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## Area of Expertise

The focus of my research lab is to apply and assess a safe intermittent-hypoxia (IH) procedure as a physical-conditioning regimen to preserve and improve the heart and brain functions in humans. Repeated intermittent-hypoxia induces cyclic, brief, and moderate decreases in blood oxygen concentration, and increases heart rate and breathing rate. We have found that IH conditioning is a safe, novel, and effective way to improve heart function and to optimize oxygen delivery to the brain. We believe this IH intervention is beneficial for older adults, especially those who cannot participate in regular physical activities because of the limitations associated with age-related declining physical or mental functions. Moreover, repeated low-dose intermittent-hypoxia can promote and mobilize the growth factors for healthy nerve system and blood vessel. These physiological and neurobiological reactions and adaptations to IH conditioning may have multi-faceted influences on prevention and treatment for mild Alzheimer's disease and cognitive impairment associated with aging.

## Qualifications

MA in Exercise Science, Shanghai Institute of Physical Education  
BA in Physical Education, Shanghai Teachers University  
PhD in Physiology, Yale University

## Recent Publications

### **Habitual physical activity improves vagal cardiac modulation and carotid baroreflex function in elderly women**

Cai, M., Wang, H., Kline, G., Ding, Y., Ross, S. E., Davis, S., Mallet, R. T. & Shi, X., Jun 2023, In: *Experimental Biology and Medicine*. 248, 11, p. 991-1000 10 p.

### **Hypoxic breathing produces more intense hypoxemia in elderly women than in elderly men**

Zhao, J., Ding, Y., Kline, G. P., Zhou, Z., Mallet, R. T. & Shi, X., 26 Oct 2022, In: *Frontiers in Physiology*. 13, 989635.

### **Determinants of student's physical activity: a 12-month follow-up study in Ningxia province**

Huang, W., Shi, X., Wang, Y., Li, X., Gao, P., Lu, J. & Zhuang, J., Dec 2021, In: *BMC Public Health*. 21, 1, 512.

### **Intermittent Hypoxia Training Prevents Deficient Learning-Memory Behavior in Mice Modeling Alzheimer's Disease: A Pilot Study**

Ryou, M. G., Chen, X., Cai, M., Wang, H., Jung, M. E., Metzger, D. B., Mallet, R. T. & Shi, X., 1 Jul 2021, In: *Frontiers in Aging Neuroscience*. 13, 674688.

### **Intermittent Hypoxic Preconditioning: A Potential New Powerful Strategy for COVID-19 Rehabilitation**

Cai, M., Chen, X., Shan, J., Yang, R., Guo, Q., Bi, X., Xu, P., Shi, X., Chu, L. & Wang, L., 30 Apr 2021, In: *Frontiers in Pharmacology*. 12, 643619.

### **Reduced cerebrovascular and cardioventilatory responses to intermittent hypoxia in elderly**

Liu, X., Chen, X., Kline, G., Ross, S. E., Hall, J. R., Ding, Y., Mallet, R. T. & Shi, X., Jan 2020, In: *Respiratory Physiology and Neurobiology*. 271, 103306.

### **Intermittent Hypoxia Training for Treating Mild Cognitive Impairment: A Pilot Study**

Wang, H., Shi, X., Schenck, H., Hall, J. R., Ross, S. E., Kline, G. P., Chen, S., Mallet, R. T. & Chen, P., 2020, In: *American journal of Alzheimer's disease and other dementias*. 35

### **Wuqinxi exercise improves hand dexterity in patients with Parkinson's disease**

Wang, T., Xiao, G., Li, Z., Jie, K., Shen, M., Jiang, Y., Wang, Z., Shi, X. & Zhuang, J., 2020, In: *Evidence-based Complementary and Alternative Medicine*. 2020, 8352176.

**Effects of exercise training on the autophagy-related muscular proteins expression in ovariectomized rats**

Zhong, W., Shi, X., Yuan, H., Bu, H., Wu, L. & Wang, R., 2019, In: *Frontiers in Physiology*. 10, JUN, 735.

**Risk factors associated with poor physical fitness in three- to six-year-old children in tuja-nationality settlement of China**

Liu, X., Xiang, Z., Liu, C., Shi, X., Yi, X., Cheng, M., Schenck, H. & Bates, J., 2018, In: *Evidence-based Complementary and Alternative Medicine*. 2018, 5702190.

## **Sponsored Projects**

**Cranial Osteopathy and Cerebral Tissue Oxygenation**

Shi, X.

American Osteopathic Association

1/09/09 → 30/08/10

**Intermittent Hypoxia and Cardiovascular Function - The Effect of Age: Acute Cardiovascular response to Simulated OSA**

Shi, X.

Intramural Research(UNTHSC)

1/06/16 → 31/05/18

**Intermittent Hypoxia as a Therapy for Cognitive Loss in Aging: A Proof-of-Concept Pilot Study**

Shi, X.

Intramural Research(UNTHSC)

1/09/15 → 31/08/16

**Intermittent Hypoxia - Novel Intervention for Treatment of Mild Cognitive Impairment**

Shi, X.

Texas A&M Health Science Center

1/10/15 → 30/07/18

**Intermittent Hypoxia Training: A Novel Therapy for Mild Cognitive Impairment**

Shi, X.

National Institute on Aging

1/05/22 → 30/04/24

**Intermittent Hypoxia Training: A Novel Therapy for Mild Cognitive Impairment**

Shi, X., Mallet, R., Kline, G., Wiechmann, A., Ross, S., Zhou, Z. & Davis, S.

NIA: National Institute on Aging

1/05/22 → 30/04/25

**Wrist-Based Non-Invasive Wearable Sensors for Continuous Blood Pressure Monitoring using Pulse Transit Time**

Shi, X. & Hensel, K.

Intramural Research(TxMRC)

1/05/13 → 30/04/14