Chuanhai Cao, Ph.D.

University of South Florida, **Taneja College of Pharmacy,** Tampa, Florida

Address

12901 Bruce B. Downs Boulevard, MDC 3013, Tampa, FL 33612
Office: 813.396.0742
Cellular: 813.368.0309
Email: ccao@usf.edu

Citizenship USA

Education

Biostatistics and Epidemiology (Public Health) Tianjin Medical University, M.S Tianjin, China	Sept 1990- June 1993
Medical Microbiology and Virology Tianjin Medical University, Ph.D, Tianjin, China	Sept 1993- June 1996

Postgraduate Training

Postdoctoral Fellow Molecular Biology Nankai University, Tianjin, China	1996-1998
Postdoctoral Fellow, Cancer Biology Department of Pathology University of South Florida College of Medicine, Tampa, FL, USA	1998-1999
Postdoctoral Fellow, Immunology Department of Medical Microbiology and Immunology, University of South Florida College of Medicine, Tampa, FL, USA	1999-2002

Awards, Honors, Honorary Society Membership

Certificate (Medical Doctor) Liaoning Health Department Liaoning, China	1988
Outstanding Postdoctoral Presentation University of South Florida College of Medicine Research Day Tampa FL, USA	1999
Outstanding Postdoctoral Presentation University of South Florida College of Medicine Research Day Tampa FL, USA	2000
Platinum Dean's Recognition Award University of South Florida College of Medicine and USF Health Tampa, FL, USA	2010
Outstanding Poster Award University of South Florida College of Medicine Research Day Tampa FL, USA	2010
Excellent Presenter Award American Physician Round Table Conference Tampa, FL, USA	2011
Token of Appreciation for Grant Submission Effort USF Research and Innovation Tampa, FL, USA	2013
Special Professor Award The First Affiliated Hospital of Dalian Medical University Tianjin, China	2013
Token of Appreciation for Grant Proposal Submission USF Research and Innovation Tampa, FL, USA	2013
Special Professor Award Tianjin Infectious Hospital Tianjin, China	2013
Plenary Talk Award International Conference on Complex Medical Engineering Taipei Taiwan	2014
Excellent in Innovation Award	2017

The 9 th NAI USF Chapter Sept 25th 2017 Tampa FL

Outstanding presentation 2018
Florida Education Funds Midyear research and writing conference
Tampa FL

Appointments

Science Research Investigator 2018-date
Department of Veterans Affairs
Tampa, FL, USA

Graduate Program 2017-date
Department of Chemistry
University of South Florida
College of Arts and Sciences,
Tampa, FL, USA

Associate Professor (Tenured) 2016-date
Department of Pharmaceutical Sciences
University of South Florida College of Pharmacy
Tampa, FL, USA

Courtesy Associate Professor 2016-date
Department of Cell Biology, Microbiology, and Molecular Biology
College of Arts & Sciences
Tampa, FL, USA

Courtesy Associate Professor 2016-date
Department of Neurology
University of South Florida College of Medicine,
Tampa, FL, USA

Assistant Professor 2015-2016
Department of Neurology
University of South Florida College of Medicine
Tampa, FL, USA

Courtesy Assistant Professor 2013-2016
Department of Cell Biology, Microbiology, and Molecular Biology
University of South Florida College of Pharmacy
Tampa, FL, USA

Assistant Professor (Tenure Track) 2011-2016
Department of Pharmaceutical Sciences
University of South Florida College of Pharmacy

Tampa, FL, USA

Research Assistant Professor 2008-2011
Department of Molecular Pharmacology and Physiology,
University of South Florida College of Medicine,
Tampa, FL, USA

Research Investigator (Assistant Professor equivalent) 2005-2008
USF Health Byrd Alzheimer's Institute
Tampa, FL, USA

Research Scientist 2002-2005
Department of Medical Microbiology and Immunology
University of South Florida College of Medicine
Tampa, FL, USA

Teaching, Lecture

Pharmacotherapeutics II PHA 6783C (5 Credit)	2011-date
Pharmacotherapeutics III PHA 6784C (5 Credit)	2011-date
Molecular Principles of Drug Action PHA 6577 (4 Credit)	2011-date
PHA 6783C and PHA 6784C (Co-Course Coordinator)	2011-2018
Introduction for Principle of Drug Action PHA 6575 (3 Credit)	2019-date
PHA 6575 (Course Coordinator)	2019-date

Committee for the Dissertation of PhD. Students:

Statistical and Data Mining Methodologies for Behavioral Analysis in Transgenic Mouse Models of Alzheimer's Disease: Parallels with Human AD Evaluation 2009
Author: Ralph E. Leighty

Effects of G-CSF on Monocytes and Neurons: in vitro and in vivo studies in a Mouse 2012

Model of Alzheimer's Disease
Author: Amanda Renee Pennington

The Inflammatory Response Initiated by the Spleen to Ischemic Stroke — 2013
Author: Hilary Seifert

Insights into [aacute]-AA peptides and ã-AA peptides as broad spectrum antimicrobial peptidomimetics and as anti-biofilm agents — 2014
Author: Shruti Padhee

Design and Synthesis of Bioactive Peptidomimetics — 2015
Author: Yaogang Hu

Design, Synthesis and Applications of Polymer Biomaterials — 2015
Author: Frankie Costanza

Gamma AApeptides as Host Defense Peptide Mimics — 2016
Author: Yaqiong Li

Cell permeability studies of AApeptides and novel molecular probes for AD — 2016
Author: Ge Bai

New Reaction Discoveries in Gold Catalysis — 2017
Author: Seyedmorteza Hosseyni

Visiting Scholars and Post-doctoral

2011-2012 Zhe Zhang
Associate Professor
Shandong Chinese Traditional Medical University, Shandong, China

2011-2012 Fang Yuan
Surgeon
301 Hospital of the Chinese Military, Beijing, China

2012-2013 Yan Wang
Associate Professor
Tianjin Huanhu Hospital, Tianjin, China

2012 Yu Fu
Assistant Professor
Tianjin Infectious Hospital, Tianjin, China

2012 Srvadaman Pathak
Visiting Scholar
Sina-American Exchange Program
Dalian Medical University, Dalian, China

2012-2013 Jie Qin
Professor
Tianjin Huanhu Hospital, Tianjin, China

2012-2013 Hui Lu
Assistant Professor
Tianjin Huanhu Hospital, Tianjin, China

2012-2013 Qi Li
Director of Oncology and Professor
Shuguang Hospital of Shanghai Traditional Medical University, Shanghai, China

2012-2013 Yuxia Hao
Associate Professor
Shanxi Provincial Hospital, Shanxi, China

2013-2014 Xiaozhen Zhao
Associate Professor
Nohua Hospital of Shanghai Traditional Medical University, Shanghai, China

2013-2014 Dong Lin
Associate Professor
Fuzhou Chinese Traditional Medical University, Fuzhou, China

2014-2015 Li Chu
Associate Professor
No. 10 Hospital of Shanghai, Shanghai, China

2014-2015 Jiang Chen
Associate Professor
Ningxia Medical University, Ningxia, China

2014-2015 Lifang Zhang
Professor
Ningxia Medical University, Ningxia, China

2015-2016 Jingwen Zhang

Assistant Professor
Dalian Medical University Dalian, China

2015-2019 Yuzhu Hong
Visiting Scholar
Fuzhou Chinese Traditional Medical University, Fuzhou, China

Committee member for Doctoral and Medical Students

2009-2012 Ralph Leighty
Department of Cell Biology, Microbiology, and Molecular Biology
University of South Florida, Tampa, FL, USA

2009-2016 Ge Bai
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2010-2016 Yaqiong Li
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2010-2015 Seong Kim
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2011-2017 Yaogang Hu
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2011-2017 Sheshanka Kesani
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2011-2017 Siqi Sun
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2011-2015 Haifan Wu
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2012-2016 Amanda Row
Department of Neurology
University of South Florida College of Medicine, Tampa, FL, USA

2012-2017 Qiao Qiao
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2012-2018 Padmini Kavuru
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2013-2017 Hilary Seifert
Doctoral Program in Neuroscience
University of South Florida College of Medicine, Tampa, FL, USA

2013-2018 Olapeju Oyesiku
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2014-2017 Seongmin Hong
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

2015- 2018 Frankie Costanza
Doctoral Program in Chemistry
University of South Florida, Tampa, FL, USA

Supervisor for Ph.D students

2017 Ning Shen- date_Doctoral Program in Chemistry
Doctoral Program in Chemistry
University of South Florida College of Pharmacy, Tampa, FL, USA

2018 Haiqiang Yang- date
Doctoral Program in Chemistry
University of South Florida College of Pharmacy, Tampa, FL, USA

2018 Haohan Zhao- date
Doctoral Program in Chemistry
University of South Florida College of Pharmacy, Tampa, FL, USA

Coach for Pharm D Students

2015-2019 Nataliya Bynzar
University of South Florida College of Pharmacy, Tampa, FL, USA

2015-2019 James Powers
University of South Florida College of Pharmacy, Tampa, FL, USA

2015-2019 Erin Kennedy
University of South Florida College of Pharmacy, Tampa, FL, USA

2015-2019 Benjamin Groves
University of South Florida College of Pharmacy, Tampa, FL, USA

2015-2019 Saneeya Islam
University of South Florida College of Pharmacy, Tampa, FL, USA

2015-2019 Lionel Ishikawa
University of South Florida College of Pharmacy, Tampa, FL, USA

2015-2019 Shantel Houston
University of South Florida College of Pharmacy, Tampa, FL, USA

2015-2019 David Bohunicky
University of South Florida College of Pharmacy, Tampa, FL, USA

Master's Students

2002 Sean Yoder
Served as Master's thesis adviser
University of South Florida, Tampa, FL, USA

2002 Susan Nyland
Served as Master's thesis adviser
University of South Florida, Tampa, FL, USA

2004 Nicole McCray
Served as Master's thesis adviser
University of South Florida, Tampa, FL, USA

2010 Alessandra Giannini
Honors Program
University of Miami Medical School, Miami, FL, USA

2011 Eileen Dabrowski
Honors Program
University of South Florida, Tampa, FL, USA

2014-2015 Kyle Sutherland
Biomedical Master's Program
University of South Florida, Tampa, FL, USA

Undergraduate Students

2008-2011 Vignesh Chinnasamy
University of South Florida, Tampa, FL, USA

2008-2011 Christine Dillingham
Wake Forest Medical School, Winston-Salem, NC,USA

2010 Bill Xu
University of Florida Medical School, Gainesville, FL, USA

2011-2012 Jugal Phanchal
University of South Florida College of Pharmacy, Tampa, FL, USA

2011-2012 Neel Narba
University of South Florida, Tampa, FL, USA

2012-2013 Joseph June
Emory University, Atlanta, GA, USA

2012-2014 Jonathan Myal
University of Central Florida Medical School, Orlando, FL, USA

2014-2016 Nikoa Skakavac
University of South Florida, Tampa, FL, USA

2014-2016 Tyler D. Panzer
University of South Florida, Tampa, FL, USA

2014-2016 Stephanie Hernandez
University of South Florida, Tampa, FL, USA

2015-2016 Lawrence Guan
University of South Florida, Tampa, FL, USA

2015-2016 Andrew Tran
University of Illinois at Urbana-Champaign, Champaign, IL, USA

2015-2016 Armando Cabre
University of South Florida, Tampa, FL, USA

2015-2017 Mario Cuzzi
University of South Florida, Tampa, FL, USA

2015-2017 Sahar Takshi
University of South Florida, Tampa, FL, USA

2015-2017 Adryan Perez
University of South Florida, Tampa, FL, USA

2016-2018 Phillip Pham,
University of South Florida, Tampa, FL, USA

2016-2018 Umer Khan,
University of South Florida, Tampa, FL, USA

2017-2018 Adryan Perez
University of South Florida, Tampa, FL, USA

Lectures by Invitation

AD Treatment with Antigen Pulsed Dendritic Cells, NSF Byrd Institute 2006, Florida USA

Change in Plasma Aβ Levels can be an early marker for AD treatment in PS1/APP Alzheimer's Mice models, International Conference Alzheimer's Disease 2006, Florida USA

New vaccine strategies against neurodegenerative diseases, USF Department of Cell Biology, Microbiology and Molecular Biology 2010, Florida USA

How to develop a safe and efficacy vaccine against Alzheimer's disease, USF Department of Pathology 2011, Florida USA

T-Cell Receptor Changes as a Biomarker of Parkinson's Disease, Michael J. Fox Foundation 2012, New York USA

The Therapeutic and prophylactic effects of coffee in Alzheimer's Disease 2012, National Taipei University of Technology, Taipei Taiwan

Alzheimer's disease and immune system, Ningxia Medical University 2014, YinChuan NingXia China

Medical Marijuana, Tianjin Huanhu Hospital 2015, Tianjin China

A Cell therapy targets Aβ and modulates immune system for Alzheimer's Disease 2016, Beijing China

Immunotherapy of Parkinson's disease Tianjin Huanhu Hospital 2016, Tianjin China

A Safe and Efficacy Immunomodulatory Vaccine for Alzheimer's Disease, Jeffrey Vinik Funds 2017, Florida USA

The Impact of Coffee on Alzheimer's Disease, USF College of Pharmacy 2017, Florida USA

A Novel Cell based vaccine against Alzheimer's Disease, Spartan Capital 2017, New York USA

Understand the role of immune balance to AD and its treatment, Tampa Alliance Church 2017, Florida USA

Cannabinoids as a treatment for Alzheimer's Disease USF Department of Chemistry 2017, Florida USA

Medical Marijuana as a treatment for Alzheimer's Disease Department of Neurology Texas A&M 2017, Texas USA

THC as a treatment for Alzheimer's Disease, Baypine Veteran Hospital 2017, Florida USA

Understand the role of Aβ in Alzheimer's disease, Chinese Alzheimer's Association 2018, Beijing China

Understand and Develop a treatment for Alzheimer's Disease Guided by Traditional Chinese Medicine, Jiaotong University 2019, Beijing China

Scholarly Activities (Grant History)

A) Current Grants

Agency: NIH
ID# R01AG056569
Title: Gamma-AA peptides as novel biomaterials inhibiting Abeta peptide aggregation
P.I: Jianfeng Cai, Ph.D
Role on project: Multiple P.I
Percent Effort: 15%
Direct costs per year: $250,000
Total costs for project period: $1,800,000
Project period: July 2017–June 2022

Agency: NIH
I.D# 9R01AI152416-06
Title: Alpha-AA Peptides as a Novel Class of Antimicrobial Biomaterials
P.I.: Jianfeng Cai, Ph.D

Role on Project: Co-Investigator
Percent Effort: 8%
Direct costs per year: $300,000
Total costs for project period: $ 1,868,750
Project period: May 2020– April 2025

Agency: MageNano Biotech Inc. (Florida High Tech Matching Fund)
I.D# No ID
Title: ***Immature peptide sensitized DC vaccine for prostate cancer***
P.I.: Chuanhai Cao, Ph.D.
Percent Effort: 6%
Direct costs per year: $20,000
Total costs for project period: $9500
Project period: Oct 2020-Sept. 2021

B) Past Grants

Agency: NIH
I.D# 1R01GM112652-01A1
Title: Alpha-AA Peptides as a Novel Class of Antimicrobial Biomaterials
P.I.: Jianfeng Cai, Ph.D
Role on Project: Co-investigator
Percent Effort: 8%
Direct costs per year: $200,000
Total costs for project period: $1,500,000
Project period: May 2015-April 2020

Agency: NIH
I.D# R01AG051500
Title: Influence of systemic immune inflammation upon the tauopathy phenotype in a mouse model of tauopathy
P.I.: David Morgan, Ph.D
Role on Project: Co-investigator
Percent Effort: 5%
Direct costs per year: $200,000
Total costs for project period: $1,500,000
Project period: May 2015-April 2020

Agency: NIH SBIR
ID# 1R43NS090653-01A1
Title: Disaggregation of Toxic Protein Oligomers in Brain with Electromagnetic Treatment
P.I.: Gary Arendash, Ph.D

Role on Project: Co-I
Percent Effort: 12%
Direct costs per year: $225,000
Total costs for project period: $225,000
Project period: Nov 2017-Oct 2018

Agency: NeuroEM Inc.
I.D# No ID number
Title: Cell phone Signal treatment for AD (clinical trial)
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 5%
Total costs for project period: $75,000
Project period: Feb 2018-Jan 2019

Agency: Rhodes Pharmaceuticals L.P.
I.D# No ID number
Title: The Role of THC in AD, and nasal formulation for AD treatment
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 5%
Direct costs per year: $120,000
Total costs for project period: $323,528
Project period: Dec 2015- Jan 2018

Agency: Insys Therapeutics Inc.
I.D# No ID Number
Title: The therapeutic efficacy of orally delivered THC in an Alzheimer's mouse model
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 20%
Direct costs per year: $100,000
Total costs for project period: $308,090
Project period: 2015-April 2017

Agency: USF Health Intramural Zika Grant
I.D# No ID Number
Title: Develop a novel vaccine against Zika virus
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 5%
Total costs for project period: $40,000
Project period: July 2017-June 2018

Agency: Coins for Alzheimer's Research Trust Fund
I.D# No ID Number

Title: Oligomeric Aβ nanoparticle sensitized dendritic cells as therapeutic
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 5%
Total costs for project period: $50,000
Project period: Oct 2014-Sept 2015

Agency: Blume Family Donation
I.D# No ID Number
Title: Granulocyte colony stimulating factor (GCSF) therapy in patients with amyotrophic lateral sclerosis (ALS)
P.I.: Vu Tuan, M.D.
Role on Project: subcontract PI
Percent Effort: 5%
Total costs for project period: $200,000
Project period: Sept 2012- Aug 2015

Agency: Florida Consortium for AF - Suncoast Gerontology
I.D# No ID Number
Title: Florida Consortium for African-American Alzheimer's Disease Studies
P.I.: Nilufer Ertekin-Taner MD Ph.D
Role on Project: Co-I
Percent Effort: 5%
Total costs for project period: **$**500,000
Project period: Feb 2017-Jan 2019

Agency: USF Health/Byrd Institute Internal Grant
I.D# No ID Number
Title: Generating monoclonal antibody against Tau
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 5%
Total costs for project period: $25,000
Project period: July 2014-June 2015

Agency: Florida Alzheimer's Disease Research Center
I.D# No ID Number
Title: Function of chlamydia Infection in Alzheimer's disease
P.I.: Herman Fredman, Ph.D
Role on Project: Co-I
Percent Effort: 5%
Total costs for project period: $80,000
Project period: July 2006-June 2007

Agency: Parkinson Research Foundation

I.D# No ID Number
Title: Immunotherapy in Parkinson Disease
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 10%
Total costs for project period: $50,000
Project period: Oct 2008-Sept 2009

Agency: BiTT Center at University of South Florida
I.D# No ID Number
Title: Metabolomics and mitochondrial proteomics of Alzheimer's mice
P.I.: Patrick Bradshaw Ph.D
Role on Project: Co-I
Percent Effort: 5%
Total costs for project period: $50,000
Project period: July 2009-June2010

Agency: The Michael J. Fox Foundation for Parkinson's Research
I.D# No ID Number
Title: T-cell receptor changes as a biomarker of Parkinson's disease
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 20%
Total costs for project period: $225,000
Project period: July 2009-June 2012

Agency: Alzheimer's Drug Discovery Foundation
I.D# No ID Number
Title: Granulocyte-colony stimulating factor (GCSF) clinical study for Alzheimer's disease
P.I.: Sanchez-Ramos, MD Ph.D
Role on Project: Co-I
Percent Effort: 5%
Total costs for project period: $300,000
Project period: Sept 2009-Aug 2012

Agency: University of South Florida Women's Health Program
I.D# No ID Number
Title: Gender-linked stem cell alterations in stroke are magnified in postpartum depression: A target for neurorehabilitation.
P.I.: Winderbaum Fernandez, Ph.D
Role on Project: Co-I
Percent Effort: 5%
Total costs for project period: $11,200

Project period: July 2013-June 2014

Agency: Veteran's Affairs Merit Grant
I.D# No ID Number
Title: Mechanisms of Action of Filgrastim in a Mouse Model of AD
P.I.: Sanchez-Ramos, MD Ph.D
Role on Project: Co-I
Percent Effort: 10%
Total costs for project period: $750,000
Project period: Sept 2009-Aug 2014

Pending grants:

Agency: NIH
I.D# No ID Number
Title: Phase II: Disaggregation of Toxic Protein Oligomers in Brain with Electromagnetic Treatment
P.I.: Gary Arendash, Ph.D
Role on Project: Co-PI
Percent Effort: 10%
Total costs for project period: $2,000,000
Project period: 09/01/2020-08/31/2022
(Impact Score:31)

Agency: NIH
I.D# R01AG066716
Title: An Immunomodulatory Vaccine Against Aggregated Aβ for Alzheimer Disease
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 20%
Total costs for project period: $3,284,308
Project period: 9/01/2020-08/31/2025
(Impact Score: 59)

Agency: NIH
I.D# R01AG070057
Title: Innovative Nasal Spray of THC-CBD Micelles as A Combinational Therapy for Alzheimer Disease
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 20%
Total costs for project period: $3,400,172
Project period: 09/01/2020-08/31/2025

Agency: NIH
I.D# R01AG071302
Title: Novel peptide mimetics as potential AD therapeutics
P.I.: Jianfeng Cai, Ph.D
Role on Project: Multiple PI
Percent Effort: 15%
Total costs for project period: $1,875,000
Project period: 09/01/2020-08/31/2025

Grants Submitted Since 2016 (Not Awarded)

Agency: NIH
I.D# 1R01AG062598-01
Title: Polymer/Abeta nanomaterials for the intervention of AD
P.I.: Jianfeng Cai Ph.D
Role on Project: COI
Percent Effort: 10%
Total costs for project period:$1,868,750.00
Project period: 05/01/2019 - 04/30/2024

Agency: NIH
I.D# R01AG059315
Title: Combinational effects of intranasal delivery of THC and CBD in fighting Alzheimer's Disease
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 10%
Total costs for project period:$3,241,838.00
Project period: 04/01/2018 - 03/31/2023

Agency: NIH
I.D# R21AG053770
Title: Validate a Therapeutic Vaccine Against Alzheimer’s Disease on APP/PS1 mouse model
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 20%
Total costs for project period:$411,125.00
Project period: 07/01/2016-06/30/2018

Agency: NIH

I.D# R21AI137901
Title: Developing a peptide sensitized dendritic cells as a novel vaccine against the Zika virus
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 20%
Total costs for project period:$411,125.00
Project period: 04/01/2018-03/31/2020

Agency: NIH
I.D# R01AG054172
Title: Association between Immunosenescence and Neurological Function in Alzheimer's disease
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 20%
Total costs for project period: $2,588,783.00
Project period: 07/01/2016 - 06/30/2021

Agency: NIH
I.D# R01NS100107
Title: Antigen-specific Exosomes derived from Dendritic Cells as Therapeutics for Parkinson's disease
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 25%
Total costs for project period: $1,000,000.00
Project period: 12/01/2016-11/30/2021

Agency: NIH
I.D# R01AG054172
Title: Association between Immunosenescence and Neurological Function in Alzheimer's disease
P.I.: Chuanhai Cao, Ph.D
Percent Effort: 25%
Total costs for project period:$2,588,783.00
Project period: 07/01/2016-06/30/2021

Publication Bibliography:

1. Viveros, M., Dickey, C., Cotropia, J.P., Gevorkian, G., Larralde, C., Broliden, K., Levi, M., Burgess, A., **Cao, C.,** Weiner, D.B., Agadjanyan, M.G., Ugen, K.E., 2000. Characterization of a novel human immunodeficiency virus type 1 neutralizable epitope within the immunodominant region of gp41. Virology 270, 135–145.

2. Yoder, S., ***Cao, C.,*** Ugen, K.E., Dao, M.L., 2000. High-level expression of a truncated wall-associated protein A from the dental cariogenic Streptococcus mutans. DNA Cell Biol. 19, 401–408.

3. Dickey, C.A., Morgan, D.G., Kudchodkar, S., Weiner, D.B., Bai, Y., **Cao, C.,** Gordon, M.N., Ugen, K.E., 2001. Duration and specificity of humoral immune responses in mice vaccinated with the Alzheimer's disease-associated beta-amyloid 1-42 peptide. DNA Cell Biol. 20, 723–729.

4. Han, T.K., Yoder, S., **Cao, C.,** Ugen, K.E., Dao, M.L., 2001. Expression of Streptococcus mutans wall-associated protein A gene in Chinese hamster ovary cells: prospect for a dental caries DNA vaccine. DNA Cell Biol. 20, 595–601.

5. Gómez-Román, V.R., **Cao, C.**, Bai, Y., Santamaría, H., Acero, G., Manoutcharian, K., Weiner, D.B., Ugen, K.E., Gevorkian, G., 2002. Phage-displayed mimotopes recognizing a biologically active anti-HIV-1 gp120 murine monoclonal antibody. J. Acquir. Immune Defic. Syndr. 31, 147–153.

6. Manoutcharian, K., Acero, G., Munguia, M.E., Montero, J.A., Govezensky, T., **Cao, C.,** Ugen, K., Gevorkian, G., 2003. Amyloid-beta peptide-specific single chain Fv antibodies isolated from an immune phage display library. J. Neuroimmunol. 145, 12–17.

7. Nyland, S.B., ***Cao, C.,*** Bai, Y., Loughran, T.P., Ugen, K.E., 2003. Modulation of infection and type 1 cytokine expression parameters by morphine during in vitro coinfection with human T-cell leukemia virus type I and HIV-1. J. Acquir. Immune Defic. Syndr. 32, 406–416.

8. ***Cao, C.,*** Bai, Y., Holloway, M.J., Edgeworth, R.L., Jackson, E.A., Cotropia, J., Ugen, K.E., 2004. Characterization of a novel human anti-HIV-1 gp41 IgM monoclonal antibody designated clone 37. DNA Cell Biol. 23, 836–841.

9. Ferrantelli, F., Kitabwalla, M., Rasmussen, R.A., **Cao, C.**, Chou, T.-C., Katinger, H., Stiegler, G., Cavacini, L.A., Bai, Y., Cotropia, J., Ugen, K.E., Ruprecht, R.M., 2004. Potent cross-group neutralization of primary human immunodeficiency virus isolates with monoclonal antibodies--implications for acquired immunodeficiency syndrome vaccine. J. Infect. Dis. 189, 71–74.

10. Li, Q., ***Cao, C.***, Chackerian, B., Schiller, J., Gordon, M., Ugen, K.E., Morgan, D., 2004. Overcoming antigen masking of anti-amyloid beta antibodies reveals breaking of B cell tolerance by virus-like particles in amyloid beta immunized amyloid precursor protein transgenic mice. BMC Neurosci. 5, 21.

11. Manoutcharian, K., Acero, G., Munguia, M.E., Becerril, B., Massieu, L., Govezensky, T., Ortiz, E., Marks, J.D., **Cao, C.,** Ugen, K., Gevorkian, G., 2004. Human single

chain Fv antibodies and a complementarity determining region-derived peptide binding to amyloid-beta 1-42. Neurobiol. Dis. 17, 114–121.

12. Mccray, A; **Cao, C**; Muthumani, K; Weiner D, Ugen K; Richard Heller Regression of Established Melanoma Tumors through Intratumoral Delivery of HIV-1 Vpr Using In Vivo Electroporation Molecular Therapy, 2004, Vol.9(S1), p.S363

13. Ethell, D.W., Shippy, D., **Cao, C.,** Cracchiolo, J.R., Runfeldt, M., Blake, B., Arendash, G.W., 2006. Abeta-specific T-cells reverse cognitive decline and synaptic loss in Alzheimer's mice. Neurobiol. Dis. 23, 351–361.

14. Gregson, B.P., Millie, D.F., **Cao, C.,** Fahnenstiel, G.L., Pigg, R.J., Fries, D.P., 2006. Simplified enrichment and identification of environmental peptide toxins using antibody-capture surfaces with subsequent mass spectrometry detection. J. Chromatogr. A 1123, 233–238.

15. Kutzler, M.A., ***Cao, C.***, Bai, Y., Dong, H., Choe, P.Y., Saulino, V., McLaughlin, L., Whelan, A., Choo, A.Y., Weiner, D.B., Ugen, K.E., 2006. Mapping of immune responses following wild-type and mutant ABeta42 plasmid or peptide vaccination in different mouse haplotypes and HLA Class II transgenic mice. Vaccine 24, 4630–4639.

16. Bao, J., **Cao, C.**, Zhang, X., Jiang, F., Nicosia, S.V., Bai, W., 2007. Suppression of beta-amyloid precursor protein signaling into the nucleus by estrogens mediated through complex formation between the estrogen receptor and Fe65. Mol. Cell. Biol. 27, 1321–1333.

17. Li, Q., Gordon, M., **Cao, C.,** Ugen, K.E., Morgan, D., 2007. Improvement of a low pH antigen-antibody dissociation procedure for ELISA measurement of circulating anti-Abeta antibodies. BMC Neurosci. 8, 22.

18. Lee, H., Kim, D., Dan, H.C., Wu, E.L., Gritsko, T.M., **Cao, C.**, Nicosia, S.V., Golemis, E.A., Liu, W., Coppola, D., Brem, S.S., Testa, J.R., Cheng, J.Q., 2007. Identification and characterization of putative tumor suppressor NGB, a GTP-binding protein that interacts with the neurofibromatosis 2 protein. Mol. Cell. Biol. 27, 2103–2119.

19. **Cao, C.**, Lin, X., Wahi, M.M., Jackson, E.A., Potter, H., 2008a. Successful adjuvant-free vaccination of BALB/c mice with mutated amyloid beta peptides. BMC Neurosci. 9, 25.

20. **Cao, C.**, Lin, X., Zhang, C., Wahi, M.M., Wefes, I., Arendash, G., Potter, H., 2008b. Mutant amyloid-beta-sensitized dendritic cells as Alzheimer's disease vaccine. J. Neuroimmunol. 200, 1–10.

21. Sanchez-Ramos, J., Song, S., **Cao, C**., Arendash, G., 2008. The potential of

hematopoietic growth factors for treatment of Alzheimer's disease: a mini-review. BMC Neurosci. 9 Suppl 2, S3.

22. Arendash, G.W., Mori, T., **Cao, C.**, Mamcarz, M., Runfeldt, M., Dickson, A., Rezai-Zadeh, K., Tane, J., Citron, B.A., Lin, X., Echeverria, V., Potter, H., 2009. Caffeine reverses cognitive impairment and decreases brain amyloid-beta levels in aged Alzheimer's disease mice. J. Alzheimers Dis. 17, 661–680.

23. ***Cao, C.***, Arendash, G.W., Dickson, A., Mamcarz, M.B., Lin, X., Ethell, D.W., 2009a. Abeta-specific Th2 cells provide cognitive and pathological benefits to Alzheimer's mice without infiltrating the CNS. Neurobiol. Dis. 34, 63–70.

24. ***Cao, C.,*** Cirrito, J.R., Lin, X., Wang, L., Verges, D.K., Dickson, A., Mamcarz, M., Zhang, C., Mori, T., Arendash, G.W., Holtzman, D.M., Potter, H., 2009b. Caffeine suppresses β-amyloid levels in plasma and the brain of Alzheimer's transgenic mice. J. Alzheimers Dis. 17, 681–697.

25. Echeverria, V., Burgess, S., Gamble-George, J., Zeitlin, R., Lin, X., **Cao, C.**, Arendash, G.W., 2009. Sorafenib inhibits nuclear factor kappa B, decreases inducible nitric oxide synthase and cyclooxygenase-2 expression, and restores working memory in APPswe mice. Neuroscience 162, 1220–1231.

26. Olcese, J.M., ***Cao, C***., Mori, T., Mamcarz, M.B., Maxwell, A., Runfeldt, M.J., Wang, L., Zhang, C., Lin, X., Zhang, G., Arendash, G.W., 2009. Protection against cognitive deficits and markers of neurodegeneration by long-term oral administration of melatonin in a transgenic model of Alzheimer disease. J. Pineal Res. 47, 82–96.

27. Sanchez-Ramos, J., Song, S., Sava, V., Catlow, B., Lin, X., Mori, T., **Cao, C.,** Arendash, G.W., 2009. Granulocyte colony stimulating factor decreases brain amyloid burden and reverses cognitive impairment in Alzheimer's mice. Neuroscience 163, 55–72.

28. Arendash, G.W., **Cao, C.**, 2010. Caffeine and coffee as therapeutics against Alzheimer's disease. J. Alzheimers Dis. 20 Suppl 1, S117–126.

29. Arendash, G.W., Sanchez-Ramos, J., Mori, T., Mamcarz, M., Lin, X., Runfeldt, M., Wang, L., Zhang, G., Sava, V., Tan, J., **Cao, C**., 2010. Electromagnetic field treatment protects against and reverses cognitive impairment in Alzheimer's disease mice. J. Alzheimers Dis. 19, 191–210.

30. **Cao, C.**, Wang, L., Lin, X., Mamcarz, M., Zhang, C., Bai, G., Nong, J., Sussman, S., Arendash, G., 2011. Caffeine synergizes with another coffee component to increase plasma GCSF: linkage to cognitive benefits in Alzheimer's mice. J. Alzheimers Dis. 25, 323–335.

31. Dragicevic, N., Bradshaw, P.C., Mamcarz, M., Lin, X., Wang, L., **Cao, C**., Arendash, G.W., 2011. Long-term electromagnetic field treatment enhances brain mitochondrial function of both Alzheimer's transgenic mice and normal mice: a mechanism for electromagnetic field-induced cognitive benefit. Neuroscience 185, 135–149.

32. Dragicevic, N., Copes, N., O'Neal-Moffitt, G., Jin, J., Buzzeo, R., Mamcarz, M., Tan, J., **Cao, C.,** Olcese, J.M., Arendash, G.W., Bradshaw, P.C., 2011a. Melatonin treatment restores mitochondrial function in Alzheimer's mice: a mitochondrial protective role of melatonin membrane receptor signaling. J. Pineal Res. 51, 75–86.

33. Dragicevic, N., Smith, A., Lin, X., Yuan, F., Copes, N., Delic, V., Tan, J., **Cao, C.,** Shytle, R.D., Bradshaw, P.C., 2011b. Green tea epigallocatechin-3-gallate (EGCG) and other flavonoids reduce Alzheimer's amyloid-induced mitochondrial dysfunction. J. Alzheimers Dis. 26, 507–521.

34. Niu, Y., Padhee, S., Wu, H., Bai, G., Harrington, L., Burda, W.N., Shaw, L.N., **Cao, C.**, Cai, J., 2011. Identification of γ-AApeptides with potent and broad-spectrum antimicrobial activity. Chem. Commun. 47, 12197–12199.

35. Padhee, S., Hu, Y., Niu, Y., Bai, G., Wu, H., Costanza, F., West, L., Harrington, L., Shaw, L.N., **Cao, C.,** Cai, J., 2011. Non-hemolytic α-AApeptides as antimicrobial peptidomimetics. Chem. Commun. 47, 9729–9731.

36. Song, S., Sava, V., Rowe, A., Li, K., **Cao, C**., Mori, T., Sanchez-Ramos, J., 2011. Granulocyte-colony stimulating factor (G-CSF) enhances recovery in mouse model of Parkinson's disease. Neurosci. Lett. 487, 153–157.

37. Bai, G., Padhee, S., Niu, Y., Wang, R.E., Qiao, Q., Buzzeo, R., **Cao, C**., Cai, J., 2012. Cellular uptake of an α-AApeptide. Org. Biomol. Chem. 10, 1149–1153.

38. **Cao, C.**, Loewenstein, D.A., Lin, X., Zhang, C., Wang, L., Duara, R., Wu, Y., Giannini, A., Bai, G., Cai, J., Greig, M., Schofield, E., Ashok, R., Small, B., Potter, H., Arendash, G.W., 2012. High blood caffeine levels in MCI linked to lack of progression to dementia. J. Alzheimers Dis. 30, 559–572.

39. Chen, X.-W., Sneed, K.B., Pan, S.-Y., **Cao, C**., Kanwar, J.R., Chew, H., Zhou, S.-F., 2012. Herb-drug interactions and mechanistic and clinical considerations. Curr. Drug Metab. 13, 640–651.

40. Dragicevic, N., Delic, V., **Cao, C**., Copes, N., Lin, X., Mamcarz, M., Wang, L., Arendash, G.W., Bradshaw, P.C., 2012. Caffeine increases mitochondrial function and blocks melatonin signaling to mitochondria in Alzheimer's mice and cells. Neuropharmacology 63, 1368–1379.

41. Hu, Y., Amin, M.N., Padhee, S., Wang, R.E., Qiao, Q., Bai, G., Li, Y., Mathew, A.,

Cao, C., Cai, J., 2012. Lipidated peptidomimetics with improved antimicrobial activity. ACS Med. Chem. Lett. 3, 683–686.

42. Luo, Z., Li, J., Nabar, N.R., Lin, X., Bai, G., Cai, J., Zhou, S.-F., **Cao, C**., Wang, J., 2012. Efficacy of a therapeutic vaccine using mutated β-amyloid sensitized dendritic cells in Alzheimer's mice. J. Neuroimmune Pharmacol. 7, 640–655.

43. Nabar, N.R., Yuan, F., Lin, X., Wang, L., Bai, G., Mayl, J., Li, Y., Zhou, S.-F., Wang, J., Cai, J., **Cao, C**., 2012. Cell therapy: a safe and efficacious therapeutic treatment for Alzheimer's disease in APP+PS1 mice. PloS One 7, e49468.

44. Niu, Y., Bai, G., Wu, H., Wang, R.E., Qiao, Q., Padhee, S., Buzzeo, R., **Cao, C**., Cai, J., 2012a. Cellular translocation of a γ-AApeptide mimetic of Tat peptide. Mol. Pharm. 9, 1529–1534.

45. Niu, Y., Padhee, S., Wu, H., Bai, G., Qiao, Q., Hu, Y., Harrington, L., Burda, W.N., Shaw, L.N., **Cao, C**., Cai, J., 2012b. Lipo-γ-AApeptides as a new class of potent and broad-spectrum antimicrobial agents. J. Med. Chem. 55, 4003–4009.

46. Sanchez-Ramos, J., Cimino, C., Avila, R., Rowe, A., Chen, R., Whelan, G., Lin, X., **Cao, C**., Ashok, R., 2012. Pilot study of granulocyte-colony stimulating factor for treatment of Alzheimer's disease. J. Alzheimers Dis. 31, 843–855.

47. Wu, H., Niu, Y., Padhee, S., Wang, R.E., Li, Y., Qiao, Q., Bai, G., **Cao, C**., Cai, J., 2012. Design and synthesis of unprecedented cyclic γ-AApeptides for antimicrobial development. Chem. Sci. 3, 2570–2575.

48. Li, Y., Wu, H., Niu, Y., Hu, Y., Li, Q., **Cao, C**., Cai, J., 2013. Development of RNA aptamer-based therapeutic agents. Curr. Med. Chem. 20, 3655–3663.

49. Niu, Y., Wu, H., Li, Y., Hu, Y., Padhee, S., Li, Q., **Cao, C**., Cai, J., 2013. AApeptides as a new class of antimicrobial agents. Org. Biomol. Chem. 11, 4283–4290.

50. Selenica, M.-L.B., Alvarez, J.A., Nash, K.R., Lee, D.C., **Cao, C**., Lin, X., Reid, P., Mouton, P.R., Morgan, D., Gordon, M.N., 2013. Diverse activation of microglia by chemokine (C-C motif) ligand 2 overexpression in the brain. J. Neuroinflammation 10, 86.

51. Song, S., **Cao, C.**, Lin, X., Li, K., Sava, V., Sanchez-Ramos, J., 2013. Hippocampal neurogenesis and the brain repair response to brief stereotaxic insertion of a microneedle. Stem Cells Int. 2013, 205878.

52. ***Cao, C***., Li, Y., Liu, H., Bai, G., Mayl, J., Lin, X., Sutherland, K., Nabar, N., Cai, J., 2014. The potential therapeutic effects of THC on Alzheimer's disease. J. Alzheimers Dis. JAD 42, 973–984.

53. Lin, X., Bai, G., Lin, L., Wu, H., Cai, J., Ugen, K.E., **Cao, C**., 2014. Vaccination induced changes in pro-inflammatory cytokine levels as an early putative biomarker for cognitive improvement in a transgenic mouse model for Alzheimer disease. Hum. Vaccines Immunother. 10, 2024–2031.

54. Padhee, S., Smith, C., Wu, H., Li, Y., Manoj, N., Qiao, Q., Khan, Z., **Cao, C.**, Yin, H., Cai, J., 2014. The development of antimicrobial α-AApeptides that suppress pro-inflammatory immune responses. Chembiochem 15, 688–694.

55. Costanza, F., Padhee, S., Wu, H., Wang, Y., Revenis, J., **Cao, C**., Li, Q., Cai, J., 2014. Investigation of antimicrobial PEG-poly (amino acid)s. RSC Adv. 4, 2089–2095.

56. Lin, D., De La Pena, I., Lin, L., Zhou, S.-F., Borlongan, C.V., **Cao, C**., 2014. The neuroprotective role of acupuncture and activation of the BDNF signaling pathway. Int. J. Mol. Sci. 15, 3234–3252.

57. Wu, H., Li, Y., Bai, G., Niu, Y., Qiao, Q., Tipton, J.D., **Cao, C**., Cai, J., 2014. γ-AApeptide-based small-molecule ligands that inhibit Aβ aggregation. Chem. Commun. 50, 5206–5208.

58. Cheng, J., Zhou, Z.-W., Sheng, H.-P., He, L.-J., Fan, X.-W., He, Z.-X., Sun, T., Zhang, X., Zhao, R.J., Gu, L., **Cao, C.**, Zhou, S.-F., 2015. An evidence-based update on the pharmacological activities and possible molecular targets of Lycium barbarum polysaccharides. Drug Des. Devel. Ther. 9, 33–78.

59. Li, Y; Smith, C; Wu, H; Teng, P; Shi, Y; Padhee, S; Jones, T; Nguyen, A; **Cao, C**; Yin, H; Cai, J. Short Antimicrobial Lipo-α/γ-AA Hybrid Peptides 2014 ChemBioChem, 13 October 2014, Vol.15(15), pp.2275-2280

61. Ugen, K.E., Lin, X., Bai, G., Liang, Z., Cai, J., Li, K., Song, S., **Cao, C**., Sanchez-Ramos, J., 2015. Evaluation of an α synuclein sensitized dendritic cell based vaccine in a transgenic mouse model of Parkinson disease. Hum. Vaccines Immunother. 11, 922–930.

62. Shahaduzzaman, M., Nash, K., Hudson, C., Sharif, M., Grimmig, B., Lin, X., Bai, G., Liu, H., Ugen, K.E., **Cao, C.**, Bickford, P.C., 2015. Anti-human α-synuclein N-terminal peptide antibody protects against dopaminergic cell death and ameliorates behavioral deficits in an AAV-α-synuclein rat model of Parkinson's disease. PLoS ONE 10.

63. Chu, L., Zhao, H., Fang, J., Li, C., Liu, Z., Cui, R., Hu, F., Zhang, X., Chen, Y., Han, H., **Cao, C.**, Xu, Q., 2015. The traditional Chinese medicinal formula BDL301

suppresses tumor growth by inhibiting STAT3 pathway and inducing apoptosis in colorectal cancer cells. DNA Cell Biol. 34, 178–188.

64. Lin, D., Lin, L., Sutherland, K., **Cao, C**. 2015. Manual acupuncture at the SJ5 (Waiguan) acupoint shows neuroprotective effects by regulating expression of the anti-apoptotic gene Bcl-2. Neural Regeneration Research, 10(0).

65. Hao, Y., Bai, G., Wang, J., Zhao, L., Sutherland, K., Cai, J., **Cao, C**., 2015. Identifiable biomarker and treatment development using HIV-1 long term non-progressor sera. BMC Immunol. 16.

66. Li, Y., Wu, H., Teng, P., Bai, G., Lin, X., Zuo, X., **Cao, C**., Cai, J., 2015. Helical antimicrobial sulfono-γ-AApeptides. J. Med. Chem. 58, 4802–4811.

67. Lin, D., Wu, Q., Lin, X., Borlongan, C.V., He, Z.-X., Tan, J., **Cao, C**., Zhou, S.-F., Brain-derived neurotrophic factor (BDNF) signaling pathway modulation by acupuncture in telomerase knockout mice. Altern. Ther. Health Med. 2015 Nov;21(6):36-46.

68. Cheng, J., Lin, X., Morgan, D., Gordon, M., Chen, X., Yang, X., Wang, Z., Li, H.-N., Zhou, S.-F., **Cao, C.,** The differential responses of dendritic and langerhans cells to Aβ peptides stimulation and their implication in Alzheimer's Disease immunotherapy. Oncotarget. 2015 Nov 3;6(34):35443-35457.

69. Citron BA, Saykally JN, **Cao C**, Dennis JS, Runfeldt M, Arendash GW. Transcription factor Sp1 inhibition, memory, and cytokines in a mouse model of Alzheimer's disease. Am J Neurodegener Dis. 2015 Dec 28;4(2):40-8.

70. Tran A, Zhang CY, Cao C. Current and future therapies for Parkinson's disease. J of Alz Dis and Parkinsonism. 2015.

71. Perez A, Li T, Hernandez S, Zhang RY, and **Cao C**. The Rationale of using Coffee and Melatonin as Alternative Treatment for Alzheimer's disease. J of Alz Dis and Parkinsonism. Jan 2016, 6:205.

72. Perez A, Guan L, Sutherland K, and **Cao C**. Immune system and Parkinson's disease. Arch Med. Jan 2016, 8:2.

73. Lin X, Bai G, Sutherland K, Costanza F, Breitenkamp K, Sill K, Cai J, **Cao C**. Polymer-Encapsulated Aβ Peptide Fragments as an Oligomeric-Specific Vaccine for Alzheimer's disease. J. Biomed. Nanotechnol., 2016 Jul 12(7), 1421-1430.

74. Song S, Kong X, Sava V, **Cao C**, Acosta S, Borlongan C, Sanchez-Ramos J. Transient Microneedle Insertion into Hippocampus Triggers Neurogenesis and Decreases Amyloid Burden

in a Mouse Model of Alzheimer's Disease Cell Transplantation, Volume 25, Number 10, 2016, pp. 1853-1861(9)

75. Lin, L; Skakavac, N; Lin, X; Lin, D; Borlongan, M; Borlongan, C; **Cao, C**. Acupuncture-Induced Analgesia: The Role of Microglial Inhibition Cell Transplantation, April 2016, Vol.25(4), pp.621-628

76. Grewal R, Haghighi M, Huang S, Smith AG, **Cao C**, Lin X, Lee DC, Teten N, Hill AM, Selenica MB Identifying biomarkers of dementia prevalent among amnestic mild cognitively impaired ethnic female patients Alzheimers Res Ther. 2016 Oct 18;8(1):43.

77. Khan U and **Cao C,.** Coffee Consumption Provides Therapeutic Benefits against AD through Increasing Plasma G-CSF Levels and Improving Cognitive Performance J Clin Neurol Neurosurg. 2018 Vol1:103

78. Shen N, Song G, Yang H, Lin X, Brown B, Hong Y, Cai J, **Cao C**. Identifying the Pathological Domain of Alpha- Synuclein as a Therapeutic for Parkinson's Disease Int J Mol Sci. 2019 May 11;20(9). pii: E2338.

79. ***Cao C*** and Brown B,. Understanding chinese medicine and western medicine to reach the maximum treatment benefit J Transl Sci, 2019.

80. Ratliff WA, Saykally JN, Mervis RF, Lin X, **Cao C**, Citron BA. Behavior, protein, and dendritic changes after model traumatic brain injury and treatment with nanocoffee particles BMC Neurosci. 2019 Aug 22;20(1):44.

81. Arendash G, **Cao C**, Abulaban H, Baranowski R, Wisniewski G, Becerra L, Andel R, Lin X, Zhang X, Wittwer D, Moulton J, Arrington J, Smith A. A Clinical Trial of Transcranial Electromagnetic Treatment in Alzheimer's Disease: Cognitive Enhancement and Associated Changes in Cerebrospinal Fluid, Blood, and Brain Imaging J Alzheimers Dis. 2019 Aug 6.

82. Su, M., Wang, M., Hong, Y., Nimmagadda, A., Shen, N., Shi, Y., Gao, R., Zhang, E. **Cao, C**., Cai, J. 2019. Polymyxin derivatives as broad-spectrum antibiotic agents. Chemical Communications, 55(87), 13104-13107.

83. Wang M, Gao R, Sang P, Zheng M, Shi Y, Xu H, **Cao C,** and Cai J,. Dimeric γ-AApeptides with Potent and Selective Antibacterial Activity Front. Chem. 2020|

84. Pocock K, Suresh N, Suradi Y, Dang S, Harvey B, **Cao C**, Sutherland K, Lin X, Vu TH, Gooch C. An Open-Label, Prospective Study Evaluating the Clinical and Immunological Effects of Higher Dose Granulocyte Colony-Stimulating Factor in ALS J Clin Neuromuscul Dis. 2020 Mar;21(3):127-134.

85. Shen N, and **Cao C.**. The comments to "The clinical trial of

EMF---the impact to cognition, CSF, blood and brain imagine" Chinese Journal of Alzheimer's Disease and Related Disorders 2020 Jan 3 (1):46-47

86. ***Cao C***. The comments to "Prevent AD through effective control to stroke"—Berlin Manistifo Chinese Journal of Alzheimer's Disease and Related Disorders 2020 Jan Vol 3 (1);3

87. Song G, Yang H, Pham P, Brown B, Lin X, Hong Y, Sinu P, Cai J, Li X, Leon M, Gordon M, Morgan D, Zhang S, and **Cao C.** An Immunomodulatory Therapeutic Vaccine Targeting Oligomeric Amyloid Beta. J Alzheimers Dis. 2020. PMID: 32925044.

88. Chen Y, Yang JL, Xue ZZ, Cai QC, Hou C, Li HJ, Zhao LX, Zhang Y, Gao CW, Cong L, Wang TZ, Chen DM, LuoSQ, Yao Q, Zhu QS, **Cao C** Effects and mechanism of microRNA-218 against lung cancer Molecular Medicine Reports 2020 https://doi.org/10.3892/mmr.2020.11666

89. Shi-Yi Qi , Dong Lin , Li-Li Lin, Xiao-Zhen Huang , Shen Lin , Yun-Ying Yu,Chuan-Hai Cao ,and Zhi-Xin Wang Using Nonlinear Dynamics and Multivariate Statistics to Analyze EEG Signals of Insomniacs with the Intervention of Superficial Acupuncture Evidence-Based Complementary and Alternative Medicine Volume 2020, Article ID 8817843, 13 pages https://doi.org/10.1155/2020/8817843

90. Minesh Kapadia, M. Firoz Mian, Donglai Ma, Craig P. Hutton, Amber Azam, Klotilda Narkaj, Chuanhai Cao, Breanna Brown, Bernadeta Michalski, David Morgan, Paul Forsythe, Iva B. Zovkic, Margaret Fahnestock and Boris Sakic Differential effects of chronic immunosuppression on behavioral, epigenetic, and Alzheimer's disease associated markers in 3xTg-AD mice Alzheimer's Research & Therapy (2021) 13:30 https://doi.org/10.1186/s13195-020-00745-9

(Purple color publications are published since being promoted to associate professor, Name with underline is correspondent author)

Manuscripts Under Preparation

1. **Chuanhai Cao**, Xiaoyang Lin, Cai, J., Mayl, J., Huntington Potter, Liang, Z., Zhang, Morgan D. TCR clonality as early and stable biomarker for Alzheimer's disease.

2. Yuzhu Hong, Breanna Brown, Xiaoyang Lin, Jiyu Yan, Haohan Zhao, Ning Shen Ping Chang, Marcia Gordon, David Morgan, **Chuanhai Cao** Intranasal low dose THC improved memory in AD mouse model

3. Ning Shen, Nanqi Liu, Breanna Brown, Xiaoyang Lin, Haohan Zhao, Haiqiang Yang Ping Chang, Jianfeng Cai, David Morgan, **Chuanhai Cao** Low dose THC delivered by intraperitoneal delay the memory impairment in AD mouse model

4. **Chuanhai Cao**, Xiaoyang Lin, Yuzhu Hong, Ning Shen, Yanhong Wang, Qishun Zhu, Wenshi Wang The innovative utilization of antigen sensitized dendritic cell as a powerful vaccine

5.**Chuanhai Cao**, Ning Shen, Xiaoyang Lin, Haohan Zhao, Haiqiang Yang,

Breanna Brown, Peng Teng, Bo Song, Yuzhu Hong, Jinsheng He, Ying Zhang, Xiaopeng Li and Jianfeng Cai Ratifying Aβ as the pathological factor and therapeutic target for Alzheimer's disease

6. Lifang Zhang, Jessica Cao, Haiqiang Yang, Phillip Pham, Umer Khan, Breanna Brown, Yuzhu Hong, and **Chuanhai Cao.** The Quantity and Quality of Coffee for Alzheimer's disease

7. **Cao, C.,** Zesiekwiz, T., Li, Y., Lin, X., Li, F., Wang, W., Zhang, C., Bai, G., Cai, J., Mayl, J., Yuan, Z., Liang, Z., Zhang, P., Sanchez-Ramos, J.
Peripheral blood as an early and stable biomarker for Parkinson's disease. Hum. Vaccines Immunother.

8. Ji-lin Yang, Hong-juan Li, Ying Zhang, Yan Chen , Cheng-wei Gao, Li Cong, Chun Hou, Tian-zuo Wang, Zhen-zhen Xue, Dong-mei Chen, Liu-xin Zhao, Guo-sheng Li 1 , Qian Yao,Chan-juan Yang, Qiu-chen Cai, Zhu Qi-shun, **Chuanhai Cao**
Biological effects of artemether in the glioma cell line U251

Books and Chapters in Books

1. Nyland, S.B., **Cao, C**., Ugen, K.E., 2002. Human T-cell lymphotropic virus types I and II, in: Rose, N.R., Hamilton, R.G., Detrick, B. (Eds.), Manual of Clinical Laboratory Immunology. American Society Microbiology, Washington, D.C, pp. 749–753.

2. **Cao, C.**, Ugen, K.E., Dickey, C., Wilcock, D., Bai, Y., Gordon, M.N., Morgan, D., 2012. Characterization of amyloid beta vaccination strategies in mice, in: Selkoe, D.J., Christen, Y. (Eds.), Immunization Against Alzheimer's Disease and Other Neurodegenerative Disorders, Research and Perspectives on Alzheimer's Disease. Springer Science & Business Media, pp. 21–32.

3. **Cao, C.**, Moore, T., Chu, L., 2014. Chapter 48: Coffee, granulocyte colony-stimulating factor (G-CSF), and neurodegenerative diseases, in: Preedy, V.R. (Ed.), Coffee in Health and Disease Prevention. Academic Press, pp. 435–442.

4. **Cao C.,** et al. Antioxidant Nutraceuticals : Preventive and Healthcare Applications (CRC Press 2018). ISBN9781351647342 (Editor)

5. **Cao C.,** et al. Chinese Terms In Alzheimer's disease. 2019
ISBN 9787030616845

6. **Cao C.**, et al. Infectious & Non-Infectious Dementia. Prion & Alzheimer's.

Peer-reviewed Abstracts

1. **Cao, C.**, Lin, X., Zhang, C., Dillingham, C., Wang, L., Potter, H., 2008. Age–related changes in clonalities of T-cell receptor Vβ repertoire within CD8 subsets, but not CD4, in healthy individuals. Presented at the American Association of Immunologists Conference, Miami, FL.

2. **Cao, C**., Lin, X., Zhang, C., Dickson, A., Mamcarz, M., Wang, L., Arendash, G., Potter, H., 2008. Change of plasma Aβ levels can be an early marker for AD treatment in PS1/APP Alzheimer's Mice model. Presented at the International Conference on Alzheimer's Disease, Chicago, IL.

3. Lin, X., Zhang, C., Potter, H., Breitenkamp, K., K, S., Christine, D., **Cao, C**., 2008. Nanoparticle Alzheimer's disease vaccine targeting oligomeric Aβ. Presented at the International Conference on Alzheimer's Disease, Chicago, IL.

4. Sanchez-Ramos, J., Song, S., **Cao, C**., Lin, X., Mori, T., Arendash, G., 2008. Granulocyte-colony stimulating factor reduces hippocampal amyloid load And Improves behavioral performance in a transgenic Alzheimer's disease mouse model. Presented at the International Conference on Alzheimer's Disease, Chicago, IL.

5. Olcese, J.M., Mori, T., Dorsey, M.B., **Cao, C**., Arendash, G.W., 2008. Melatonin lowers brain β-amyloid load and reduces cognitive loss in a transgenic model of Alzheimer dementia. Presented at the Society for Neuroscience Conference, Washington, DC.

6. Wang, L., Lin, X., Zhang, C., Potter, H., Arendash, G., **Cao, C**., 2008. The non-caffeine constituents of coffee to do interfere with caffeine's ability to reduce blood Aβ levels in Alzheimer's transgenic mice. Presented at the Society for Neuroscience Conference, Washington, DC.

7. Ethell, D., **Cao, C**., Dickson, A., Mamcarz, M.B., Lin, X., Arendash, G., 2009. Cognitive and pathological benefits of Aβ-sensitive Th2 cells are independent of antigen-specific B cell activation. Presented at the International Conference on Alzheimer's Disease, Copenhagen, Denmark.

8. **Cao, C**., Lin, X., Wang, M., Mamcarz, M., Runfeldt, M., Arendash, G., 2009. The therapeutic effects of caffeine and coffee in Alzheimer's disease. Presented at the Society for Neuroscience Conference, Chicago, IL.

9. Song, S., Catlow, B., Li, K., Sava, V., **Cao, C**., Arendash, G., Sanchez-Ramos, J., 2009. Promotion of brain self-repair mechanisms by stereotaxic micro-lesions. Presented at the Society for Neuroscience Conference, Chicago, IL.

10. Arendash, G., Sanchez-Ramos, J., Mori, T., Dorsey, M.B., Wang, L., Lin, X., Bradshaw, P.C., Dragicevic, N., **Cao, C**., 2010. Electromagnetic field treatment protects against and reverses cognitive impairment in Alzheimer's mice Alpha

synuclein peptide sensitized dendritic cells as a vaccine against Parkinson's disease. Presented at the Society for Neuroscience Conference, San Diego, CA.

11. **Cao, C**., Lin, X., Wang, M., Song, S., Bai, G., Li, F., Sanchez-Ramos, J., 2010. Alpha synuclein peptide sensitized dendritic cells as vaccine against Parkinson's disease. Presented at the Society for Neuroscience Conference, San Diego, CA.

12. O'Neal-Moffitt, G., Patel, A., **Cao, C**., Bradshaw, P.C., Lin, X., Olcese, J.M., 2010. Melatonin has neuroprotective actions in a cellular model of Alzheimer's disease. Presented at the Society for Neuroscience Conference, San Diego, CA.

13. Bai, G., Padhee, S., Niu, Y., Wang, R.E., Buzzeo, R., **Cao, C**., Cai, J., 2011a. Unexpected enhanced cellular uptake of a α-AApeptide. Presented at the USF Health, Tampa, FL.

14. Bai, G., Zesiekwiz, T., Lin, X., Li, F., Wang, W., Zhang, G., Zhang, C., Cai, J., Yuan, Z., Zhang, P., Sanchez-Ramos, J., **Cao, C**., 2011b. Biomarkers in peripheral immune system for Parkinson's disease. Presented at the USF Health, Tampa, FL.

15. **Cao, C**., Zesiekwiz, T., Lin, X., Li, F., Wang, W., Zhang, G., Bai, G., Cai, J., Sanchez-Ramos, J., 2011. T-cell receptor change as an early and stable biomarker for Parkinson's disease. Presented at the Society for Neuroscience Conference, San Diego, CA.

16. Zhang, Z., **Cao, C**., Bai, G., Zhou, S., 2011. The effect of natural compounds on signal pathway of Alzheimer's disease. Presented at the Society for Neuroscience Conference, San Diego, CA.

17. **Cao, C.**, Lin, X., Raj, A., Wang, W., Li, Y., Cai, J., Potter, Huntington, 2012. The role of CD8 T-cell and its receptor change in Alzheimer's disease. Presented at the Alzheimer's Association International Conference, Vancouver, Canada.

18. Bai, G., Lin, X., Li, Y., Wu, H., **Cao, C.**, 2012. The molecular mechanism study of melatonin on Alzheimer's Disease. Presented at the Society for Neuroscience Conference, New Orleans, LA.

19. Li, Y., **Cao, C**., Cai, J., 2012. Redefining the mechanism of tetrahydrocannabinol (THC) against Alzheimer's Disease. Presented at the Society for Neuroscience Conference, New Orleans, LA.

20. Pathak, Y., Andrisk, R., Lin, X., **Cao, C**., 2013. Development of a novel vaccine using nanoemulsion against neurodegenerative diseases. Presented at the BioFlorida, West Palm Beach, FL.

21. Bai, G., Wu, H., Li, Y., Niu, Y., Qiao, Q., Lin, X., Cai, J., **Cao, C**., 2013. Anti-

aggregation effect of AA-peptide on ß-Amyloid peptides in Alzheimer's diseases. Presented at the USF Health, Tampa, FL.

22. Sutherland, K., Dix, M., Lin, X., Bai, G., Liu, H., **Cao, C**., 2013. Distinct differences of T-cell receptor Vβ chains clonality and other markers between Parkinson's disease and Alzheimer's disease. Presented at the USF Health, Tampa, FL.

23. **Cao, C.,** Wu, H., Li, Y., Niu, Y., Qiao, Q., Lin, X., Cai, J., 2013. Anti-aggregation effect of AA-peptide on ß-Amyloid peptides in Alzheimer's diseases. Presented at the Society for Neuroscience Conference, San Diego, CA.

24. Shaduzzaman, M., Nash, K., Hudson, C., Grimmig, B., Lin, X., Bai, G., Liu, H., **Cao, C.**, Bickford, P.C., 2013. Anti-α-synuclein antibodies provide neuroprotection and reduce behavioral deficits in a rat AAV9-α-synuclein model of Parkinson's disease. Presented at the Society for Neuroscience Conference, San Diego, CA.

25. Vu, T.H., McClain, T., **Cao, C.**, Tucker, N., Harvey, B., Katzin, L., Gooch, C., 2014. Pilot trial of high frequency high dose granulocyte colony stimulating factor (GCSF) in patients with amyotrophic lateral sclerosis (ALS). Presented at the American Academy of Neurology Conference, Philadelphia, PA.

26. P. Pham, X. Lin, Y. Hong, B. Brown, J. Cai, **C. Cao.,** 2017. The novel vaccine targeting oligomeric amyloid beta with immunomodulatory effects. Presented at the Society for Neuroscience, DC USA

27. H. Yang, **C. Cao,** P. Pham. U. Khan, Y. Hong, X Lin, N. Shen., 2018. The *in vitro* effect of different coffees and extraction of coffee in Alzheimer's disease-associated cell line. Presented at the Society for Neuroscience, San Diego CA

28. **C. Cao**, X. Lin, Y. Hong, B. Brown, J. Cai. A., 2019. Mutant Beta Amyloid Sensitized Cells As An Oligomeric Specific Vaccine Against APP. Presented at the AD/PD meeting, Lisbon, Portugal.

29. **Cao, C**, Lin. X, Y. Hong, B. Brown, J. Cai., 2019. The Rationale of Mutated Amyloid Beta Sensitized Dendritic Cells As a Therapeutic Vaccine for Alzheimer's Disease. Presented at the Alzheimer's Association International Conference, Los Angeles CA.

Other Research and Creative Achievements

Awarded Patents:

1. Ugen, K.E., Specter, S., Nyland, S.B., **Cao, C**., 2011. Anti-activity of the opioid antagonist naloxone. U.S. Patent No. 8,067,430

2. **Cao, C**., 2012. Amyloid beta peptides and methods of use. U.S. Patent No. 8,188,046 (Licensed by Alzamend Neuro Inc) **Awarded: $400,000**
3. **Cao, C**., Lin, X., Potter, H., 2013. Method of diagnosing or assessing risk for Parkinson's disease or Alzheimer's disease using TCR clonality. U.S. Patent No. 8,383,347
4. Arendash, G.W., **Cao, C**., Tan, J., 2016. Prevention and treatment of Alzheimer's disease through electromagnetic field exposure. U.S. Patent No. 9,238,149 (Licensed by NeuroEM Inc. Arizona USA) **Awarded: $60,000**
5. Jianfeng Cai**, Cao, C**., Wu H., Li Y., Bai Ge., 2018. Methods of synthesizing γ-AApeptides, γ-AApeptide building clocks, γ-AApeptide libraries, and γ-AApeptide inhibitors of Aβ40 aggregates. U.S. Patent No. 10,022,420.
6. **Cao, C.**, Lin, X., 2018. Methods of using a transgenic nonhuman animal in an in vivo test method. U.S. Patent No. 10,155,030.
7. Jianfeng, Cai, **Cao, C**., 2020. Compounds for the treatment of neurodegenerative diseases. U.S. Patent No. 10,538,553

Pending Patents:

1. Cao, C., Lin, X., Breitenkamp, K., Skaff, H., Sill, K.N., 2014. Immunotherapy for treatment of amyloid-related disorders using encapsulated beta-amyloid peptides. USF Ref. No. 20140170225 A1.
2. Cao, C., 2015. THC as a potential therapeutic agent for Alzheimer's disease. USF Ref. No. 15A089PR. (Licensed by IGC Inc. Maryland USA) - **Awarded: $250,000**
3. Cai, J., Cao, C., 2019. Novel compounds for the treatment of neurodegenerative diseases. USF Ref. No. 20190211059
4. Cao C., 2018 The Dead Antigen Stimulated Immature Heterogeneous Dendritic Cell as Therapeutics for Diseases USF Ref. No.: 17A067PR (Licensed by MegaNano BioTech Inc. Tampa USA) - **Awarded: $6,000**
5. Cao C., 2020 The combinational intranasal formula using Melatonin, Insulin and THC (MIT) as therapeutic for AD. USF Ref. No. 20A115
6. Cao C. and Jianfeng Cai 2020 A novel sulfono-γ-AApeptides as potential treatment for neurological disease and promote neuron generation (filing number is pending)
7. Cao, C., and Chang P Cannabinoid compositions and dosage forms for intranasal or inhalation delivery. Application No. 63030083

Service

Grants reviewer

Alzheimer's Association 2005- date
Grant Reviewer

NIH AD Clinical Trials Review Panel 2020- date
Early and Late stage Clinical Trials for the
Spectrum of Alzheimer's Disease and Age-related Cognitive Decline
Grant Reviewer

NIH The Chronic Dysfunction and Integrative Neurodegeneration study section (CDIN) 2020 -Date
Grant Reviewer

Israel Science Foundation (ISF) 2017
Grant Reviewer

RR&D Scientific Merit Review Board 2017
Grant Reviewer

Velux Stiftung Zürich 2018-date
Switzerland
Grant Reviewer

Scientific Journals

BMC Neuroscience 2008-date
Peer reviewer

Vaccine 2008-date
Peer reviewer

Neurobiology of Aging 2010-date
Peer reviewer

Journal of Anatomy 2011-date
Peer reviewer

PLOS ONE 2011-date
Peer reviewer

Canadian Medical Association Journal 2012-date
Peer reviewer

Human Vaccines and Immunotherapeutics 2012-date
Peer reviewer

Journal of Molecular and Cell Biology 2012-date
Peer reviewer

Cellular and Molecular Immunology 2013-date
Peer reviewer

Journal of Visualized Experiments 2013-date
Peer reviewer

Journal of Nutritional Biochemistry 2013-date
Peer reviewer

Neurobiology of Aging 2013-date
Peer reviewer

SOJ Neurology 2013-date
Editorial Board Member

Journal of Alzheimer's Disease 2014-date
Associate Editor
Peer reviewer

SOJ Immunology 2015-date
Editorial Board Member

Advances in Medicine 2015-date
Editorial Board Member

SM Vaccines and Vaccination Journal 2015-date
Editorial Board Member

Chinese Dementia and Associated 2018-date
Neurological Disorders
Associate Editor and Board Member

Society Memberships

Society for Neuroscience 2005-date
Member

American Association of Immunologists 2006-date
Member

Florida Alzheimer Disease Research Center 2006- date
Research Investigator

Florida Center of Excellence for Drug Discovery and Innovation 2007- date
Member

China Committee For Alzheimer's Disease International 2008- date
Member, Scientific and Technological Advisory Board

National Academy of Inventors 2014- date
Member

China Association for Alzheimer's Disease 2015- date
Member, Senior Advisory Board

GuidePoint 2019-date
Neuromuscular and Autoimmune Expertise
Member

Academic Committees

International

First Congress of China Association for Alzheimer's Disease 2015
Senior Advisory Board Member

China Alzheimer's Disease Neuroimaging Initiative 2008-date
Scientific Advisory Board Member

Alzheimer's Disease International 2008-date
Scientific Advisory Board Member

University of South Florida

University of South Florida Asian Alliance 2013-date
President

USF-Health Neuroscience Institute 2018- date
Member

University of South Florida 2019- date
Faculty Senate Committee
Member

College of Pharmacy

Curriculum Committee 2012-2014
University of South Florida, Taneja College of Pharmacy
Member

Bylaws Committee 2012-2014
University of South Florida,Taneja College of Pharmacy
Member

Committee on Research 2012-2016
University of South Florida, Taneja College of Pharmacy
Member

International Affairs Committee 2013-2016
University of South Florida, Taneja College of Pharmacy
Member

Biosafety Committee 2014-2017
University of South Florida, Taneja College of Pharmacy
Member

Master's Program Committee 2015-2019
University of South Florida, Taneja College of Pharmacy
Member

University of South Florida Taneja College of Pharmacy 2015-2019
Admissions Committee
Member

University of South Florida Taneja College of Pharmacy 2016-2019
Tenure and promotion committee
Member

University of South Florida Taneja College of Pharmacy 2016-date
Academic Review Committee
Member