

**TITLE:**

**Environmental modulation of longevity**

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**RESEARCH PROJECT DESCRIPTION** (brief overview of background, hypothesis, methods, role of medical student, funding and relevant publications -- SHOULD NOT EXCEED ~ 250 WORDS)

We are interested in understanding the fundamental biology of the interactions between genetic factors and environmental factors in the process of animal aging. Questions asked in the lab include how do animals perceive and respond to environmental cues throughout their lives? what are the functions of membrane ion channels and receptors in aging? how do aging-related transcription factors integrate distinct sensory inputs? etc. To address these questions, we mainly use the genetic model organism *C. elegans* because of its short generation period and lifespan and powerful genetic tools. Approaches used in the lab include molecular genetics, lifespan and stress assays, calcium imaging and fluorescence imaging, protein biochemistry, and electrophysiology.

By working with postdoctoral fellows and other students in the lab, medical students will investigate the mechanisms underlying various aging-related environmental factors such as diet, temperature, and exercise.

Reference:

1. **Xiao R.** Chun L, Ronan EA, Friedman DI, Liu J & Xu XZ. (2015) RNAi Interrogation of Dietary Modulation of Development, Metabolism, Behavior, and Aging in *C. elegans*. *Cell Rep.*, 11(7):1123-33.
2. Zhang B, **Xiao R.** Ronan EA, He Y, Hsu AL, Liu J & Xu XZ (2015) Environmental Temperature Differentially Modulates *C. elegans* Longevity through a Thermosensitive TRP Channel. *Cell Rep.*, 11(9):1414-24.
3. **Xiao, R.**, Zhang, B., Dong, Y., Gong, J., Xu, T., Liu, J. & Xu, X.Z.S (2013). A genetic program promotes longevity at cold temperatures via a thermo-sensitive TRP channel. *Cell*, 152(4):806-17.