Atypical Length Responses in Mysid Chronic Testing - Are They Relevant to Risk Assessment

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Introduction

Aquatic, invertebrate life cycle exposures are a key element for the risk assessment requirements for many regulatory bodies. Mysid shrimp (*Americamysis bahia*), a marine invertebrate, are a relevant species for this testing. Invertebrate species are not currently included in guidance for endocrine disruption evaluation as the test designs are not considered to be a robust for the evaluation of endocrine activity. The endpoints for standard chronic exposures with mysid are apical. With the advances of digital imaging, the precision available for the length measurements has improved, often providing us with statistically significant effects at the length endpoint with very small percent differences from the controls. It is common in mysid testing to have anomalous and seemingly "flat" responses in growth endpoints which do not follow a typical dose response. This evaluation looks to understand trends in these flat responses and their potential role in detecting a mechanistic cause.

Methods

Data for thirty mysid chronic studies were evaluated, all performed between 2013 and 2017. Data sets were evaluated to understand where all treatment results were, in their entirety, less than or greater than the controls (i.e. no variability around the control data at any treatment level).

- Mysid chronic design is 28 days, under flow through conditions
- Four replicates for each control and concentration
- Twenty mysid, <24 hours old, in each replicate at initiation
- At maturation, male and female pair are established for evaluation of reproduction
- At termination, parental mysid are photographed for length evaluation

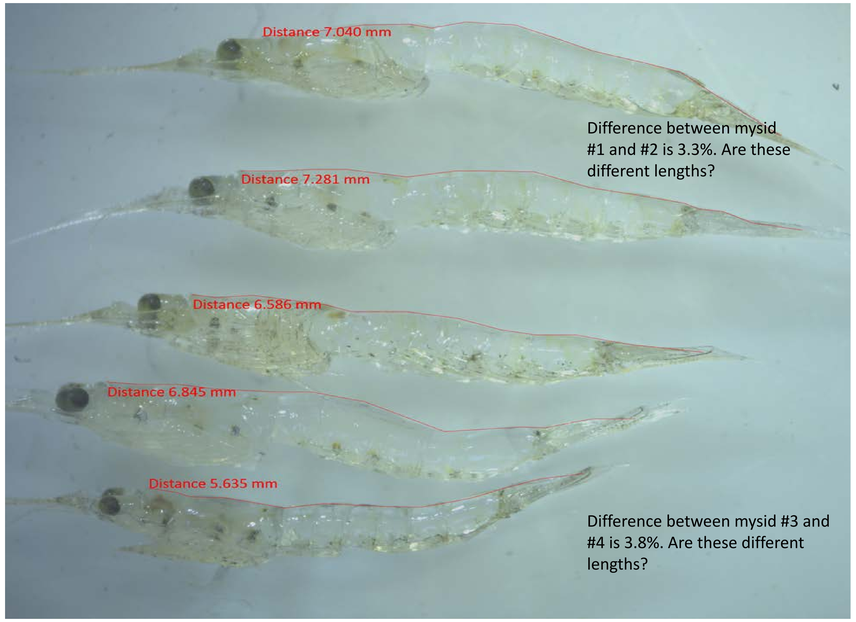
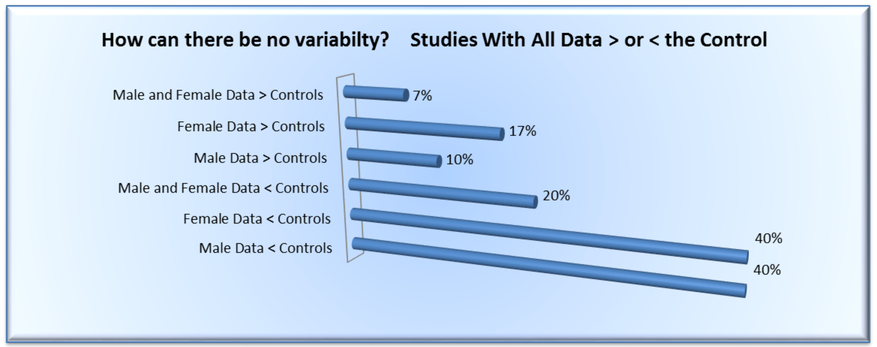
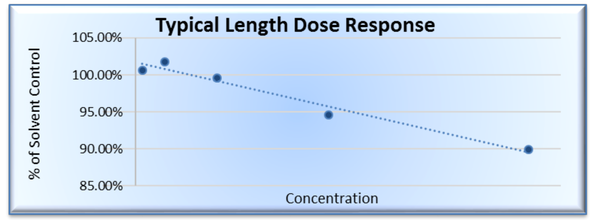
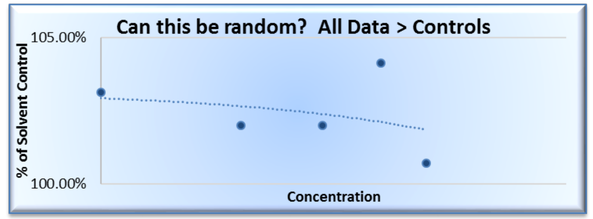


Figure 1 Representative photo used for determining lengths in a standard chronic toxicity exposure







Conclusions

- Probability for complete data sets to be > or < controls in their entirety is statistically low but the occurrence is high
- Not adverse
- Not population relevant
- Is it informative?
- Can detecting slight differences from control be indicative of a key event in an adverse outcome pathway?

Acknowledgments

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