Effects of Near-Zero Magnetic Field Exposure on *Xenopus laevis*

The effects of space travel on living organisms are not well understood. This is an important question to study as space consists of microgravity, high radiation, and zero geomagnetic field – a very different environment from Earth. Although the effects of microgravity and space radiation are more understood, there are fewer studies on near zero magnetic fields (MFs). MFs are produced by moving electric charges. Previous space studies suggested that near zero MF may alter embryo growth. To better understand how space MF alters tissue growth, we sought to identify and assess the effects of near zero MF on animal health using the clawed frog, *Xenopus laevis* – a model organism with well-documented development and high regenerative ability. We hypothesize exposing *Xenopus* to near zero MFs will result in decreased regeneration, and defects in development and wound healing.

First, we focused on constructing an apparatus, the Magshield box, to simulate space MF. The Magshield box has an exterior made of Mu metal, which blocks MFs and therefore creates a near zero MF in the interior of the box. One chamber in the box generates the Earth's normal MF (~45μT) using Helmholtz coils and serves as the control condition; the second chamber maintains near zero MF and is the experimental (space-like) condition. We have successfully built the Magshield box and confirmed that the two chambers generated the target MFs. To test the effects of MF alteration, we will place *Xenopus* embryos of the same age in each chamber and examine whether near zero MF alters development and tissue regeneration. Studying how the quantum effects of magnetism affect living systems may lead to the development of new strategies for safer space travel and also increase the knowledge in quantum biology.