

.CURRICULUM VITAE

A. Personal Information:

Name Thomas C. Chen, M.D., Ph.D., MHA, F.A.C.S.
 Business University of Southern California
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B. Education:

High School Glenbard South High School, Illinois, 1981
 University or College University of Illinois, Urbana-Champaign, B.S., 1984
 Medical School University of California, San Francisco, M.D., 1988
 Internship University of Southern California, Surgery, July 1988-June 1989
 Residency University of Southern California, Neurosurgery, July 1989-June 1995
 Graduate School University of Southern California, Experimental Pathology, Ph.D., 1996
 University of Southern California, Masters in Health Administration (MHA), 2008
 Fellowship Fellowship in Complex Spine Surgery, 1996-1997, Medical College of Wisconsin (Sanford Larson, MD, PhD)
 Honors and Awards Best in Medicine 2019
 Castle & Connolly's Top Neurosurgeons 2020
 Castle & Connolly's Best Doctors 10 year 2020
 Pasadena Top Doctors, 2012-2014
 Southern California Super Doctors (LA Magazine, 2008-2014)
 Best Doctors (2007-2019 Castle & Connolly's)
 America's Best Oncologists (2007-2019; Castle & Connolly's)
 America's Top Surgeons (2007-2014)
 America's Top Physicians (2007-2014)
 Stryker Award, Best Neuro-oncology Research, Congress Neurological Surgeons (2009)
 Editor "Controversies in Neuro-oncology." 2009-2010
 Editor Neurosurgical Focus-5 issues. 2005-2015
 Associate Editor Journal of Neuro-oncology, 2007-present
 Associate Editor Spine Journal, 1998-present
 UCSF Innovation Accelerator (Biotech Competition), San

Francisco, 2006

Recognition for Cancer Care, California Legislature, 2005

Alpha Omega Alpha, University of California, 1987

Summa Cum Laude, University of Illinois, 1984

Bronze Tablet, University of Illinois, Univ. honors, top 3%,
1984

Highest Distinction in Chemistry, University of Illinois, 1984

Phi Beta Kappa (Phi Beta Kappa Scholarship), University of
Illinois, 1984

Valedictorian, Glenbard South High School, 1981

Medical Licensure G066798, California, 1989 to present

Board Certification The American Board of Neurological Surgery
(Neurological Surgery), 2000, 2010

C. Professional Background:

1. Director, Spine surgery, Los Angeles County Medical Center 2021-present
2. Chair, Good Samaritan Hospital Neurosurgery 2014-2020
3. Director, USC Neurosciences at Garfield, 2015-2020
4. Director, USC Neuro-oncology Research Laboratories 1997-present
5. Professor with Tenure, Neurosurgery, Pathology, Orthopedic Surgery, Keck School of Medicine, 2013-present
6. Associate Professor with Tenure, Neurosurgery and Pathology, Keck School of Medicine, University of Southern California, Los Angeles, CA, 2003-2012
7. Director, Surgical Neuro-oncology, Norris Cancer Hospital, USC University Hospital, University of Southern California, Los Angeles, CA, 1997-present
8. Assistant Professor, Neurosurgery, Keck School of Medicine, University of Southern California, Los Angeles, CA, 1997-2003
9. Assistant Professor, Pathology, Keck School of Medicine, University of Southern California, Los Angeles, CA, 1997-2003

Specific Teaching Responsibilities

1. Clinical Instructor, Department of Neurosurgery, University of Southern California, 1995-1996
2. Medical Student Lecturer: 2nd year Medical Students-Spine Injury, 1997-2010
3. Assistant Professor Neurosurgery-intraoperative and postoperative teaching and mentoring of neurosurgery residents at LAC/USC; USUH, 1997-2003
4. Graduate Student Mentor: Dept. of Pathology, Univ. of Southern California: Undergraduate students (5), Master students (5), Medical students (4), PhD students (4), postdoctoral fellows (4), 1997-present
5. Medical Student Summer Research Mentor: Dept. of Neurosurgery, University of Southern California, (2nd year medical students – 3), 1997-present

6. Director of Surgical Neuro-oncology-lectures to oncology fellows, 2010-present
7. Professor Neurosurgery – intraoperative and postoperative teaching and mentoring of neurosurgery residents, 2013-present

Students/Residents/Postdoctoral Fellows Mentored

Neurosurgery Residents Mentored/Graduated

1. Ehud Mendel, MD (1998)
2. Sean Lavine, MD (1998)
3. Felipe Albuquerque, MD (1999)
4. Mark Krieger, MD (1999)
5. Arun Amar, MD (2000)
6. SooHo Choi, MD (2000)
7. Joseph Chen, MD (2001)
8. Mark Liker, MD (2001)
9. Sanjay Ghosh, MD (2002)
10. Larry Khoo, MD (2002)
11. Charles Liu, MD, PhD (2003)
12. Michael Wang, MD (2003)
13. David Hart, MD (2004)
14. Mark Spicer, MD, PhD (2004)
15. Indro Chakrabarti (2005)
16. John Kuo (2005)
17. Christopher Aho (2006)
18. Sean McNatt (2006)
19. Anthony Kim (2007)
20. Scott Leary (2007)
21. Bryan Oh (2008)
22. Chris Heller (2008)
23. James Elder (2009)
24. Daniel Hoh (2009)
25. Laurence Davidson (2010)
26. Azadeh Farin (2010)
27. Gabriel Zada (2011)
28. Alexander Khalessi (2011)
29. Alexander Taghva (2012)
30. Parham Yashar (2012)
31. Jonathan Russin (2013)
32. Jesse Winer (2014)
33. Aaron Robinson (2014)

34. Yvette Marquez (2015)
35. Brian Lee (2015)
36. Eisha Christian (2016)
37. Frank Attenello (2016)
38. Alexander Tuchman (2016)
39. Martin Pham (2017)
40. Patrick Reid (2017)
41. Joshua Lucas (2018)
42. Vivek Mehta (2018)

Postdoctoral Fellows Mentored

1. Steffie Schmittmeir, PhD (2003-2005)
2. Apostolos Stathopoulos, MD (2007-2008)
3. Clovis Fonseca, MD (2009)
4. Weijun Wang, MD (1999-present)
5. Heeyon Cho, PhD (2009-present)
6. Fabienne Agassi, PhD (2009-present)
7. Marcela Salazar, PhD (2011-present)
8. Nagore Ramos, PhD (2017-present)

Research Assistant Professors Mentored

1. Heeyon Cho, PhD
2. Weijun Wang, MD
3. Josh Neman, PhD
4. Camelia Danilov, PhD
5. Radu Minea, PhD
6. Steve Swenson, PhD
7. Nagore Ramos, PhD

PhD Students Mentored

1. Peter Pyrko (2005-2009)
2. Vinay Gupta (2005-2009)
3. Encouse Golden (2006-2009)
4. Jenny Virrey (2005-2009)
5. Christiana Charalambous (2004-2008)
6. Adel Kardosh (2005-2009)
7. John Popovich (2005-2010)
8. Niyati Javeri (2009 to present)

Medical Students Mentored

1. Don Phillips (2007-2008)
2. Walavan Sivakumar (2008-2010)
3. Dawn Ueda (2008-2009)
4. Zar Chan (2009-2010)

5. Jim Chen (2009-2010)
6. Casey Jarvis (2017)
7. Edith Yuan (2017)
8. Louis Nguyen (2018)
9. Austin Tang (2018)

Masters Students Mentored

1. Peter Pyrko (2003-2005)
2. Adel Kardosh (2003-2005)
3. Nathaniel Soriano (2006-2008)
4. David Wang (2008-2010)
5. Zhi Liu (2009-2010)
6. Niyati Jhaveri (2009-2010)

Undergraduate Students Mentored

1. Ruban Bose (2009-2010)
2. Vicky Kang (2010)
3. Jina Limo (2010)
4. Ethaniel Rubio (2010)
5. Bernard Hsu (2010)
6. Leslie Sims (2017)

Committees Served-National/International

1. North American Spine Society, Research Planning Committee, 1999-2001
2. Neurosurgery representative to California Medical Association, 2000-2001
3. USC Dept Neurosurgery Research Committee, Chair, 2004-present
4. CNS Abstract Committee, 2007-present
5. CNS Fellowship Committee, 2007-present
6. CNS Research Committee, 2007-present
7. Society of Neuro-oncology (SNO) abstract committee, 2007-present
8. Southern California Glioma Vaccine Trials Committee (chair), 2009-present
9. NASS Advocacy Committee, 2009-present

D. Society Memberships:

Professional

1. American Association of Neurological Surgeons (AANS), 2000-present
2. Congress of Neurological Surgeons, Member (CNS), 2000-present
3. American Association of Cancer Research (AACR), 1996-present
4. North American Spine Society (NASS), 1996-present
5. American Society of Gene Therapy (ASGT), 1997-present
6. American College of Surgeons (ACS) 2002-present (Fellow, ACS: October 2002)
7. American Society of Clinical Oncology (ASCO), 1998-present
8. Society of Neuro-oncology (SNO), 1997-present

E. Service:

Professional Organizations

National/International

1. North American Spine Society, Research Planning Committee, 1999-2001
2. Neurosurgery representative to California Medical Association, 2000-2001
3. USC Dept Neurosurgery Research Committee, Chair, 2004-present
4. CNS Abstract Committee, 2007-present
5. CNS Fellowship Committee, 2007-present
6. CNS Research Committee, 2007-present
7. Society of Neuro-oncology (SNO) abstract committee, 2007-present
8. Southern California Glioma Vaccine Trials Committee (chair), 2009-present
9. NASS Advocacy Committee, 2009-2014

Local

1. USC/Norris Comprehensive Cancer Center/Developmental Therapeutics, 1996-present
2. California Association of Neurological Surgeons, 1999-present
3. Western Neurosurgical Society, 2004-present

USC Committees

1. Neurosurgery Resident Performance Review Committee, 1997-present
2. LAC+USC Medical Center, Institutional Review Board (full-board and subcommittee), 1998-2003
3. Neurosurgery Chairman Search Committee, 2004
4. OB/GYN Task Force, 2004
5. USC Clinical Practice Committee, 2004-present
6. Whittier Foundation/Norris Leadership Committee, 2004-present
7. USC Bioscience Nanoscience Initiative Committee, 2006
8. USC Whittier Translational Research Committee, 2006
9. OR Reform Committee (chair), 2006-2009
10. General Surgery Residency Review Committee, 2010
11. Glioma Research Group (chair), meets Fridays, every week
12. Spine Research Group (chair), meets Fridays, every other week
13. Brain Tumor Board (chair), meets Fridays, every other week
14. Brain Tumor Genetics Group (chair), meets Mondays, every other week
15. Neuro Nanotechnology Group (chair), meets Mondays, every other week
16. Dept Neurosurgery Research Committee (chair), meets Thursdays, every month
17. Neuro-oncology Clinical Trials Group (chair). meets Fridays, every other week

18. Anti-Invasion Group (chair), meets Tuesdays, every other week

NIH Study Section

1. NIH U01 Review Committee, RFA-CA-09-013, National Institutes of Health, RFA, Bethesda, MD, March 2010
2. NIH SBIR Review Committee, PAR-10-286, National Institutes of Health, RFA, Bethesda, MD, 7/11-12/2011
3. NIH SBIR Review Committee, PAR-10-286, National Institutes of Health, RFA, Teleconference, 11/2/2013
4. NIH Grant Review Committee, R01
5. NIH Grant Review Committee, 7/19/2017

Other Study Section

1. CNS Fellowship Committee, 2006-present
2. CNS Research Committee, 2010-present
3. AACR Scientific Review Committee for Brain Tumor Research, 2009

Editorial Boards

1. Spine Journal, Associate Editor, 2000-present
2. Journal of Neuro-oncology, Associate Editor, 2007-present
3. Current Molecular Pharmacology, Editorial Board, 2007-present
4. Orthopedics, Editorial Board, 2009-present

Journal Reviews

1. Acta Pharmacologica Sinica
2. Anticancer Drugs
3. Bioelectromagnetics
4. Brain Research
5. British J Cancer
6. Cancer Epidemiology
7. Cancer Research
8. Clinical Cancer Research
9. European Journal of Cancer
10. European Journal of Surgery
11. Human Gene Therapy
12. International Journal of Cancer
13. International Journal of Radiation Oncology
14. Investigational New Drugs
15. Journal of Neuro-oncology
16. Journal of Neurosurgery
17. Molecular Cancer and Therapeutics
18. Neuroimage
19. Neurosurgery
20. Neurosurgical Focus

21. Oncology
22. Orthopedic Research
23. PLOS ONE
24. Spine Journal
25. Surgical Neurology
26. World Neurosurgery

Grant Review

1. VA Merit Awards
2. Wright Foundation
3. CNS Fellowships
4. Baxter Foundation
5. Zumberge Foundation
6. Society of Neuro-oncology
7. CHLA Merit Awards
8. United Kingdom (UK) Cancer Research

Community Service

1. Science Career Lecturer, La Canada High School, 1997-2006

Other

Symposia

1. AO/ASIF, Course for Residents in Spine Instrumentation, Las Vegas, CA 2005
2. AO/ASIF, Complex Spine Management and Instrumentation, Carmel, CA 2005
3. Genentech National Advisory Board for Avastin, New York, NY, 2009
4. New Advances in the Treatment of Spinal Disorders. Los Angeles, CA, 2009
5. AO/ASIF-Complex Spine Instrumentation for OR Personnel, Las Vegas, CA 2006.
6. AO/ASIF-Davos Cervical and Thoracic Trauma, Davos, Switzerland, 2014

Sessions Chaired

1. Scientific Session-Society of Neuro-oncology, 2000
2. International Symposium Germinoma, Los Angeles, CA, 2005
3. Tumor Section, AANS, San Francisco, CA, 2006
4. Principles of Spinal Disorders for Operating Room Personnel-Lecture: Innovations in Spine Surgery. Universal City, September 2006.
5. Experimental Therapeutics, Society of Neuro-oncology, Las Vegas, CA, October 2009
6. 1st Annual Immunomodulation Symposium for Gliomas. Paris, France, April 2009.

7. 1st Annual Inhalational Chemotherapy Symposium for Gliomas. Rio de Janeiro, Brazil, June 2009.
8. Anti-Cancer Symposia, 8th Annual Congress of International Drug Discovery Science and Technology (IDDST), Beijing, China, October 2010.
9. Genentech Glioblastoma Advisory Board-Avastin; San Francisco, CA 11/6/2010
10. 4th Annual World Cancer Congress, Track 1-3, Brain Cancer, Dalian, China, 5/23/2011
11. USC CME (course chairman). Multimodality treatment of brain cancer: current concepts and recent advances. Los Angeles, CA 9/24/2011
12. USC CME (course chairman). Evaluation and Management of the Patient with Brain and Spine Metastasis. Los Angeles, CA 3/1/2014

Consultantships

1. Revolutionary Health (Neurosurgery), Los Angeles, CA, 2005
2. Synthes, Inc. Instructor for AO Synthes, West Chester, Pennsylvania 1997-present
3. Vital Options (radio talk show on cancer-guest speaker), Los Angeles, CA, 1998-2003
4. Tocagen, Inc (gene therapy for gliomas), San Diego, CA, 2008-present
5. ERC America (immunotherapy company), Luxemburg, 2009-present
6. Axoncology, Inc. (spine oncology), Irvine, CA, 2008-present
7. Pharmacokinesis, Inc (drug delivery), Inglewood, CA, 2007-present
8. Neonc, Inc (transnasal delivery), Los Angeles, CA, 2009-present
9. Applied Integrin Sciences, Inc. (anti-invasion, disintegrins), Los Angeles, CA, 2010

F. Research Activities:

Major Areas of Research Interest

1. Antiangiogenesis-study glioblastoma derived endothelial cells compared to normal brain endothelial cells (with Florence Hofman)
2. Novel gene delivery techniques: Study of a replication competent retrovirus for the delivery of novel suicide gene therapy for gliomas (collaboration with Dr. Nori Kasahara)
3. Role of Endoplasmic Reticulum Stress in Glioma Chemosensitization (with Axel Schonthal)
4. Anti-invasion techniques: Use of disintegrins for the inhibition of invasion in gliomas (with Dr. Frank Markland)
5. Intranasal chemotherapy for malignant gliomas (with Clovis Fonseca)
6. Autogeneic/allogeneic cell vaccines for gliomas (with Apostolos Stathopoulos)

7. Implanted metronomic biofeedback pump (MBP) for leptomeningeal carcinomatosis (with Josh Schachar)
8. Brachytherapy for spine cancer (with Kevin Armstrong)

Clinical Research in Progress

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| 1. A protocol for collecting brain tumor specimens (Chen and Hofman, PI). 2009-present, 5% effort | Not funded |
| 2. Establishment of brain tumor bank for vaccine production: A Southern California Consortium (Chen and Hofman, PI)-ERC- Epitogenetics Research Corporation, 2009-present, 5% effort | 1/1/2018-1/1/2020
\$100,000 |
| 3. An Open Label, Phase 2a Dual Cohort Non-Comparative Study of Efficacy of NEO100 in Recurrent Grade IV Glioma under IND 114,595. PI, Wagle Novocure.Chen (PI). | 7/2019-7/2020
\$50,000 |
| 4. <i>Pilot trial of NovoTTF-200A (TTFields) in patients with newly diagnosed high risk oligodendrogliomas.</i> (unresectable low grade oligodendroglioma, low grade mixed oligoastrocytoma, anaplastic oligoastrocytoma, anaplastic oligodendroglioma,anaplastic mixed oligoastrocytoma)
The goal of this grant is to demonstrate that TTFields can be used to decrease invasion in unresectable oligodendrogliomas. | 2/1/2018-2/1/2020
\$194,772.75 |
| 5. Novocure. Chen (PI). <i>Pivotal, open-label, randomized study of radiosurgery with or without Tumor Treating Fields (TTFields) for 1-10 brain metastases from non-small cell lung cancer (NSCLC).</i>
The goal of this grant is to demonstrate that addition of TTFields to patients receiving radiosurgery for NSCLC improves survival. | 7/1/2018-7/1/2020
\$160,000 |
| 6. ABT-414. Chen (PI). <i>Phase IIIb study for management of ocular side effects in subjects with EGFR-amplified glioblastoma receiving depatuxizumab mafodotin (ABT-414).</i>
The goal of this grant is to determine treatments for ocular side effects in EGFR positive patients receiving ABT-414. | 10/1/2018-10/1/2020
\$182,494.75 |
| | 4/1/2019-4/1/2010 |

7. STELLAR. Chen (PI). *A Phase III, randomized, open-label study to evaluate the efficacy and safety of eflornithine with lomustine compared to lomustine alone in patients with anaplastic astrocytoma that progress/recur after irradiation and adjuvant temozolomide chemotherapy.* \$44,747.50

The goal of this grant is to determine potential additive/synergistic effect of eflornithine with lomustine in anaplastic astrocytoma patients.

Clinical Research Performed

1. An Open Label Study of Temodal® in the Treatment of Patients with Relapsed or Progressive High Grade Malignant Glioma. Principal Investigator, Shering-Plough Corporation. 1998. *5% effort* \$50,000
2. A Phase II Open Label Study of SU101 for Patients with Anaplastic Astrocytoma in First Relapse. Principal Investigator, Sugen, Inc., 1998. *5% effort* \$22,700
3. A Phase III Open Label Study of SU101 versus Procarbazine for Patients with Glioblastoma Multiforme in First Relapse. Principal Investigator, Sugen, Inc, 1998. *5% effort* \$58,800
4. A Phase I/II Pharmacodynamic and Pharmacokinetic Study of Rally Administered Synthetic Hypericin (VIMRxyn®) For Treatment of Recurrent Malignant Brain Glioma, Principal Investigator, VIMRX, Inc., 1997-1998. *5% effort* \$40,000
5. A Phase I/II Study of Recombinant Chimeric Protein Composed of Circularly Permuted IL-4 and a Mutated For of the Pseudomonas Exotoxin Termed IL-4 (38-37)-PE38KDEL (IL-4 toxin) for the Treatment of Recurrent Malignant Astrocytoma. Principal Investigator, Neurocrine Bioscience, 1998. *5% effort* \$10,597
6. Efficacy of Surgery, Radiation and Gene Therapy vs. Surgery and Validation in Patients with Untreated Glioblastoma. Gene Therapy Inc. Sub-Investigator. 1997-1998. *5% effort* \$30,000
7. A Phase III, open-label, randomized comparative study of interstitial 131I chTNT-1/B MAb (COTARA) vs temozolomide for the treatment of recurrent glioblastoma multiforme (GBM). Peregrine Pharmaceuticals, Inc., Principal Investigator, 2002. *5% effort* \$20,000
8. Phase I/II study of the safety and tolerability of DTI-015 in patients with recurrent glioblastoma multiforme. Direct Therapeutics, Inc., Principal Investigator, 2000-2002. *5% effort* \$58,750
9. Non-Invasive, Cell Proliferation-Based Assessment Treatment Response in Human Malignant Gliomas With Positron Emission \$100,000

- Tomography. The Dana Foundation Principal Investigator 2002-2005. *5% effort*
10. A Phase III multicenter study of intratumoral/interstitial therapy with TransMID Xenova Group, PI, 2004-2005. *5% effort* \$150,000
 11. Phase III Randomized Evaluation of Convection Enhanced Delivery of IL13-PE38QQR Compared to Gliadel. NeoPharm, Inc., Principal Investigator, 2004-2005. *5 % effort* \$150,000
 12. Can the platelet plug be used safely in cancer patients? DePuy Acromed, Inc. Principal Investigator, 2004-2005. *5% effort*
 13. Phase II Study of Temozolomide and O6-BG in Patient with Temozolomide-Resistant Anaplastic Glioma. AOI Pharmaceuticals. Principal Investigator, 2007. *5% effort* \$37,500
 14. Prospective, Multi-Center, Randomized Controlled Study to Compare the Spinal Sealant System as an adjunct to sutured Dura Repair with Standard of Care Methods during Spinal Surgery. Confluent Surgical Inc., Principal Investigator, 2005-2009. *5% effort* \$38,238
 15. 6B-07-3-An Open-Label, Extended-Use Study of Human Corticotropin-Releasing Factor (HCRF) Intended for Patients who Participate in the Dexamethasone-Sparing Studies NTI 0302, NTI 0303, or other Designated Studies (NTI0501). Celtic Pharmar Management (formerly Neurobiological Technologies, Inc.), Principal Investigator, 2007-2008. *5% effort* \$25,420
 16. 6B-07-2-A Phase III Randomized, Double-Blind, Dexamethasone-Sparing Study Comparing Human Corticotropin-Releasing Factor (HCRF to Placebo for Control of Symptoms Associated with Peritumoral Brain Edema in Patients with Malignant Brain Tumor who Require Chronic Administration of High-Dose Dexamethasone (NTI 0303). Celtic Pharma Management (formerly Neurobiological Technologies, Inc.), Principal Investigator, 2007-2008. *5% effort*. \$41,309
 17. A Prospective and Randomized Controlled Trial to Evaluate the Safety and Effectiveness of Total Facet Arthroplasty in the Treatment of Degenerative Spinal Stenosis. Archus Orthopedics. Principal Investigator, 2006-2009. *5% effort* \$111,250
 18. 6G-07-1-A Phase II/III Randomized Study of CDX-110 Radiation and Temozolomide in Patients with Newly Diagnosed Glioblastoma Multiforme, Pfizer, Principal Investigator, 2008-2009. *5% effort* \$132,330
 19. Use of ChronOS granules for in-situ fusion after decompression for lumbar stenosis and for metastatic spine cancer – PI Synthes Spine, 2008-2010. *5% effort*

20. Post-Market Surveillance of Clinical and Functional Outcomes with Post-Operative Adjunctive Use of Cervical-Stim or Spinal-Stim, PI Synthes Spine, 2008-2010. 5% effort	\$77,695/yr renewal x 3 years
21. Prospective, Multi-center Trial of NovoTTF-100A Together With Temozolomide Compared to Temozolomide Alone in Patients with Newly Diagnosed GBM. PI Novocure, 2010-present, 5% effort	\$75,000
22. Cilengitide for subjects with newly diagnosed glioblastoma multiforme and methylated MGMT gene promoter - a multicenter, open-label, controlled Phase III study, testing cilengitide in combination with standard treatment (temozolomide with concomitant radiation therapy, followed by temozolomide maintenance therapy versus standard treatment alone (CENTRIC), PI Merck-Serano, 2010-present, 5% effort	\$154,437 \$264,000

Research Grants Completed

1. Non-invasive, cell proliferation based assessment of treatment response in human malignant gliomas with positron emission tomography. Dana Foundation, Principal Investigator, 2002-2005. 5% effort	\$100,000
2. In-vivo imaging of replication competent retrovirus transduction of malignant gliomas using micro-positron emission tomography. NIH. P20 grant awarded to Peter Conti, MD, PhD. Development of a cellular and molecular based cancer imaging center. NIH, Principal Investigator 2003-2004. 5% effort	\$50,000
3. Aging and the Brain Microenvironment in Human Gliomas. Wright Foundation, USC, PI 2003-2004. 5% effort	\$50,000
4. Role of PKC-Mediated GRP Induction in Glioma Chemoresistance. National Cancer Institute, PI. 2003-2006, 10% effort	\$50,000
5. Generating Brain Tumor Targeted Derivatives of the Anti-Tumor Drug Celecoxib. James H. Zumberge Research and Innovation Fund, co- PI. 2004-2005. 5% effort	\$200,000
6. New Target for Anti-angiogenic Therapy in Brain Tumors. Zumberge Research Grant, PI. 2005-2007. 5% effort	\$50,000
7. Surviving: Target for Breast Cancer Metastasis Therapy. California Breast Cancer Research Program, Co-PI, 2005-2007. 5% effort	\$49,874
	\$250,000

8. Potent enhancement of conventional multiple myeloma chemotherapy by DMC, a novel drug with multifunctional molecular applications. Multiple Myeloma Foundation. Co- PI, 2005. *5% effort* \$100,000
9. Applying COX-2 independent molecules: independent effect of celebrex to the treatment of glioblastoma. Co-PI, ABC2, 2005. *5% effort* \$150,000
10. Evaluation of the bone matrix protein (Kronos) for in-situ lumbar fusions. Synthes, PI, 2007. *5% effort*
11. Use of ER Stress in the Treatment of Malignant Gliomas. Whittier Foundation. PI. 2007, *5% effort* \$150,000
12. Use of noscapine in the Treatment of Malignant Gliomas. Cougar Pharmaceuticals. PI, 2007, *5% effort* \$75,000
13. Blocking autophagy and increasing ER stress to improve therapy of GBM. National Brain Tumor Society, co-PI. 2008-2010. *5% effort* \$240,000
14. Use of carbon nanotubes for the treatment of malignant gliomas. Whittier Nanoscience Bioinitiative. PI. 2009-2010. *5% effort* \$120,000
15. NIH U01 PAR-05-158-Translational Development of Replication Competent Retrovirus Vectors: USC. PI, 2010-2014. *5% effort* \$120,000
16. Anti-invasion glioma therapy with targeted magnetic nanoparticles. Whittier, Nanoscience Bioinitiative. PI. 2011-2014. *5% effort* \$100,000
17. Development of Intranasal delivery to the brain. Qualifying Therapeutic Discovery Project Program, PI. 7-2010. *5% effort* \$889,503
IRS company development grant for development of perillyl alcohol and its derivatives for treatment of brain tumors. Awarded to NeOnc Technologies
18. California Breast Cancer Research Program (CBCRP). Chen (co-PI). 9/2013-2/2015. Innovative Development and Exploratory Award (IDEA). *Intranasal Drug Delivery for Brain-Metastatic Breast Cancer* \$150,000
19. 1R1CA165626-01A1. Chen (PI). 11/2013-11/2014. *A novel brachytherapy agent for GBM. Use of iodinated vicrostatin for intravenous vs intratumoral brachytherapy for malignant gliomas. SBIR CTSI.* \$300,000
20. 6/1/2013-6/30/2014. Chen (PI). *Regulation of Glioma Cancer Stem Cells by the Tumor Vasculature.* The goal of this study is to determine the effect of the tumor vasculature on glioma cancer stem cell survival. Wright Foundation. \$50,000
21. 9/2/2012-9/2015. Ming Hsieh Award. Chen (PI). *Multiplexed polysilicon nanoribbon sensors for therapeutic monitoring and detection of brain cancer.* The goal is to develop a vascular \$150,000

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| endothelial growth factor (VEGF) monitor to physiologically monitor response to treatment. | \$200,000 |
| 22. N43CO-2012-00036. Chen (USC site PI). 7/2012-7/2014. <i>A VEGF Nanosensor to monitor tumor progression</i> . The goal is to develop a VEGF nanosensor for an implantable pump for leptomeningeal carcinomatosis. SBIR grant with Pharmaco-kinesis. | \$150,000 |
| 23. Whittier Foundation. Chen (PI). 8/1/2009-08/1/2015. <i>Use of carbon nanotubes for the treatment of malignant gliomas</i> . The goal of this project is to design a carbon nanotube conjugated to siRNA for treatment of malignant gliomas. | |
| 24. Novocure. Chen (PI). 5/01/2010-05/01/2015. <i>Prospective, multi-center trial of NovoTTF-100A together with temozolomide compared to temozolomide alone in newly diagnosed GBM</i> . The goal of this multi-center Phase III trial is to evaluate the use of alternating electrical fields in the treatment of newly diagnosed GBM. | \$250,000 |
| 25. Stop Cancer. Chen (PI). 8/1/2015-8/1/2018. <i>Intranasal delivery of Neo-Adjuvant NEO100 in Glioblastoma Multiforme (GBM)</i> . The goal of this grant is to provide initial startup funds for preclinical work to determine the role of NEO100 in newly diagnosed GBM. NEO100 will be used in conjunction with the standard Stupp protocol of radiation and temozolomide. | \$150,000 |
| 26. Komen Career Catalyst Award. Chen (co-PI). 9/2105-8/2018. <i>Inhibition of metabolic adaptations leads to changes in the tumor microenvironment of breast to brain metastasis</i> . The goal of this grant is to study the tumor microenvironment and its adaptation to breast cancer metastasis to the brain. | \$450,000 |
| 27. DOD/CDMRP Breast Cancer Breakthrough Award (Level 2). Chen (co-PI). 9/2015-8/2018. <i>Disruption of the tumor microenvironment in Her2+ breast to brain metastasis</i> . The goal of this grant is to determine the facilitative role of Her2+ in breast metastasis to the brain. | \$1,154,989 |
| 28. NIH 1 R41 CA192419-01A1. Chen (PI). 7/1/2016-7/1/2017. <i>Temozolomide Perillyl Alcohol Conjugate as Treatment for Recurrent Malignant Brain Tumors</i> . The goal of this grant is to determine the feasibility of using a novel compound temozolomide perillyl alcohol for the treatment of temozolomide resistant gliomas. | \$300,000 |
| Research Grants Current | |
| 1. NIH 1 R41CA217551. Chen (PI). <i>Innovative nose-to-brain anticancer drug transport facilitated by NEO100</i> . | 4/1/2018-4/1/2020
\$300,000 |

- The goal of this grant is to establish that NEO100 can be used as a solvent for the transport of drugs that normally do not cross the blood-brain barrier. 1/1/2018-1/1/2020
2. Metavivor. Chen (co-PI). *Controlled Opening of the Blood-Brain Barrier to Achieve Therapeutic Access of Trastuzumab in HER2-Positive Brain Metastases.* \$200,000
- The goal of this grant is to demonstrate that opening the BBB with NEO100 results in ability of Trastuzumab to cross the BBB and eliminate HER2 positive breast cancer metastasis to the brain.
3. Wright Foundation. Chen (co-PI). *Cerebrospinal fluid (CSF) and serum markers on predictors of spinal cord ischemia following a TEVAR surgery.* 7/2019-7/2020
\$50,000
- The goal of this grant is to demonstrate presence of inflammatory cytokines in CSF correlate with some patients' decreased neurological status post lumbar drain removal.
4. NIH R41CA246902-01A1 *Developing a clinically relevant radiosensitizer for temozolomide resistant gliomas.* 7/2020-7/2021
\$300,000
- This grant evaluates the role of NEO212 as a radiation sensitizer for MGMT + temozolomide resistant gliomas

Research Grants Pending

1. NIH R41NS113654. Chen (PI). *Controlled BBB opening for delivery of therapeutics to the brain.* 7/1/2020-7/1/2021
\$300,000
2. NIH R41NS110224. Chen (PI). *NEO214: a new drug for treatment of neurofibromatosis (NF1).* 7/1/2020-7/30/2021
\$300,000
3. NIH 12831972. Chen co-PI. *Nasal delivery of NEO100: A novel approach to glioblastoma therapy.* 7/1/2020-7/1/2022
\$1,620,631
4. NIH 2R42CA192419 Chen (PI) *Temozolomide perillyl alcohol conjugate as treatment for recurrent malignant brain tumors.* 7/1/2020-7/1/2022
\$2,125,520

Inventions and Patents

1. Schachar Y, Farkas L, Marx B, Johnson D, Farkas L, Chen TC. Magnetic breather pump and a method for treating a brain tumor using same. US 7,799,012 B2. Sep 21, 2010.
2. Schachar Y, Chen TC, Farkas L, Marx B, Johnson D, Farkas L. Enhanced method for delivering bevacizumab (Avastin) into a brain tumor using an implanted magnetic breather pump. US 8,323,270 B2. Dec 4, 2012.

3. Schachar Y, Chen TC, Farkas L, Jordan B, Zimmerman K, Chan H, Wu W. Remotely activated piezoelectric pump for delivery of biological agents to the intervertebral disc and spine. US 8,827,986 B2. Sep 9, 2014.
4. Schachar Y, Wu W, Chen T, Farkan L, Jordan B, Luboff P, Chan H, Zimmerman K. Method and apparatus for forming of an automated sampling device for the detection of Salmonella Enterica utilizing an electrochemical aptamer biosensor. US 9,329,173 B2. May 3, 2016.
5. Chen TC, Schachar Y, "An apparatus and method for cerebral microdialysis to treat neurological disease, including Alzheimer's, Parkinson's, or multiple sclerosis." Filed 1-10-2019.
6. Chen TC. "Pharmaceutical compositions comprising monoterpenes." US 8,507,743, US 9,133,085, US 9,408,659, US 9,498,448, US 9,700,524
7. Chen TC. "Pharmaceutical compositions comprising POH derivatives. US 8,916,545; US 9,499,641; US 9,580,372; US 9,663,428.
8. Chen TC. "Methods and devices for using isoperillyl alcohol." US 9,211,269
9. Chen TC. "Iso-perillyl alcohol and derivatives thereof." US 9,211,269.
10. Chen TC. "Therapeutic compositions comprising monoterpenes." US 8,236,862.
11. Chen TC. "Pharmaceutical compositions comprising POH derivatives-triconjugate." US 9,522,918; US 9,657,026; US 9,765,081.

G. Invited Lectures:

Distinguished

1. "Tumors of the Spine and Spinal Cord." Joseph P. Van der Meulen Symposium in Clinical Neuroscience, Los Angeles, California. March 1999.
2. "Case-Based Seminar – Spinal Cord Injury". University of Southern California, Los Angeles, CA. December 1999.
3. "A Roundtable Discussion of the Treatment of Glioma Patients: Irinotecan." Neuro-Oncology Annual Meeting, Scottsdale, Arizona. November 1999.
4. "Anaplastic Astrocytomas." The Power of Help, Hope and Healing. The 6th National Brain Tumor Conference, Los Angeles, California. March 2000.
5. "Surgical Management of Neurocysticercosis." University of Southern California. Los Angeles, CA, 2000.
6. "Use of PKC inhibitors to potentiate effect of CPT-11 in the treatment of malignant gliomas." Pharmacia Meeting. Asheville, NC. 2001.
7. "Advances in Surgical Neuro-oncology." Joseph P. Van der Meulen Symposium in Clinical Neuroscience. Los Angeles, CA. April 2002.
8. "Gene Therapy of Malignant Gliomas", University of Southern California, Los Angeles, CA. January 2003.
9. "Advances in Translational Neuro-oncology." Neurology Translational Grand Rounds, USC. Los Angeles, CA. October 2004.

10. My Aching Back.” North American Taiwanese Medical Association. Industry City, CA. October 2004.
11. “Replication Competent Retroviruses for Gene Therapy of Malignant Gliomas.” UCSF Grand Rounds, San Francisco, CA. July 2006.
12. What is in the pipeline for neuro-oncology at USC? Neurology Grand Rounds. University of Southern California, Los Angeles, CA. February 2009.
13. Efficacy of noscopine as therapeutic or chemosensitizing agent for glioma therapy. Cougar Pharmaceuticals, Los Angeles, CA. February 2009.
14. Treatment of malignant gliomas. USC Oncology Fellows Lecture. University of Southern California, Los Angeles, CA. April 2009.
15. Pulse of Neuro-oncology 2009. Treatment of Malignant Gliomas. USC Neurosurgery Grand Rounds. University of Southern California, Los Angeles, CA. June 2009.
16. Hofman FM, Schonthal AH, Louie SL, Petasis NC. Development of novel cancer therapeutics based on induction of ER stress. USC Norris Cancer Center, Los Angeles, CA. October 2009.
17. Use of endoplasmic reticulum stress to induce apoptosis in glioma cancer stem cells (oral presentation). USC Second Annual Stem Cell and Developmental Biology Retreat. Catalina Island, CA. October 2009.
18. Use of carbon nanotubes for treatment of malignant gliomas (invited talk). USC Nanotechnology Initiatives Program. University of Southern California, Descanso Gardens, CA. November 2009.
19. Metastatic spine tumors. New Advances in the Treatment of Spinal Disorders. Los Angeles. November 2009.
20. Spine Research Updates at USC. New Advances in the Treatment of Spinal Disorders. Los Angeles. November 2009.
21. “Use of carbon nanotubes in the treatment of malignant gliomas. CCNE Conference. August 2009.
22. “The academic medical center and development of novel therapies for malignant gliomas.” University of California, Irvine. 2010.
23. "Inhalational chemotherapy for brain tumors." USC CME "Multimodality treatment of brain cancer: current concepts and recent advances." 9/24/2011.
24. “NEO212: A new drug for temozolomide resistant malignant gliomas.” Western Neurosurgical Society, Carlsbad CA. 9/11/2016.
25. “Cervical Fusion and Arthroplasty.” USC Spine Symposium 2017. Marina Del Rey, CA.
26. “Spinal cord and peripheral nerve stimulation.” USC Spine Symposium 2017. Marina Del Rey, CA.
27. “Intranasal Brain Delivery for Brain Tumors.” Symposium on brain and spine metastases. Cosmopolitan, Las Vegas. 10/28-29/2017.

28. Intra-arterial NEO100 transiently opens up the BBB. 2018 Blood-Brain Barrier Consortium meeting. Portland, Oregon. 3/15-16/2018.

International

1. "Treatment of malignant gliomas." Kaohsiung Medical School, Kaohsiung, Taiwan. 2000.
2. "Management of metastatic spine cancer." Taipei University, Taiwan. 2002.
3. "Past immunotherapy trials and malignant gliomas: what can we learn from previous trials?" Paris, France. April 2009.
4. "Perillyl alcohol: future directions." Universidade Federal Fluminense. Rio de Janeiro, Brazil. 2009.
5. "Establishment of International Brain Tumor Bank Consortium." South Luxemburg Cliniques and Hospitals, Belgium. December 2009.
6. "Current and Future Treatments of Malignant Gliomas." National Cheng Kung University, Tainan, Taiwan. December 2009.
7. "Management of Spine and Spinal Cord Tumors." National Cheng Kung University, Tainan, Taiwan. December 2009.
8. "Metronomic delivery of chemotherapeutic agents using an implantable pump for treatment of leptomeningeal carcinomatosis." 1st Annual Inaugurate Symposium on Cancer Drug Biology. IDST. Beijing, China. 10/2010.
9. "Perillyl alcohol derivatives for the treatment of malignant gliomas." 4th Annual World Cancer Congress, Dalian, China. 5/23/2011.
10. "Malignant Gliomas: Potential Future Treatments." Shanghai Ninth Medical College. Shanghai, China. 5/26/2011.
11. "Immunotherapy for Malignant Gliomas: Potential Collaborations." Luzhou Affiliated Hospitals, Luzhou, China. 5/27/2011.
12. "Management of Malignant Gliomas." Tsingtao University, Tsingtao, China. 5/29/2011.
13. "Inhalational Chemotherapy for Brain Tumors." 5th ICFNS, Tainan, Taiwan. 11/3/2012 (honored guest).
14. "New drug delivery systems to the brain." McKay University, Taipei, Taiwan. 10/6/2014.
15. "Laminar cover for the spinal cord." McKay University, Taipei, Taiwan. 11/3/2015.
16. "A new delivery system for the brain: intranasal delivery." Southwest University, Schichuan, China. 4/5/2016.
17. "NEO100 opens up the blood brain barrier transiently." Southwest University, Schichuan, China. 3/6/2017.
18. "NEO212 and the lytic cycle response." Southwest University, Sichuan, China. 4/2018.

Bibliography

Peer Reviewed

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2. McKown RL, Orle K, **Chen TC**, Craig NL. Sequence requirements of Escherichia coli att Tn7, a specific site of transposon Tn7 insertion. *J of Bacteriology* 170: 352-258, 1998.
3. **Chen TC**, Char DH, Waldman F, and Juster RP. Flow cytometry measurement of nuclear RNA content in uveal melanoma. *Ophthalmic Res.* 22:187-193, 1990.
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5. Levy ML, **Chen TC**, Weiss MH. Monostotic fibrous dysplasia of the clivus. *J Neurosurg* 75: 800-804, 1991.
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8. **Chen TC**, Zee CS, Miller CA, Weiss MH, Tang G, Chin L, Levy ML, Apuzzo MLJ. Magnetic Resonance Imaging and Pathologic Correlates of Meningiomas. *Neurosurgery* 31: 1015-22, 1992.
9. **Chen TC**, Hinton DR, Apuzzo ML, Hofman FM. Differential effects of tumor necrosis factor-alpha on proliferation cell surface antigen expression, and cytokine interactions in malignant gliomas. *Neurosurgery* 32: 85-94, 1993.
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11. **Chen TC**, Maceri D, Levy M, Giannotta SL. Fat Graft Prolapse after Translabyrinthine Craniotomy. *Neurosurgery* 35: 521-525, 1994.
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14. Couldwell WT, Hinton DR, He S, **Chen TC**, Sebat I, Weiss MH, Law RE. Protein kinase C inhibitors induce apoptosis in human malignant glioma cell lines. *FEBS Letters* 345: 43-6, 1994.

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16. Stillerman CB, **Chen TC**, Day JD, Weiss MH. The transfacet approach for herniated thoracic discs. *J Neurosurgery* 83: 971-6, 1995.
17. Zee CS, **Chen TC**, Hinton DR, Tan M, Segall HD, Apuzzo MLJ. Magnetic resonance imaging of cystic meningiomas and its surgical implications. *Neurosurgery* 36: 482-489, 1995.
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28. **Chen TC**, Maiman DJ. Anterior Lumbar Fusions. *Techniques in Neurosurgery* 4:256-264, 1998.
29. **Chen TC**, Helm GA. Introduction to Gene Therapy. *Neurosurg Focus* Vol. 8(4): Introduction, 2000. (Online)

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34. **Chen TC**. Prostate Cancer and Spinal Cord Compression. *Oncology* 15(7): 841-55. 2001
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37. Wang WJ, Tai CK, Kasahara N, **Chen TC**. Highly efficient and tumor-restricted gene transfer to malignant gliomas by replication-competent retroviral vectors. *Human GeneTherapy* 14:117-127, 2003.
38. **Chen TC**, Su S, Fry D, Liebes L. Combination therapy of irinotecan and protein kinase C inhibitors in malignant gliomas. *Cancer Supplement* 97/9: 2363-2373, 2003.
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 144. **Chen TC**. NEO212: A novel temozolomide-perillyl alcohol conjugate exhibits superior activity against temozolomide resistant gliomas and intracranial triple negative breast cancer metastasis. Asilomar, July 22, 2014.
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 146. **Chen TC**. C2 fracture/odontoid. AO Spine, Davos Switzerland. Dec 14-18, 2014.
 147. **Chen TC**. Nonoperative treatment of thoracolumbar fractures. AO spine, Davos, Dec 14-18, 2014.
 148. **Chen TC**. Chance fractures. Chance fractures – Expert opinion and lecture. AO Spine, Davos, Switzerland. Dec 14-18, 2014.
 149. **Chen TC**. Metronomic biofeedback pump and the vision of local delivery. Invited talk. Case Western Reserve. January 30, 2015.
 150. **Chen TC**. Intra-arterial NEO100 transiently opens up the Blood Brain Barrier. Portland, Oregon. 2018 Annual Neuro-oncology and Blood Brain Barrier. March 16, 2018.
 151. **Chen TC**. Advances in Brain Tumor Treatment. American Brain Tumor Association. Invited speaker. May 16, 2018. Los Angeles, CA.
 152. **Chen TC**. NEO214 induced ER stress results in glioma DR5 expression and autoimmunity with TRAIL ligands in malignant gliomas. Asilomar June 26, 2018. Bergen Norwalk.
 153. **Chen TC**. Intra-arterial NEO100 Transiently Opens Up the Blood-Brain Barrier. Western Neurosurgical Society, Kohala Coast, Hawaii. Sept 16, 2018.

154. **Chen TC.** Novel methods for drug delivery to the brain. In optimizing multimodality management of brain and spine tumors 2018. Loews Santa Monica Beach Hotel, Santa Monica, CA. Sept 30, 2018.
155. **Chen TC.** Treatment of malignant gliomas: Why are we not more successful? Palm Desert. JW Marriott. Allied Health CME. Sept 29, 2018.
156. **Chen TC.** Going from benchtop to clinic. Pathology 570 Course. HMR 2nd floor. Sept 29, 2018.
157. **Chen TC.** Course Instructor. Arab Spine 2018. Comprehensive Approach in the Treatment of Spinal Cancer. Dubai, UAE, December 1, 2018.
158. **Chen TC.** Course Instructor. Arab Spine 2018. Sacral tumors. Dubai, UAE, December 1, 2018.
159. **Chen TC.** Course Instructor Arab Spine 2018. Radiotherapy and other modalities, Dubai UAE, December 1, 2018.
160. **Chen TC.** Course Instructor. Arab Spine 2018. Lumbar stenosis: decision making and surgical options. Dubai, UAE, December 3, 2018.
161. **Chen TC.** Invited lecture. Neurosurgical conference. UAE. Spinal cord injury: update in the management. Dubai, UAE, December 4, 2018.
162. **Chen TC.** Invited Lecture. Neurosurgical Conference. UAE. MiR133b is effective in reducing scarring post spinal cord injury. Dubai, UAE, December 4, 2018.
163. **Chen TC.** Invited Lecture. Neurosurgical conference. UAE. An implanted pump for leptomeningeal carcinomatosis. Dubai, UAE, December 5, 2018.
164. **Chen TC.** Invited Lecture. USC Spine Symposium. Surgery vs radiosurgery for metastatic spine cancer. Loew's Hotel, Los Angeles, CA March 9, 2019.
165. **Chen TC.** Invited Lecture. SBMT 2019. Novel methods of delivering biology.
166. **Chen TC.** Invited lecture. USC spine symposium. Surgery versus radiosurgery for Metastatic spine cancer. Loew's Hotel, Los Angeles, CA. March 9, 2019.
167. **Chen TC.** Invited lecture. SBMT 2019. Novel methods of delivering biologicals to the brain. Los Angeles, CA. March 17, 2019.
168. **Chen TC.** Invited lecture. BMT 2019. Intervertebral disc cell needs and challenges. Los Angeles, CA. March 17, 2019.
169. **Chen TC.** USC innovations summit. Novel drug delivery to the brain: the NEO100 Story. Los Angeles, CA. March 27, 2019.
170. **Chen TC,** Wagle N, Peereboom DM, Taylor LP, Simmon V. Intranasal brain delivery. Using NEO100 for recurrent glioblastoma. AACR, Atlanta, GA. Apr 1, 2019.
171. **Chen TC.** Intranasal delivery to the brain: a new method for treating diseases of the brain. Bioinvestors Conference, 10-2019, San Francisco, CA. **172.**
172. **Chen TC.** Bench to clinical trial: development of NEO212 for gliomas and metastatic brain tumors. Brain tumor update & symposium on brain and spine metastases. Las Vegas, NV Nov-3-2019

173. **Chen TC.** Spine controversies: management of degenerative disc disease. California Neurology Society. Anaheim, CA 11-9-2019.
174. **Chen TC.** Cognos Therapeutics: Local Delivery made Smart. New York Oncology Investors. NYC, 11-12-2019.
175. **Chen TC, Wang W, Schonthal A.** Opening the BBB allows Herceptin and Kadcylla treatment of intracranial Her2/neu metastasis to the brain. Cell Symposia. Hallmarks of Cancer. Seattle WA Nov 17-19, 2019.
176. **Chen TC.** Combination of GlioVac and Checkpoint Inhibitors: Scientific Rationale. ERC Scientific Board Meeting. Phoenix AZ Nov 23, 2019.

Chapters

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