

Key words: *Drosophila melanogaster*, development, nutrient availability, egg laying behavior

is the lack of evidence that these molecular mechanisms caused the delay in development. Future studies should expand upon the connection between TOR signaling and adult eclosion as a function of protein availability.

Lastly, we also found that larvae reared on a higher concentration of yeast had a higher viability than larvae reared on a low concentration of yeast. This result was expected, since as mentioned earlier, nutritional deficiencies halt development and led to a higher larval mortality rate (Danielsen et al., 2013). Therefore, the flies in this study could not develop into adults if they died during an earlier development stage.

Future research is still needed to determine the molecular mechanisms that lead to larval death under nutrient deficient conditions, as well as determining whether ecdysone accumulation explains the developmental delay in this experimental paradigm. Future studies should also determine whether the length of the development period is sexually dimorphic when larvae are fed food with concentrations of yeast. Future studies should also be done to explore whether different larval diets result in change in lifespan and fertility to demonstrate the importance of larval diets on later life characteristics and survival.

Overall, the results of this study demonstrate the importance of a rich protein diet for larvae to increase development speed and viability in *Drosophila melanogaster*. Furthermore, many genes and molecular mechanisms are conserved between flies and humans. Hence, these results in combination with findings in the scientific literature, invite further research to explore the connection between developmental and nutrient-dependent mechanisms in mammals.

Figures

Figure 1a. Total number of male and female flies that eclosed each day (16, 19, 20, 21, and 22) post-mating when raised on food medium containing 1% concentration of yeast. Error bars indicate standard deviation.

Figure 1b. Total number of male and female flies that eclosed each day (16, 19, 20, 21, and 22) post-mating when raised on food medium containing 5% concentration of yeast. Error bars indicate standard deviation.

Figure 2a. Total average of flies (males + females) that eclosed each day after post-mating for flies raised on food medium containing 1% or 5% concentration of yeast. Error bars indicate standard deviation.

Figure 2b. Average eclosion time in days as a function of yeast concentration in fly food medium (1% yeast and 5% yeast). Error bars indicate SEM.

Figure 2c. Average percent of flies that eclosed when raised on food medium containing 1% or 5% concentration of yeast. Error bars indicate standard deviation.

References

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