Stanford

Heng Zhao

Curriculum Vitae available Online

Resume available Online

Bio

ACADEMIC APPOINTMENTS

- Member, Wu Tsai Neurosciences Institute

PROFESSIONAL EDUCATION

- PhD, Nihon University, Japan , Pharmacology (1999)
- MS, West China Univ. Med. Sci. , Pharmacognosy (1990)
- BS, West China Univ. Med. Sci. , Pharmacy (1987)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My lab mainly studies the protective effect of postconditioning against stroke. Reperfusion (the restoration of blood flow) is one of the first choices for ischemic stroke treatment. However, reperfusion can also cause overproduction of reactive oxygen species (ROS) or free radicals that lead to reperfusion injury. Limiting the damage caused by reperfusion is a key issue for stroke treatment. We were the first to demonstrate that interrupting the early hyperemic response after reperfusion reduces infarction after stroke, a novel phenomenon called postconditioning. Since postconditioning is performed after reperfusion, it has great potential for clinical application. In addition, we also study protective effect of preconditioning and mild hypothermia. The rationale for studying three means of neuroprotection is that we may discover mechanisms that these treatments have in common. Conversely, if they have differing mechanisms, we will be able to offer more than one treatment for stroke and increase a patient’s chance for recovery. Our researches include studying roles of caspase-dependent and independent apoptotic pathway, PKC pathways and Akt pathway, among others, in the ischemic damage development after stroke.

Publications

PUBLICATIONS

- **Distinctive Effects of T Cell Subsets in Neuronal Injury Induced by Cocultured Splenocytes In Vitro and by In Vivo Stroke in Mice** *STROKE*
  Gu, L., Xiong, X., Zhang, H., Xu, B., Steinberg, G. K., Zhao, H.
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- **The Akt signaling pathway contributes to postconditioning's protection against stroke; the protection is associated with the MAPK and PKC pathways** *JOURNAL OF NEUROCHEMISTRY*
  Gao, X., Zhang, H., Takahashi, T., Hsieh, J., Liao, J., Steinberg, G. K., Zhao, H.
  2008; 105 (3): 943-955
- **Limb remote-preconditioning protects against focal ischemia in rats and contradicts the dogma of therapeutic time windows for preconditioning** *NEUROSCIENCE*
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2008; 151 (4): 1099-1103

- **Delayed postconditioning protects against focal ischemic brain injury in rats** *PLoS ONE*
  Ren, C., Gao, X, Niu, G, Yan, Z, Chen, X, Zhao, H
  2008
- **Interrupting reperfusion as a stroke therapy: ischemic postconditioning reduces infarct size after focal ischemia in rats** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
  Zhao, H., Sapolsky, R. M., Steinberg, G. K.
  2006; 26 (9): 1114-1121
- **Akt contributes to neuroprotection by hypothermia against cerebral ischemia in rats** *JOURNAL OF NEUROSCIENCE*
  Zhao, H., Shimohata, T., Wang, J. Q., Sun, G. H., Schaal, D. W., Sapolsky, R. M., Steinberg, G. K.
  2005; 25 (42): 9794-9806
- **Ischemic post-conditioning facilitates brain recovery after stroke by promoting Akt/mTOR activity in nude rats** *JOURNAL OF NEUROCHEMISTRY*
  Xie, R., Wang, P., Ji, X., Zhao, H.
  2013; 127 (5): 723-732
- **T Cells Contribute to Stroke-Induced Lymphopenia in Rats** *PLOS ONE*
  Gu, L., Xiong, X., Wei, D., Gao, X., Krams, S., Zhao, H.
  2013; 8 (3)
- **The protective effects of T cell deficiency against brain injury are ischemic model-dependent in rats** *NEUROCHEMISTRY INTERNATIONAL*
  Xiong, X., Gu, L., Zhang, H., Xu, B., Zhu, S., Zhao, H.
  2013; 62 (3): 265-270
- **Hurdles to Clear Before Clinical Translation of Ischemic Postconditioning Against Stroke** *TRANSLATIONAL STROKE RESEARCH*
  Zhao, H.
  2013; 4 (1): 63-70
- **Using hormetic strategies to improve ischemic preconditioning and postconditioning against stroke.** *International journal of physiology, pathophysiology and pharmacology*
  Zhao, H., Joo, S., Xie, W., Ji, X.
  2013; 5 (2): 61-72
- **Lithium Treatment Reduces Brain Injury Induced by Focal Ischemia with Partial Reperfusion and the Protective Mechanisms Dispute the Importance of Akt Activity** *AGING AND DISEASE*
  Takahashi, T., Steinberg, G. K., Zhao, H.
  2012; 3 (3): 226-233
- **PHOSPHORYLATED MITOGEN-ACTIVATED PROTEIN KINASE/EXTRACELLULAR SIGNAL-REGULATED KINASE 1/2 MAY NOT ALWAYS REPRESENT ITS KINASE ACTIVITY IN A RAT MODEL OF FOCAL CEREBRAL ISCHEMIA WITH OR WITHOUT ISCHEMIC PRECONDITIONING** *NEUROSCIENCE*
  Takahashi, T., Steinberg, G. K., Zhao, H.
  2012; 209: 155-160
- **Prokineticin 2 is an endangering mediator of cerebral ischemic injury** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Cheng, M. Y., Lee, A. G., Culbertson, C., Sun, G., Talati, R. K., Manley, N. C., Li, X., Zhao, H., Lyons, D. M., Zhou, Q., Steinberg, G. K., Sapolsky, R. M.
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- **The Chronic Protective Effects of Limb Remote Preconditioning and the Underlying Mechanisms Involved in Inflammatory Factors in Rat Stroke** *PLOS ONE*
  Wei, D., Ren, C., Chen, X., Zhao, H.
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- **From rapid to delayed and remote postconditioning: the evolving concept of ischemic postconditioning in brain ischemia.** *Current drug targets*
  Zhao, H., Ren, C., Chen, X., Shen, J.
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- **The Protective Effects of Ischemic Postconditioning against Stroke: From Rapid to Delayed and Remote Postconditioning.** *The open drug discovery journal*
  Zhao, H.
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- **An Insult-Inducible Vector System Activated by Hypoxia and Oxidative Stress for Neuronal Gene Therapy** *TRANSLATIONAL STROKE RESEARCH*
  Cheng, M. Y., Lee, I., Jin, M., Sun, G., Zhao, H., Steinberg, G. K., Sapolsky, R. M.
  2011; 2 (1): 92-100
- **Limited Therapeutic Time Windows of Mild-to-Moderate Hypothermia in a Focal Ischemia Model in Rat.** *Stroke research and treatment*
  Zhao, H., Steinberg, G.
  2011; 2011: 131834-?
- **The Akt Pathway Is Involved in Rapid Ischemic Tolerance in Focal Ischemia in Rats** *TRANSLATIONAL STROKE RESEARCH*
  Gao, X., Zhang, H., Steinberg, G., Zhao, H.
  2010; 1 (3): 202-209
- **Limb remote ischemic postconditioning protects against focal ischemia in rats** *BRAIN RESEARCH*
  Ren, C., Yan, Z., Wei, D., Gao, X., Chen, X., Zhao, H.
  2009; 1288: 88-94
- **The protective effect of early hypothermia on PTEN phosphorylation correlates with free radical inhibition in rat stroke** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
  Lee, S. M., Zhao, H., Maier, C. M., Steinberg, G. K.
  2009; 29 (9): 1589-1600
- **Ischemic postconditioning as a novel avenue to protect against brain injury after stroke** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
  Zhao, H.
  2009; 29 (5): 873-885
- **Activating delta PKC antagonizes the protective effect of ERK1/2 inhibition against stroke in rats** *BRAIN RESEARCH*
  Castaneda, D., Zhao, H., Mochly-Rosen, D., Steinberg, G. K.
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- **Blocking glucocorticoid and enhancing estrogenic genomic signaling protects against cerebral ischemia** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
  Cheng, M. Y., Sun, G., Jin, M., Zhao, H., Steinberg, G. K., Sapolsky, R. M.
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- **Improving Tumor-Targeting Capability and Pharmacokinetics of Tc-99m-Labeled Cyclic RGD Dimers with PEG(4) Linkers** *MOLECULAR PHARMACEUTICS*
  Wang, L., Shi, J., Kim, Y., Zhai, S., Jia, B., Zhao, H., Liu, Z., Wang, F., Chen, X., Liu, S.
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- **Positron Emission Tomography Imaging of Poststroke Angiogenesis** *STROKE*
  Cai, W., Guzman, R., Hsu, A. R., Wang, H., Chen, K., Sun, G., Gera, A., Choi, R., Bliss, T., He, L., Li, Z., Maag, A. D., Hori, et al
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  Ren, C., Gao, X., Niu, G., Yan, Z., Chen, X., Zhao, H.
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  Zhang, H., Ren, C, Gao, X, Takahashi, T, Sapolsky, RM, Steinberg, GK , Zhao, H
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  Zhao, H., Steinberg, G. K., Sapolsky, R. M.
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  2007; 2 (4): 313-318

- **Viral caspase inhibitor p35, but not crmA, is neuroprotective in the ischemic penumbra following experimental stroke** *NEUROSCIENCE*
  Sung, J. H., Zhao, H., Roy, M., Sapolsky, R. M., Steinberg, G. K.
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- **Suppression of delta PKC activation after focal cerebral ischemia contributes to the protective effect of hypothermia** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
  Shimohata, T., Zhao, H., Sung, J. H., Sun, G., Mochly-Rosen, D., Steinberg, G. K.
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- **epsilon PKC may contribute to the protective effect of hypothermia in a rat focal cerebral ischemia model** *STROKE*
  Shimohata, T., Zhao, H., Steinberg, G. K.
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- **Gene therapy using SOD1 protects striatal neurons from experimental stroke** *NEUROSCIENCE LETTERS*
  Davis, A. S., Zhao, H., Sun, G. H., Sapolsky, R. M., Steinberg, G. K.
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  Liu, J., Zhao, H., Sung, J., Sun, G., Steinberg, G. K.
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- **Biphasic cytochrome c release after transient global ischemia and its inhibition by hypothermia** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
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  Zheng, Z., Zhao, H., Steinberg, G. K., Yenari, A. A.
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- **Bcl-2 overexpression protects against neuron loss within the ischemic margin following experimental stroke and inhibits cytochrome c translocation and caspase-3 activity** *JOURNAL OF NEUROCHEMISTRY*
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- **Minimal effect of brain temperature changes on glutamate release in rat following severe global brain ischemia: a dialysis electrode study** *NEUROREPORT*
  Asai, S., Zhao, H., Takahashi, Y., Nagata, T., Kohno, T., Ishikawa, K.
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