



# ***Arm-Gal4* inheritance influences development and lifespan in *Drosophila melanogaster***

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**ABSTRACT.** The *UAS-Gal4* ectopic expression system is a widely used and highly valued tool that allows specific gene expression in *Drosophila melanogaster*. Yeast transcription factor Gal4 can be directed using *D. melanogaster* transcriptional control elements, and is often assumed to have little effect on the organism. By evaluation of the consequences of maternal and paternal inheritance of a *Gal4* transgene under the transcriptional regulation of *armadillo* control elements (*arm-Gal4*), we demonstrated that Gal4 expression could be detrimental to development and longevity. Male progeny expressing *arm-Gal4* in the presence of *UAS-lacZ* transgene had reduced numbers and size of ommatidia, compared to flies expressing *UAS-lacZ* transgene under the control of other Gal4 transgenes. Aged at 25°C, the median life span of male flies with maternally inherited *elav-Gal4* was 70 days, without a responding transgene or with *UAS-lacZ*. The median life span of maternally inherited *arm-Gal4* male flies without a responding transgene was 48 days, and 40 days with the *UAS-lacZ* transgene. A partial rescue of this phenotype was observed with the expression of *UAS-lacZ* under paternal *arm-Gal4* control, having an average median lifespan of 60 days. This data suggests that *arm-Gal4* has detrimental effects on *Drosophila* development and lifespan that are directly dependent upon parental inheritance, and that the benign responder and

reporter gene *UAS-lacZ* may influence *D. melanogaster* development. These findings should be taken into consideration during the design and execution of *UAS-Gal4* expression experiments.

**Key words:** *Drosophila melanogaster*; *Arm-Gal4*; Parental inheritance; *UAS-lacZ*; Development; Longevity