

Section III: Results

Spatial Learning Assessment

This subsection would describe the data for a specific set of tests that would measure (as an example) spatial ability.

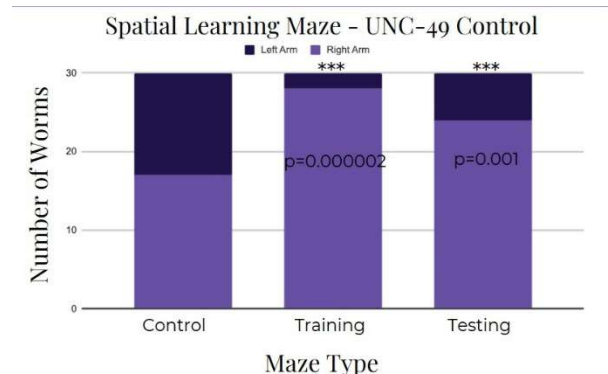


Figure 1. Spatial learning performance of UNC-49 control worms. Maze type, number of worms, and experimental conditions (control, training, and testing) are shown. Statistical comparisons were performed using a Z-test with a population proportion of 0.5 ($p = 0.000002$, $p = 0.001$)

UNC-49 Controls

As shown in **Figure 1**, control UNC-49

worms demonstrated differences across maze phases. Training performance differed significantly from control performance ($p < 0.00002$ ***), and learning performance also differed significantly from control ($p < 0.001$ ***).

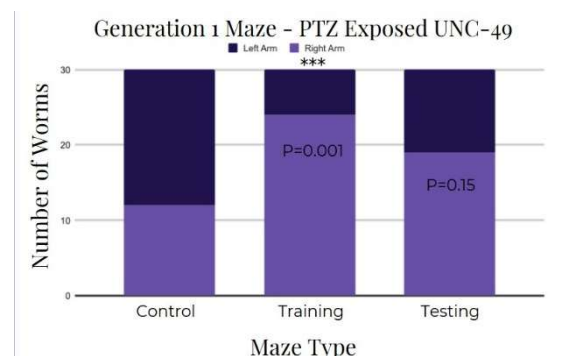


Figure 2. Spatial learning performance of Generation 1 PTZ-exposed UNC-49 worms. Maze type, number of worms, and experimental conditions (control, training, and testing) are indicated. Statistical comparisons were performed using a Z-test with a population proportion of 0.5 ($p = 0.001$, $p = 0.15$)

Generation 1

Single PTZ Exposure

As shown in **Figure 2**, Generation 1

UNC-49 worms exposed to PTZ demonstrated significant differences between control and training phases ($p < 0.001$ ***). Learning phase performance also differed significantly from control ($p = 0.015$ *).

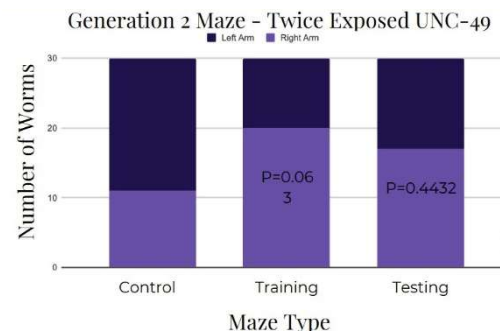


Figure 3. Spatial learning performance of Generation 2 UNC-49 worms twice exposed to PTZ. Maze type, number of worms, and experimental conditions (control, training, and testing) are shown. Statistical comparisons were performed using a Z-test with a population proportion of 0.5 ($p = 0.063$, $p = 0.4432$)

Generation 2

PTZ Exposed in Generation 2

As shown in **Figure 3**, Generation 2 UNC-49 worms exposed to PTZ twice demonstrated significant differences between control and training performance ($p = 0.0063^{**}$). Learning phase performance differed from control ($p = 0.04432^*$).

PTZ Exposed in Generation 1 only

As shown in **Figure 5**, Generation 2 UNC-49 worms exposed to PTZ once demonstrated significant differences between control and training performance ($p = 0.0003^{***}$). Learning phase performance also differed significantly from control ($p = 0.0018^{**}$).

Generation 3

PTZ Exposed in Generation 3

As shown in **Figure 6**, Generation 3 UNC-49 worms exposed to PTZ three times demonstrated significant differences between control and training performance ($p = 0.001^{**}$). Learning performance did not significantly differ from control ($p = 0.7424$).

PTZ Exposed in Generations 1 & 2 Only

As shown in **Figure 7**, Generation 3 UNC-49 worms exposed to PTZ twice demonstrated significant differences between control and training

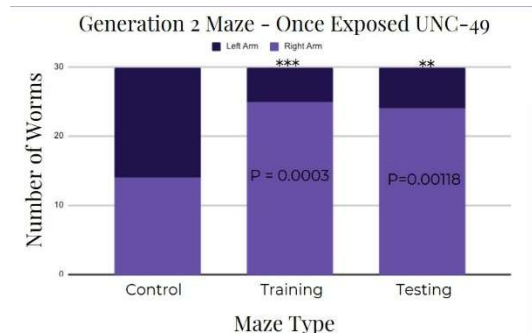


Figure 5. Spatial learning performance of Generation 2 UNC-49 worms once exposed to PTZ. Maze type, number of worms, and experimental conditions (control, training, and testing) are indicated. Statistical comparisons were performed using a Z-test with a population proportion of 0.5 ($p = 0.0003$, $p = 0.00118$)

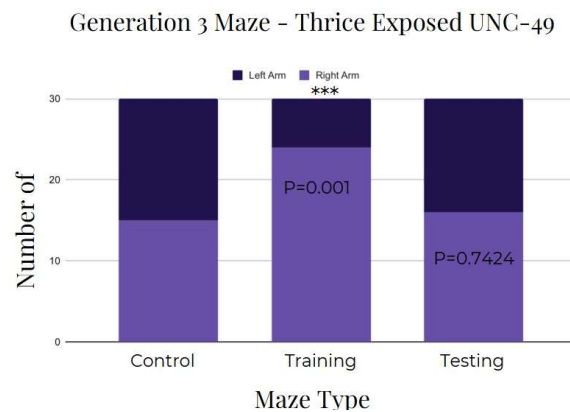


Figure 6. Spatial learning performance of Generation 3 UNC-49 worms thrice exposed to PTZ. Maze type, number of worms, and experimental conditions (control, training, and testing) are shown. Statistical comparisons were performed using a Z-test with a population proportion of 0.5 ($p = 0.001$, $p = 0.7424$)

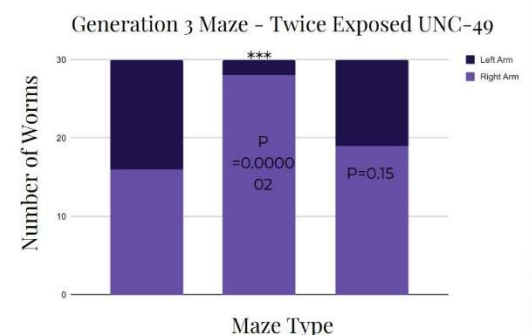


Figure 7. Spatial learning performance of Generation 3 UNC-49 worms twice exposed to PTZ. Maze type, number of worms, and experimental conditions (control, training, and testing) are indicated. Statistical comparisons were performed using a Z-test with a population proportion of 0.5 ($p = 0.000002$, $p = 0.15$)

performance ($p < 0.000002^{***}$). Learning phase performance differed significantly from control ($p = 0.015^*$).

PTZ Exposed in Generation 1 Only

As shown in **Figure 8**, Generation 3 UNC-49 worms exposed to PTZ once demonstrated significant differences between control and training performance ($p = 0.000028^{***}$). Learning phase performance also differed significantly from control ($p = 0.0001^{***}$).

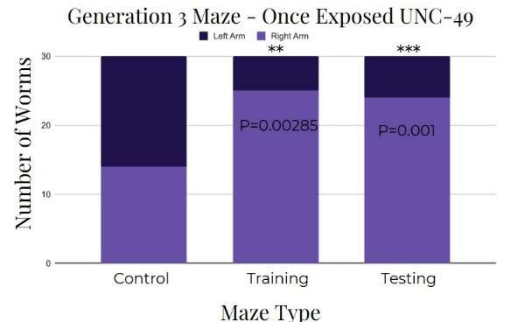


Figure 8. Spatial learning performance of Generation 3 UNC-49 worms once exposed to PTZ. Maze type, number of worms, and experimental conditions (control, training, and testing) are indicated. Statistical comparisons were performed using a Z-test with a population proportion of 0.5 ($p = 0.00285$, $p = 0.001$)

Cross-Generation Comparison of Single PTZ Exposure

PTZ Exposed in Generation 3

As shown in **Figure 4**, spatial learning performance was compared among once-exposed UNC-49 worms across Generations 1, 2, and 3. Two-proportion Z-tests indicated no significant difference between Generation 1 and Generation 2 ($p = 0.09694$) or between Generation 2 and Generation 3 ($p = 0.26128$). A significant difference was observed between Generation 1 and Generation 3 ($p = 0.0276^*$).

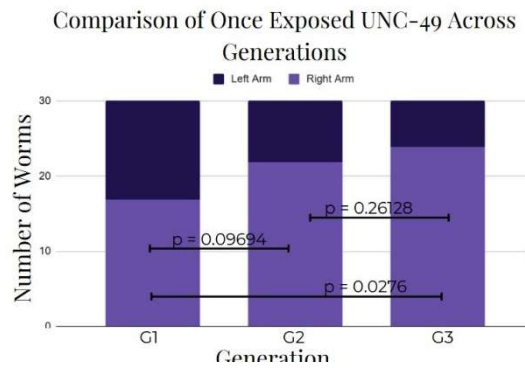


Figure 4. Comparison of spatial learning in once-exposed UNC-49 worms across generations. Number of worms and generation (G1, G2, G3) are indicated. Statistical comparisons were performed using two-proportion Z-tests: G1 vs G2 ($p = 0.09694$), G2 vs G3 ($p = 0.26128$), and G1 vs G3 ($p = 0.0276$)