

Resume of Zhijian CAO

Basic Information



School:	School of Life and Health Sciences
Gender:	Male
Date of Birth:	197605
Title:	Professor
Education:	Ph.D of Science
Tutor:	Master/Doctoral degree
Interest of research:	Animal Toxin Peptides and Antiviral Drugs

Academic Background

- 1994/09-1998/07, Wuhan University, Bachelor's degree in Virology;
- 1999/09-2004/07, Wuhan University, Ph.D of Microbiology.

Oversea Visiting

- 2014/02-2015/02, Visiting scholar, Meharry Medical College, USA.

Honors and Awards

1. An Excellent Young Scholar for National Natural Science Foundation of China in 2014
2. An Outstanding Young Scholar for Natural Science Foundation of Hubei Province in 2015
3. The Outstanding Youth Science and Technology Award from Chinese Society of Toxicology in 2016
4. A Winner of Hubei Provincial Natural Science Award (First Prize) for Toxinomics of the Scorpion *Mesobuthus martensii* Karsch in 2005.

Representative Projects

1. National Natural Science Foundation of China for studying on the analgesic effect and mechanism of scorpion toxin peptide Ct2589 activating TRPV1 channel (No. 32370547). Project leader. 2023.
2. National Natural Science Foundation of China for P38 MAPK signaling pathway mediated anti-HBV/HCV and related hepatocellular carcinoma effects and mechanisms of BmKDFsin3/4 animal venom peptide family (No.32161160303). Project leader. 2021.
3. National Natural Science Foundation of China for GPCR-TRP signaling axis mediated itch inducing effect and mechanism of scorpion venom peptide IP (No.

- 32070525). Project leader. 2020.
4. National Natural Science Foundation of China for studying on role and mechanism of scorpion venom peptide Sm286 in the discovery of host antiviral factor potassium channel Kv1.3 (No. 31872239). Project leader. 2018.
 5. National Natural Science Foundation of China for studying on potassium channel mediated scorpion venom peptide Hp98 inhibiting HBV replication (No.31572289). Project leader. 2015.
 6. National Natural Science Foundation of China for research on protection, understanding and utilization of scorpion venom genetic resources (No. 31422049). Project leader. 2014.
 7. National Natural Science Foundation of China for anti-gliomas molecular mechanism of recombinant chlorotoxin BmKCT (No. 30971500). Project leader. 2009.
 8. National Natural Science Foundation of China for studying on antibacterial effect and molecular mechanism of the Asian scorpion venom peptides (No. 30570045). Project leader. 2005.
 9. National "Eleventh Five Year Plan" Major New Drug Special Project for development of new natural peptide drug against MRSA resistant pathogens (No. 2009ZX09103-612). Project leader. 2010.

Representative Articles

1. **Cao Z[#]**, Yu Y[#], Wu Y[#], Hao P[#], Di Z[#], He Y[#], Chen Z, Yang W, Shen Z, He X, Sheng J, Xu X, Pan B, Feng J, Yang X, Hong W, Zhao W, Li Z, Huang K, Li T, Kong Y, Liu H, Jiang D, Zhang B, Hu J, Hu Y, Wang B, Dai J, Yuan B, Feng Y, Huang W, Xing X, Zhao G, Li X, Li Y, Li W. The genome of *Mesobuthus martensii* reveals a unique adaptation model of arthropods. *Nat Commun*. 2013, **4**:2602.
2. Li X, Yang H, Han Y, Yin S, Shen B, Wu Y, Li W, **Cao Z***. Tick peptides evoke itch by activating MrgprC11/X1 to sensitize downstream TRPV1 in pruriceptors. *J Allergy Clin Immunol*. 2021 Jun;147(6):2236-2248.
3. Hong W, Zhang R, Di Z, He Y, Zhao Z, Hu J, Wu Y, Li W, **Cao Z***. Design of histidine-rich peptides with enhanced bioavailability and inhibitory activity against hepatitis C virus. *Biomaterials*. 2013, **34**(13):3511-3522.
4. Yu XF, Sun Z, Li M, Xiang Y, Wang QQ*, Tang F, Wu Y, **Cao Z***, Li W*. Neurotoxin-conjugated upconversion nanoprobe for direct visualization of tumors under near-infrared irradiation. *Biomaterials*. 2010, **31**(33): 8724-8731.
5. Cheng Y, Sun F, Wang L, Gao M, Xie Y, Sun Y, Liu H, Yuan Y, Yi W, Huang Z, Yan H, Peng K, Wu Y, **Cao Z***. Virus-induced p38 MAPK activation facilitates viral infection. *Theranostics*. 2020 Oct 30;10(26):12223-12240.
6. Zeng Z, Zhang R, Hong W, Cheng Y, Wang H, Lang Y, Ji Z, Wu Y, Li W, Xie Y*, **Cao Z***. Histidine-rich modification of a scorpion-derived peptide improves bioavailability and inhibitory activity against HSV-1. *Theranostics*. 2018, **8**(1):199-211.
7. Gan B, Yu L, Yang H, Jiao H, Pang B, Chen Y, Wang C, Lv R, Hu H, **Cao Z***, Ren R*. Mechanism of agonist-induced activation of the human itch receptor MRGPRX1. *PLoS Biol*. 2023 Jun 22;21(6):e3001975.

8. Fan S, Sun Z, Jiang D, Dai C, Ma Y, Zhao Z, Liu H, Wu Y, **Cao Z***, Li W*. BmKCT toxin inhibits glioma proliferation and tumor metastasis. *Cancer Lett.* 2010, **291**(2):158-166.
9. Xia Z, He D, Wu Y, Kwok HF, Cao Z. Scorpion venom peptides: Molecular diversity, structural characteristics, and therapeutic use from channelopathies to viral infections and cancers. *Pharmacological Research*, 2023, 197:106978.
10. Sun F, Mu C, Kwok HF, Xu J, Wu Y, Liu W, Sabatier JM, Annweiler C, Li X*, **Cao Z***, Xie Y*. Capiwasertib restricts SARS-CoV-2 cellular entry: a potential clinical application for COVID-19. *Int J Biol Sci.* 2021, **17**(9):2348-2355.
11. Zeng Z, Han S, Hong W, Lang Y, Li F, Liu Y, Li Z, Wu Y, Li W, Zhang X*, **Cao Z***. A tat-conjugated peptide nucleic acid Tat-PNA-DR inhibits hepatitis B virus replication in vitro and in vivo by targeting LTR direct repeats of HBV RNA. *Mol Ther Nucleic Acids.* 2016, **5**:e295.
12. Xia Z, Ren Y, Li S, Xu J, Wu Y, **Cao Z***. ML-SA1 and SN-2 inhibit endocytosed viruses through regulating TRPML channel expression and activity. *Antiviral Res.* 2021, **195**:105193.
13. Xia Z, Wang L, Li S, Tang W, Sun F, Wu Y, Miao L*, **Cao Z***. ML-SA1, a selective TRPML agonist, inhibits DENV2 and ZIKV by promoting lysosomal acidification and protease activity. *Antiviral Res.* 2020, **182**:104922.
14. Hong W, Li T, Song Y, Zhang R, Zeng Z, Han S, Zhang X, Wu Y, Li W, **Cao Z***. Inhibitory activity and mechanism of two scorpion venom peptides against herpes simplex virus type 1. *Antiviral Res.* 2014, **102**:1-10.
15. de Seabra Rodrigues Dias IR, **Cao Z***, Kwok HF*. Adamalysins in COVID-19 - Potential mechanisms behind exacerbating the disease. *Biomed Pharmacother.* 2022, 150:112970.
16. Chen B, Li F, Zhu XK, Xie W, Hu X, Zan MH, Li X, Li QY, Guo SS, Zhao XZ, Jiang YA*, **Cao Z***, Liu W*. Highly biocompatible and recyclable biomimetic nanoparticles for antibiotic-resistant bacteria infection. *Biomater Sci.* 2021, **9**(3):826-834.
17. Wang L, Xia Z, Tang W, Sun Y, Wu Y, Kwok HF*, Sun F*, **Cao Z***. p38 activation and viral infection. *Expert Rev Mol Med.* 2022, 24:e4.
18. Wang L, Sun F, Hu J, Zuo W, Zheng Y, Wu Y, **Kwok HF***, **Cao Z***. The tick saliva peptide HIDfsin2 promotes the tick-borne virus SFTSV replication in vitro by enhancing p38 signal pathway. *Arch Toxicol.* 2023 Jun;97(6):1783-1794.
19. Qin H, Zuo W, Ge L, Siu SWI, Wang L, Chen X, Ma C, Chen T, Zhou M, **Cao Z***, **Kwok HF***. Discovery and analysis of a novel antimicrobial peptide B1AW from the skin secretion of *Amolops wuyiensis* and improving the membrane-binding affinity through the construction of the lysine-introduced analogue. *Comput Struct Biotechnol J.* 2023 May 6;21:2960-2972.
20. Liu G, Yang F, Li F, Li Z, Lang Y, Shen B, Wu Y, Li W, Harrison PL, Strong PN, Xie Y, Miller K*, **Cao Z***. Therapeutic potential of a scorpion venom-derived antimicrobial peptide and its homologs against antibiotic-resistant gram-positive bacteria. *Front Microbiol.* 2018 May 29;9:1159.