investigator

American Cancer Society/University of Colorado Cancer Center Seed Grant, Alex Franzusoff (PI) 6/02-5/03

Univ. Colorado Cancer Center

Development of novel lung tumor vaccines

The goals of this project are to test a novel yeast-based cancer vaccine for use against lung cancer.

Role: Co-Investigator

Source: ABC2 Foundation Alex Franzusoff (PI) 6/00-5/01

Project Title: Development of novel brain tumor vaccines

The goals of this project are to test a novel yeast-based cancer vaccine for use against brain cancer.
Role: Co-Investigator

Source: American Cancer Society/University of Colorado Cancer Center Seed Grant, Alex Granzusoff (PI) 6/00-5/01. Univ. Colorado Cancer Center

Project Title: Development of novel lung tumor vaccines

The goals of this project are to test a novel yeast-based cancer vaccine for use against lung cancer.

Source: NIH RO-1 CA079788-03

Project Title: Brain therapy using ultrasound-mediated drug delivery.

P.I: Lawrence K. Ng, Ph.D.

Co-P.I.'s: **Kevin O. Lillehei, M.D.**, Leonard Bond, Ph.D.

Direct Costs: \$679,125

Period of Support: 12/01/98-11/31/01

Source: Bob and Pris Partridge (Private Donation)

Project Title: Immunotherapy Brain Tumor Research

P.I.: **Kevin O. Lillehei, M.D.**

Direct Costs: \$50,000

Period of Support: One time donation

Source: Academic Enrichment Fund-University of Colorado Health Sciences Center

Project Title: Vaccination with irradiated tumor cells plus cytokine in the treatment of malignant glioma in the rat model.

P.I.: **Kevin O. Lillehei, M.D.**

Direct Costs: \$17,000

Period of Support: 7/01/98-6/30/01

Source: Genetic Therapy Inc., Gaithersburg, Maryland

Project Title: Prospective, open-label, parallel-group, randomized, multicenter trial Comparing the efficacy of surgery, radiation and injection of murine cells Producing herpes simplex thymidine kinase vector followed by intravenous gancyclovir against the efficacy of surgery and radiation in the treatment of newly diagnosed, previously untreated glioblastoma.

P.I.: **Kevin O. Lillehei, MD**

Direct Costs: \$98,060

Entire Period of Support: 8/1/96-7/31/00

Source: NIH/NCI P30-CA46934

Project Title: Cancer Center Core Grant

Principal Investigator: Paul A. Bunn, Jr., MD

Role: Co-director-Adult Clinical Oncology Program: **Kevin O. Lillehei**

Total Annual Direct Costs of Project: \$8,395.395

Direct Costs to Investigator: \$53,750

Entire Period of Support: 3/01/95-2/28/00

Source: Milheim Foundation for Cancer Research

Project Title: Active Specific Immunotherapy Using a Tumor Vaccine Strategy Combined With Local and/or Systemic Inhibition of TGF-beta for Treatment of Intracranial Glioma.

P.I. **Kevin O. Lillehei, MD**

Direct Costs: \$13,000
Period of Support: 7/1/98-6/30/99

Source: American Cancer Society/University of Colorado Cancer Center Fellowship Grant
Project Titles: Active Specific Immunotherapy Using a Tumor Vaccine Strategy Combined with Local and/or Systemic Inhibition of TGF-beta for Treatment of Intracranial Gliomas.

Faculty Sponsor: **Kevin O. Lillehei, MD**

Direct Costs: Fellowship Grant Dr. Yang Liu--\$10,000
Period of Support: 7/1/97-6/30/98

Source: National Cancer Institute
Project Title: Cancer Center Core Grant-#5P30CA46934-05
Principal Investigator: Paul A. Bunn, Jr.
Surgical Oncology Program Leader: **Kevin O. Lillehei** (10% effort)
Direct Costs: \$50,000
Entire Period of Support: 3/1/91-2/28/95
Clinical Investigations Core Co-Director: Kevin O. Lillehei (5% effort)
Direct Costs: \$18,750
Entire Period of Support: 3/1/92-2/28/95

Source: NOVA Pharmaceutical Corporation, Baltimore, Maryland
Project Title: The Safety and Tolerability of the Use of Gliadel for the Treatment of Recurrent Malignant Glioma (Protocol NPC #9115)
Principal Investigator: **Kevin O. Lillehei**
Direct Costs: No funding offered-Compassionate use awaiting FDA approval.

Source: NIH ROI Supplement
Project Title: Immunotherapy for Primary Brain Glioma
Principal Investigator: Carol A. Kruse
Co-Investigators: **Kevin O. Lillehei**, Donald Bellgrau
Direct Costs: \$35,145
Entire Period of Support: 8/1/91-7/31/95

Source: NIH ROI
Project Title: Immunotherapy for Primary Brain Glioma
Principal Investigator: Carol A. Kruse
Co-Investigators: **Kevin O. Lillehei**, Donald Bellgrau
Direct Costs: \$709,815
Entire Period of Support: 8/1/90-7/31/95
Director of Clinical Studies: Kevin O. Lillehei (10% effort)
Direct Costs: \$20,006
Entire Period of Support: 8/1/93-7/31/95

Source: University of Colorado Academic Enrichment Fund
Project Title: Synthesis and Characterization of a Paramagnetic Protein Conjugate (Gadolinium-DTPA Corticotropin Releasing Factor), with an Affinity for the Pituitary Corticotroph Cell Receptor, for use in in-vivo magnetic Resonance imaging of Pituitary ACTH secreting cells.

Principal Investigator: **Kevin O. Lillehei**
Direct Costs: \$6,544
Entire Period of Support: 7/1/92-6/30/93

Source: NOVA Pharmaceutical Corporation, Baltimore, Maryland
Project Title: A double-blind, placebo-controlled study of BCNU delivered from Bidel, a biodegradable, surgically implanted polymer for treatment of recurrent, malignant glioma (Protocol NPC #8802)

Principal Investigator: **Kevin O. Lillehei**
Direct Costs: \$17,600
Entire Period of Support: 12/1/89-4/1/91

Source: Cell Technology, Inc., Boulder, Colorado
Project Title: Phase II Study of ImuVert in Patients with Recurrent or Refractory Anaplastic Astrocytoma or Glioblastoma Multiforme.

Principal Investigator: **Kevin O. Lillehei**
Direct Costs: \$50,893
Entire Period of Support: 11/3/88-7/17/90

Source: William V. Gervasini Brain Tumor Foundation
Project Title: Interleukin-2 Investigation Involving Malignant Glioma
Investigators: Denver Brain Tumor Research Group (**K.O. Lillehei**, Head of Clinical Investigation, C.A. Kruse, Head of Basic Research Studies)
Direct Costs: \$44,527
Entire Period of Support: 1988-1991

Source: Cancer League of Colorado
Project Title: Immunotherapy for Brain Tumors-Clinical Trial
Investigators: Denver Brain Tumor Research Group (**K.O. Lillehei**, Head of Clinical Investigation, C.A. Kruse, Head of Basic Research Studies)
Direct Costs: \$15,000
Entire Period of Support: 9/1/87-9/1/88

Source: The Colorado Trust
Project Title: Autologous Stimulated Lymphocytes-Immunotherapy for Brain Tumors
Investigators: Denver Brain Tumor Research Group (**K.O. Lillehei**, Head of Clinical Investigation, C.A. Kruse, Head of Basic Research Studies)
Direct Costs: \$60,000
Entire Period of Support: 1/1/87-1/1/89

Source: Biomedical Research Support-University of Colorado Health Sciences Center
Project Title: Autologous Stimulated Lymphocytes-Immunotherapy for Brain Tumors
Principal Investigator: **Kevin O. Lillehei**
Direct Costs: \$10,400
Entire Period of Support: 10/8/86-4/30/87

Source: Hoffmann-LaRoche Pharmaceutical, Nutley, New Jersey
Project Title: Interleukin-2 Clinical Investigation Involving Malignant Glioma
Investigators: Denver Brain Tumor Research Group (**K.O. Lillehei**, Head of Clinical Investigation, C.A. Kruse, Head of Basic Research Studies)
Direct Costs: \$30,000
Entire Period of Support: 10/1/86-7/1/88

Source: American Critical Care Corporation, Chicago, Illinois
Project Title: Role of Colloid Volume Expansion in the Treatment
Of Cold Induced Vasogenic Edema
Principal Investigator: Bruce Tranmer
Co-Investigators: **Kevin O. Lillehei**, Glenn Kindt, Cordell Gross
Direct Costs: \$13,000
Entire Period of Support: 1/1/86-12/31/86