Analysis of Longevity from Muscle dTORC1 Effector Flies

Dave Bridges, Isabelle Hatfield and Erika Yates

February 9, 2015

These studies evaluate the effects of knockdown of several dTORC1 effectors, including Autophagy genes (*Atg5*, *Atg8a* and *Atg8b*) and the SREBP1 ortholog *Hlh106* This data is located in /Users/davebridges/Documents/Source/DrosophilaMuscleFunction/Lifespan and was most recently updated on Tue Feb 9 16:48:57 2016.

Experimental Design

This script was most recently run on Tue Feb 9 16:48:58 2016. There has been a total of **1117** deaths, with **1113** of natural causes and **1109** of identifiable genotypes excluding accidental deaths. The oldest fly recorded so far was 155 days old at time of death.

Gene Level Analysis

Number of Flies Examined

The total number of deaths for each cross and genotype, removing deaths that were accidental or not due to natural causes, the data is shown in the table below:

Table 1: Total Natural Deaths by Gender for Each Gene and Genotype

| UAS	Gene	female	male
36304	Control	124	101
25975	HLH106	44	22
27551	Atg5	61	81
27554	Atg8b	54	46
34073	HLH106	57	64
34340	Atg8a	10	47

Survival Analysis

All of these are relative to the reference Genotype which is the knockdown (GAL4/shRNA). The key packages used in this The summary statistics from this analysis are shown in the tables below:
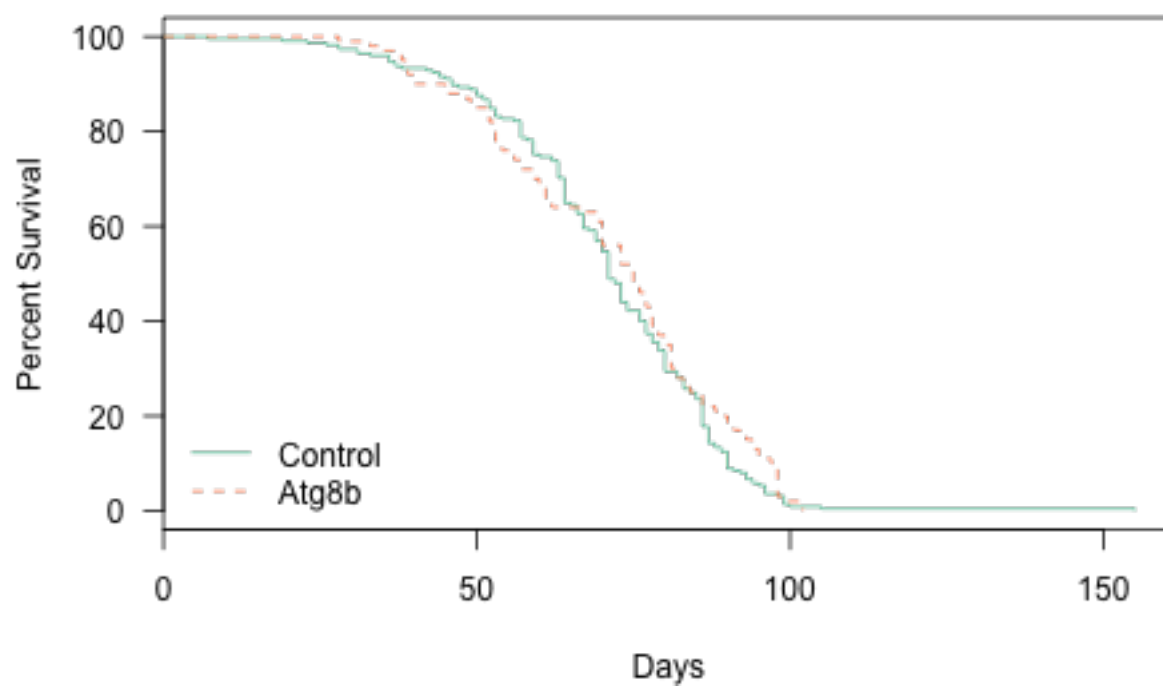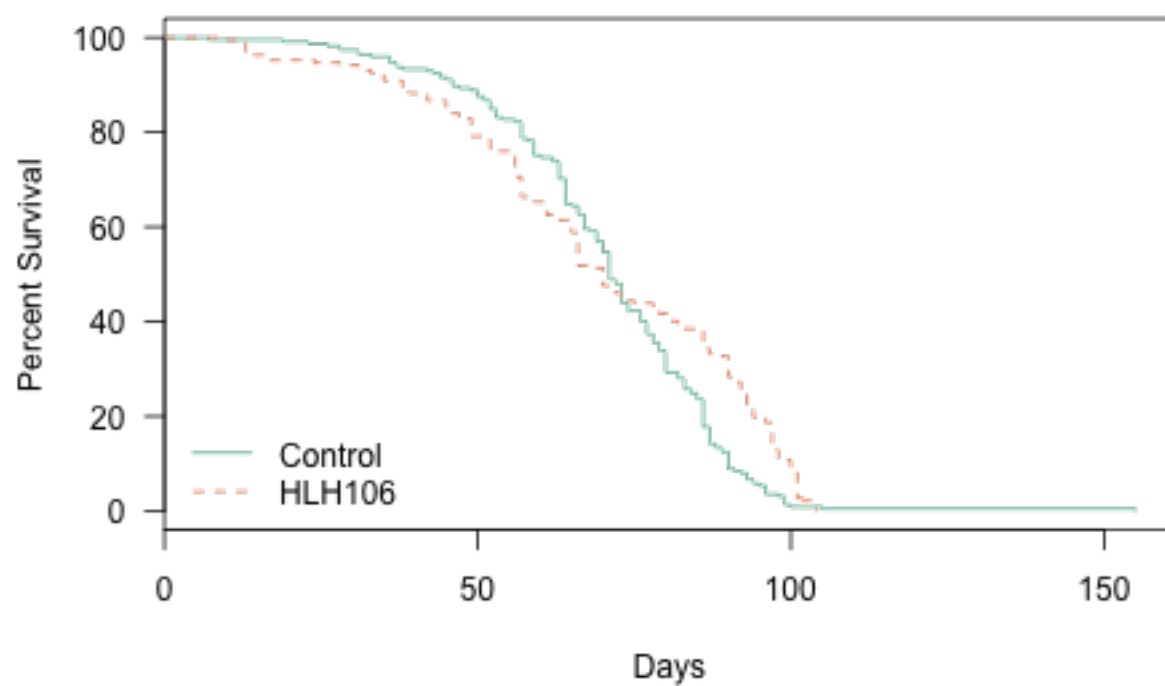
Survival of Atg5 with 24B-GAL4 Driver
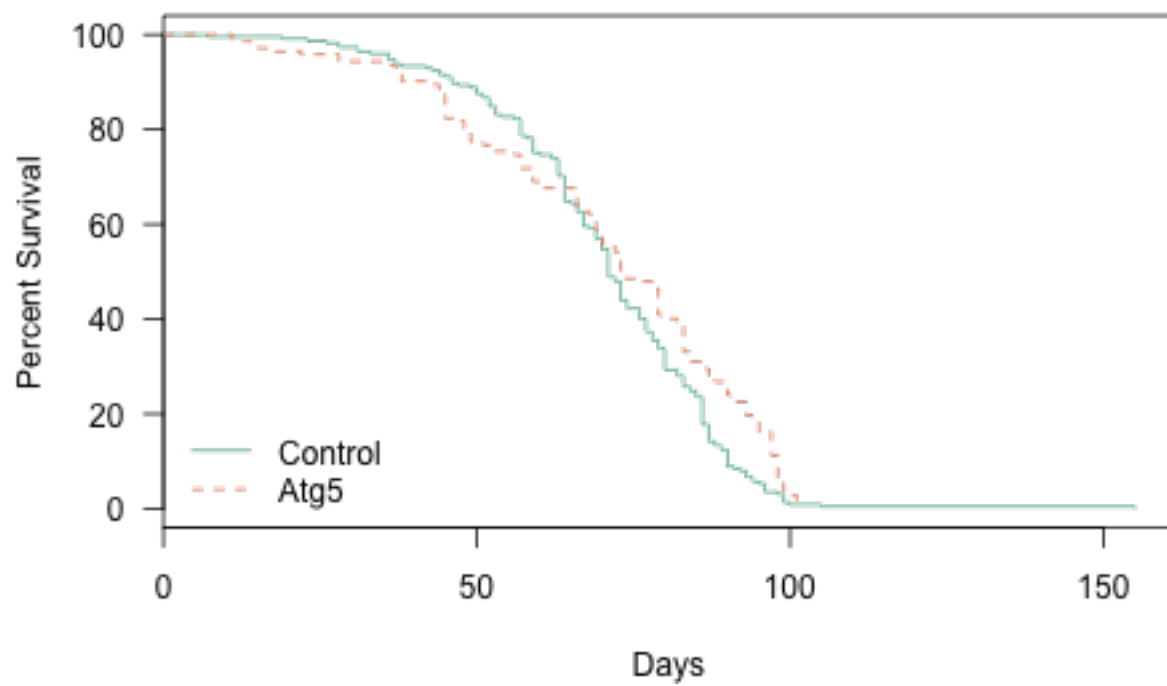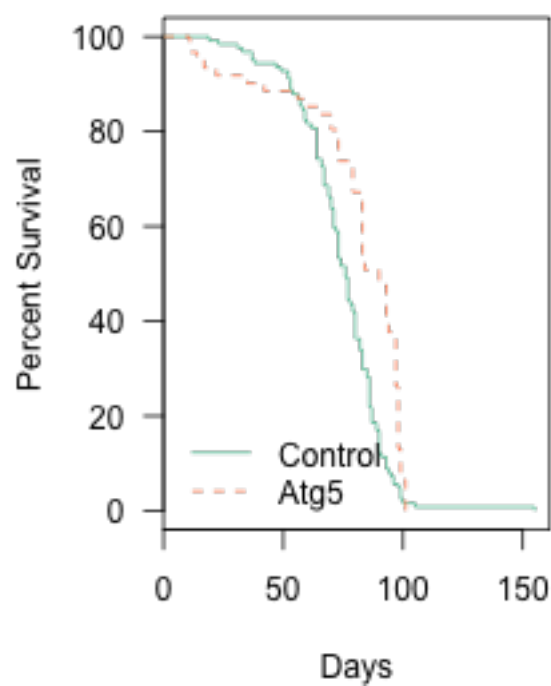

Survival of Atg8a with 24B-GAL4 Driver
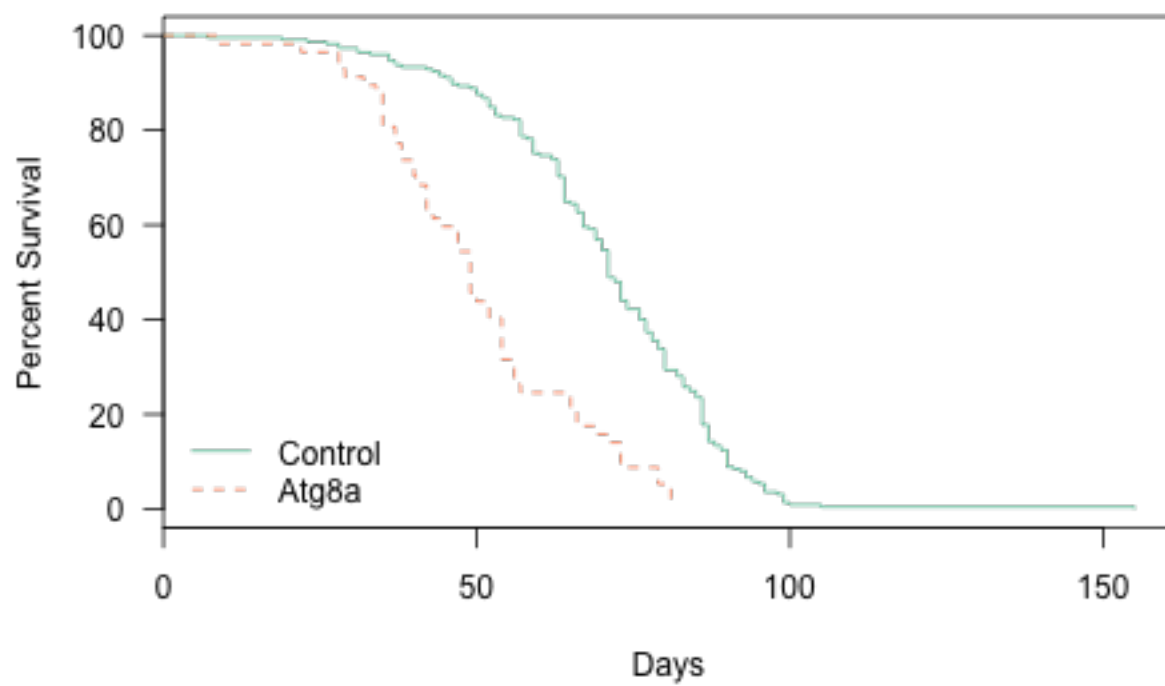
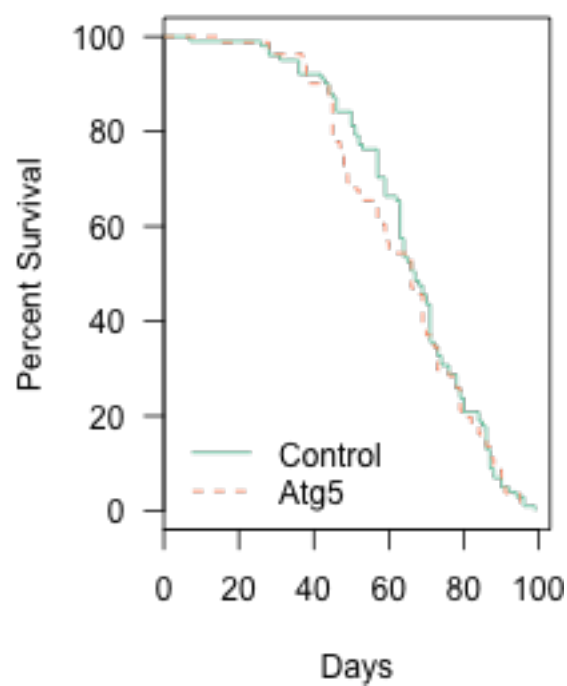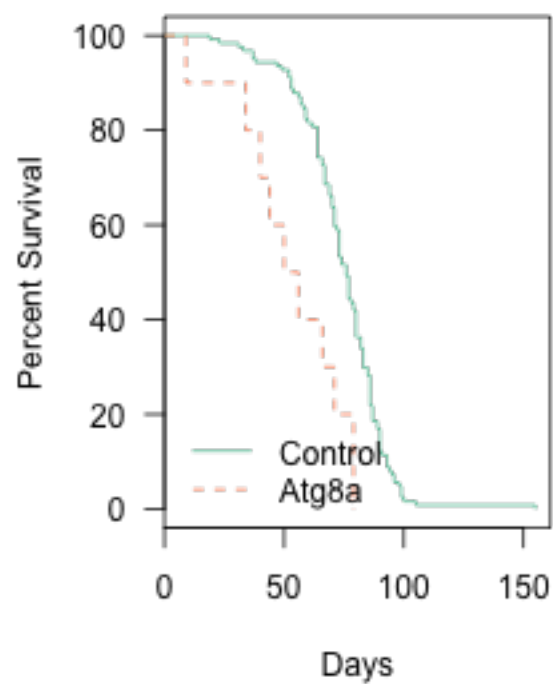## Survival of Atg8b with 24B-GAL4 Driver

Survival of HLH106 with 24B-GAL4 Driver
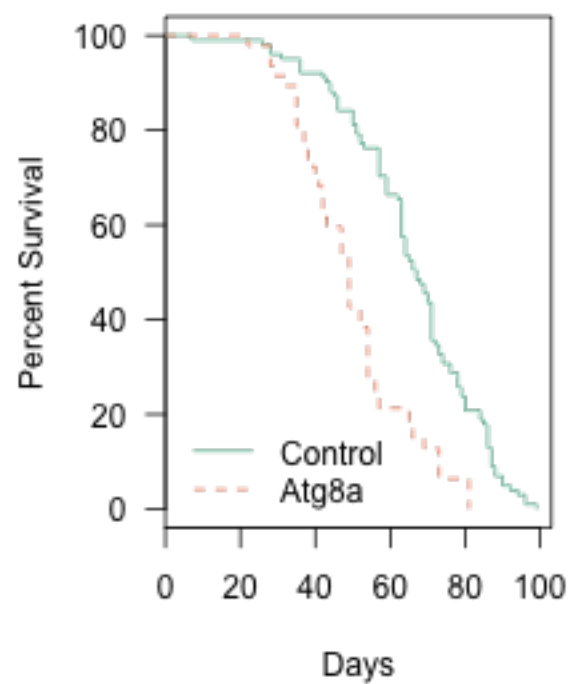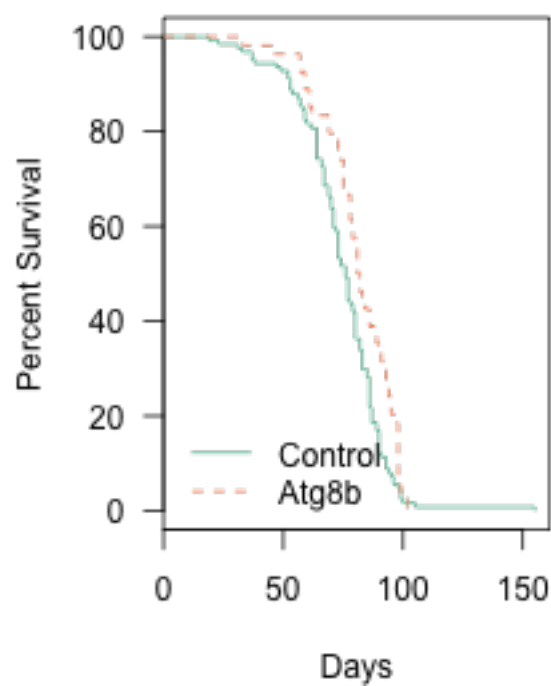
Atg5 female

Atg5 male

Atg8a female

Atg8a male
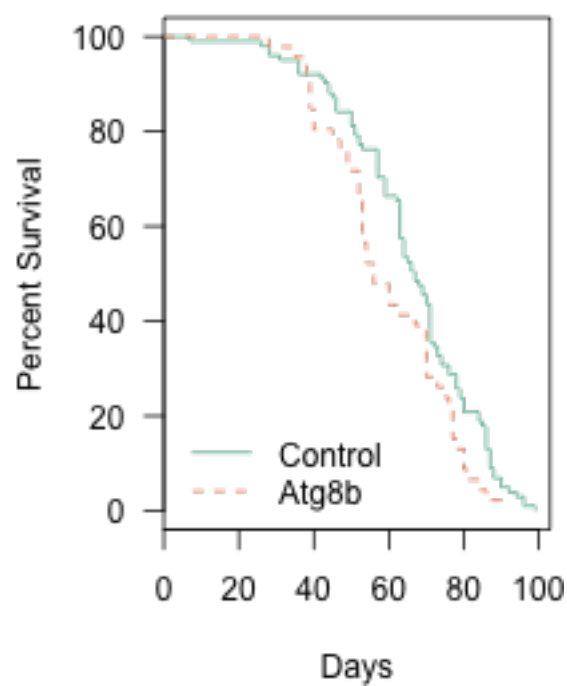

4

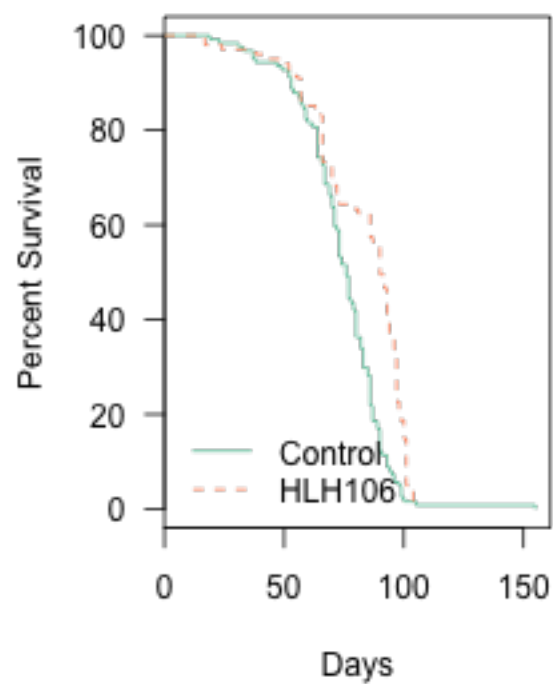# Atg8b female

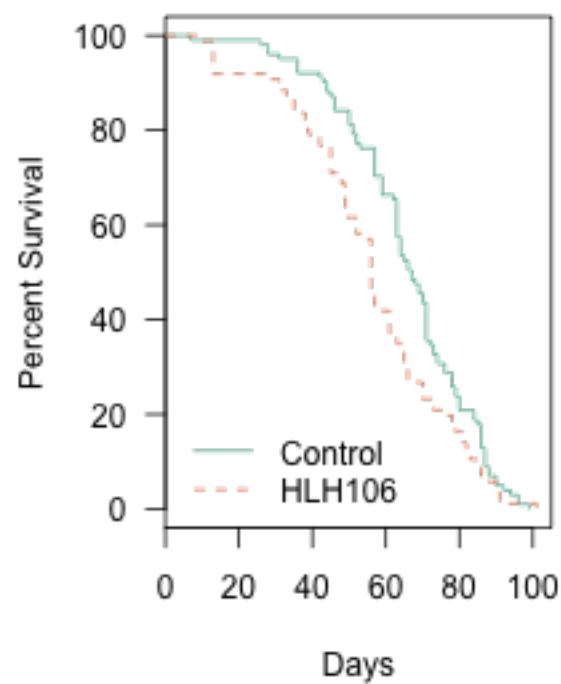# Atg8b male

HLH106 female

HLH106 male

Table 2: Gene Level Tests for 24B-Gal4 Drivers

	n	logtest.p	waldtest.p	sctest.p
Control	NA	NA	NA	NA
Atg5	367	0.0208122	0.0218350	0.0215273
Atg8a	282	0.0000000	0.0000000	0.0000000
Atg8b	325	0.2681544	0.2719850	0.2716462
HLH106	412	0.0032338	0.0033468	0.0032504

Table 3: Gene and Gender Level Tests for 24B-Gal4 Drivers

	n	logtest.p	waldtest.p	sctest.p
Atg5 male	182	0.562147821	0.561551164	0.561427958
Atg5 female	185	0.000078321	0.000118024	0.000095685
Atg8a male	148	0.000000252	0.000000051	0.000000015
Atg8a female	134	0.001739391	0.000273395	0.000107367
Atg8b male	147	0.017618991	0.014771812	0.014005598
Atg8b female	178	0.015224195	0.017577936	0.016912379
HLH106 male	187	0.013451588	0.012740739	0.012257140
HLH106 female	225	0.000001906	0.000002068	0.000001487

Analysis by shRNA Clone

Survival of 25975 with 24B-GAL4 Driver
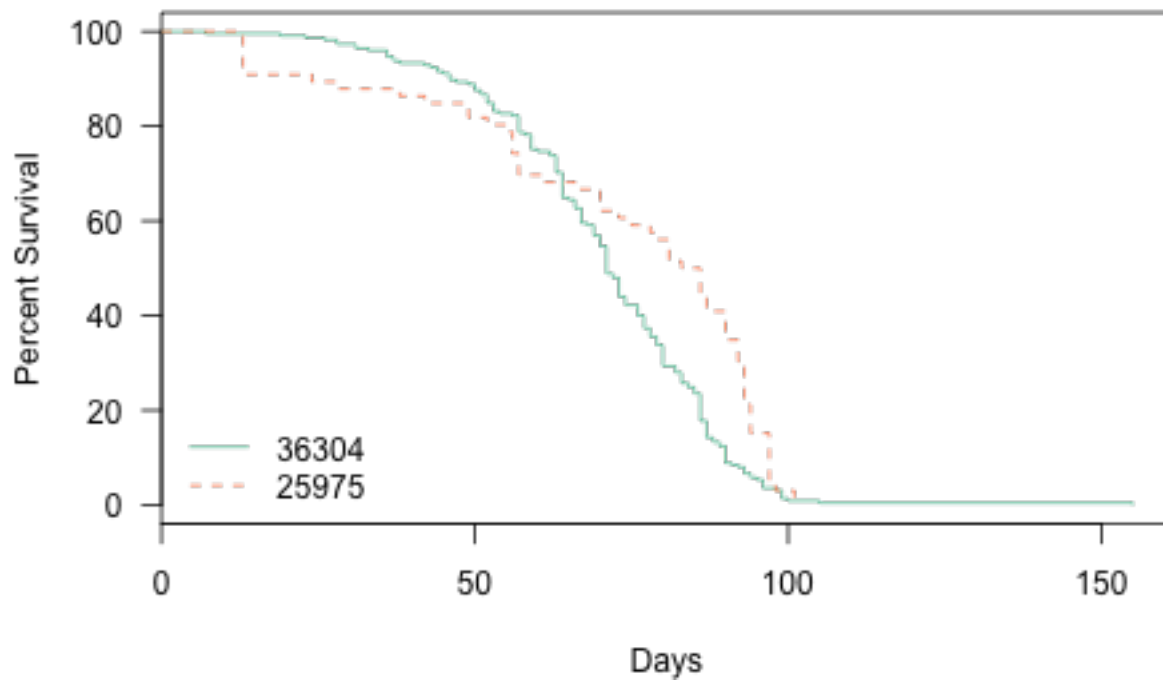
Survival of 27551 with 24B-GAL4 Driver
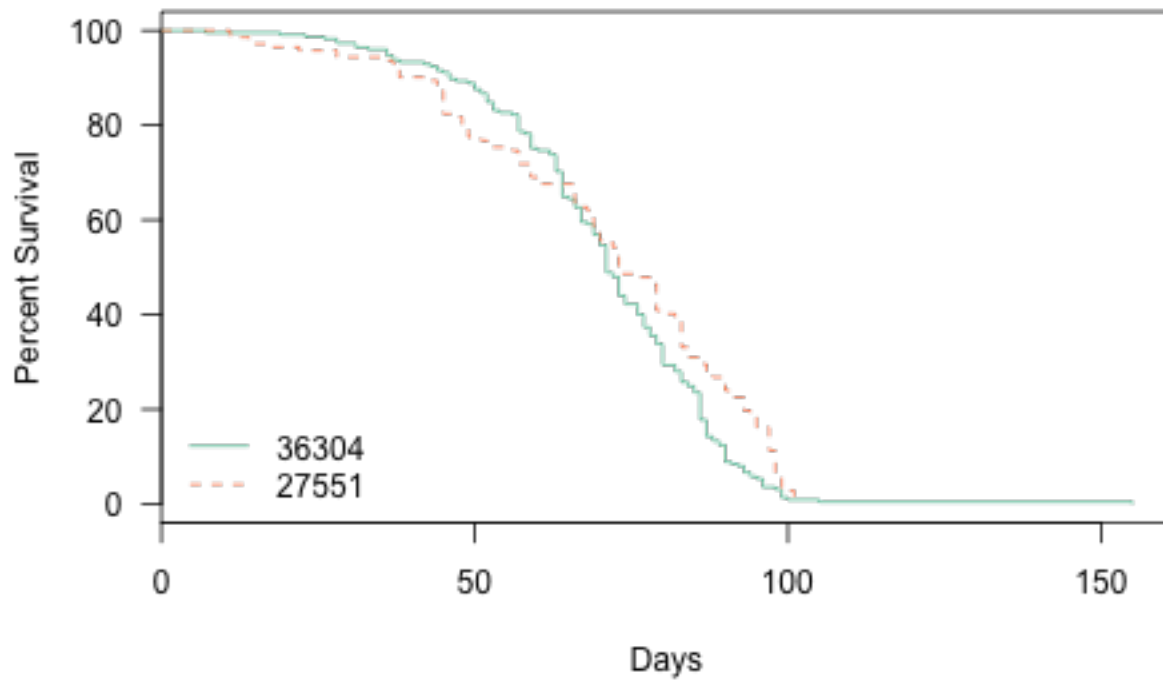
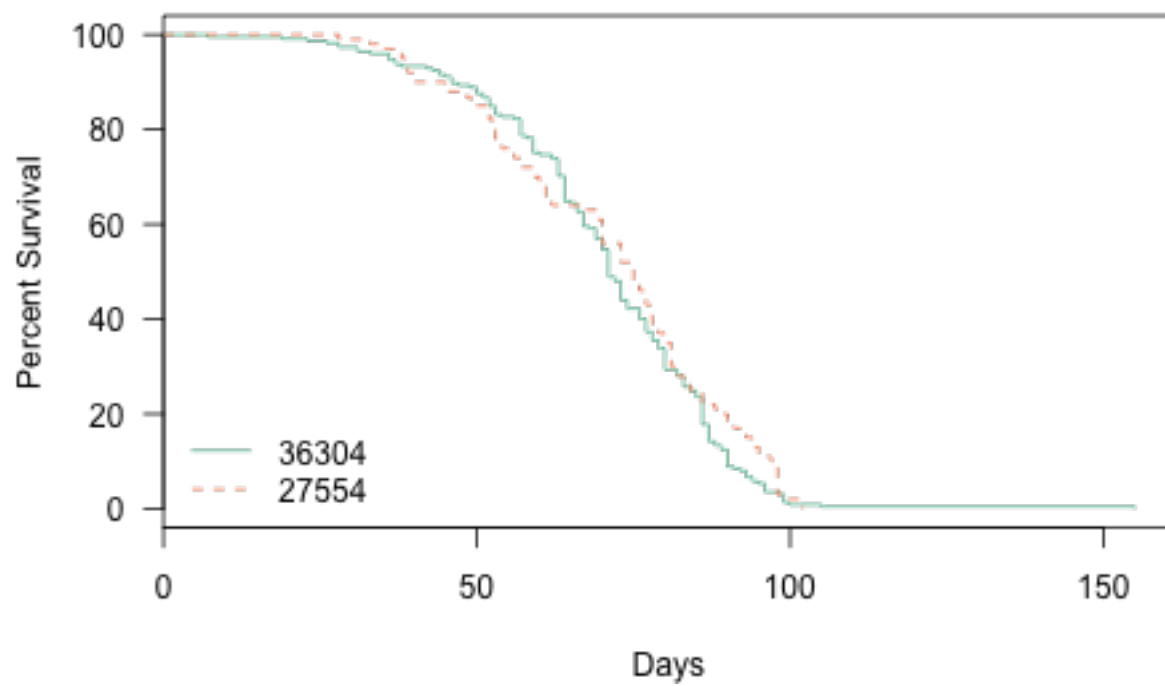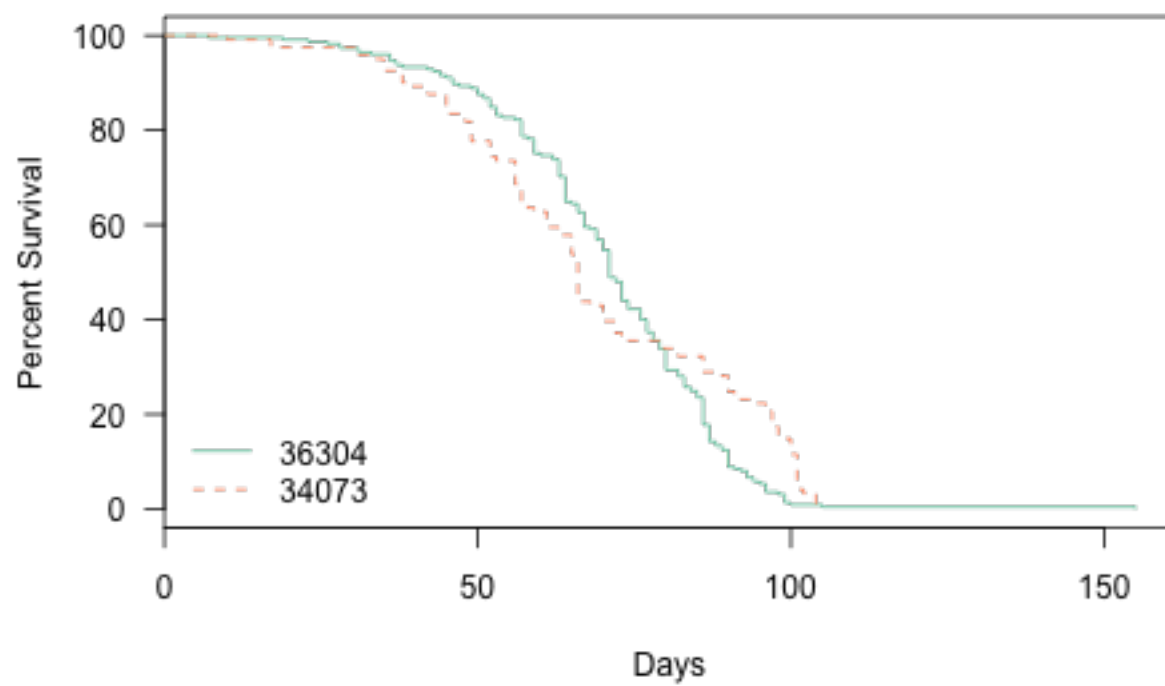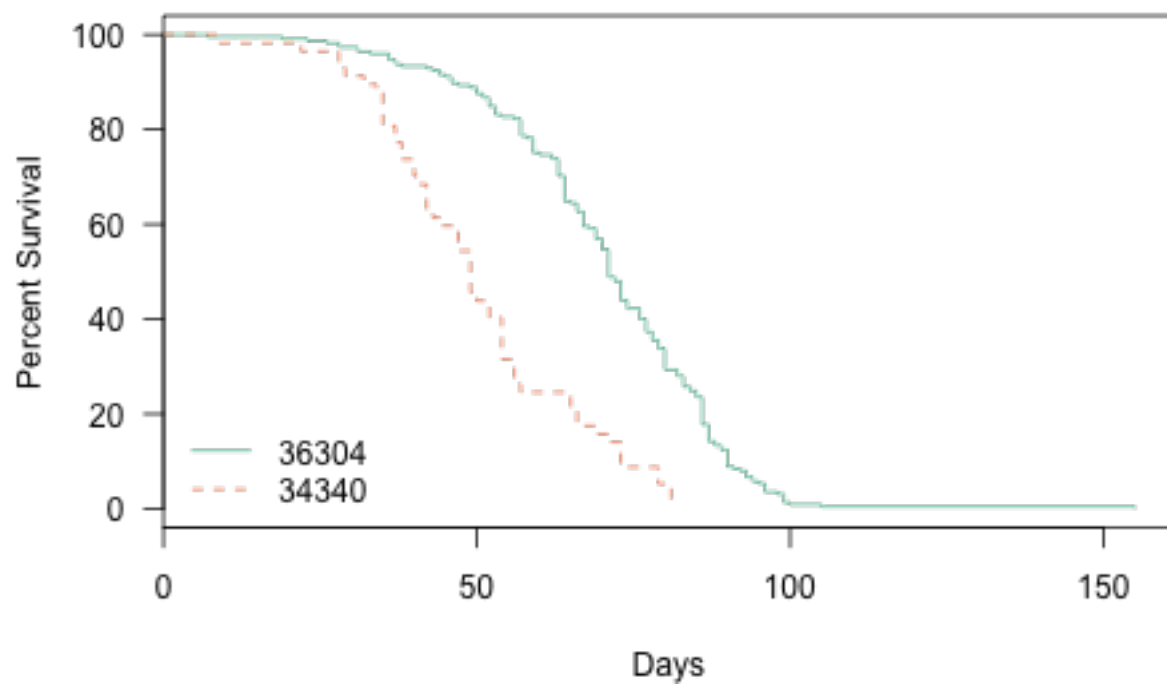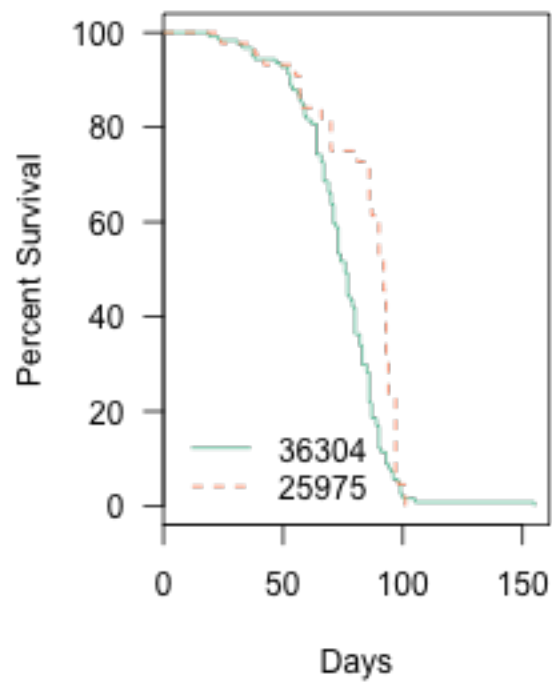## Survival of 27554 with 24B-GAL4 Driver

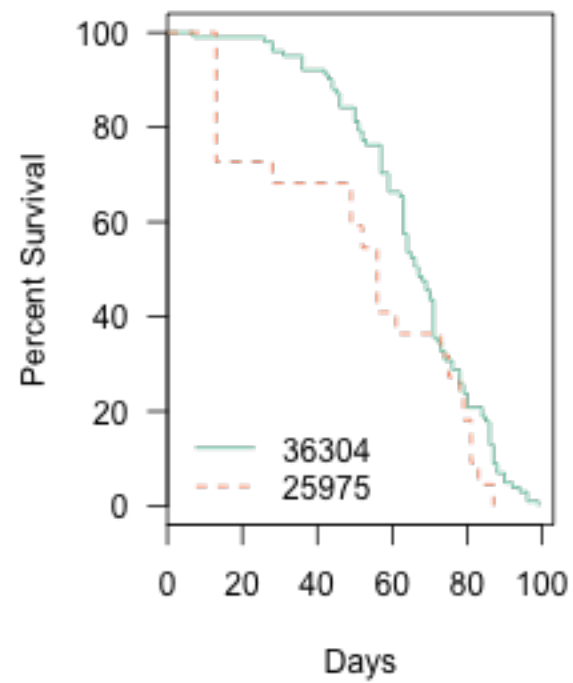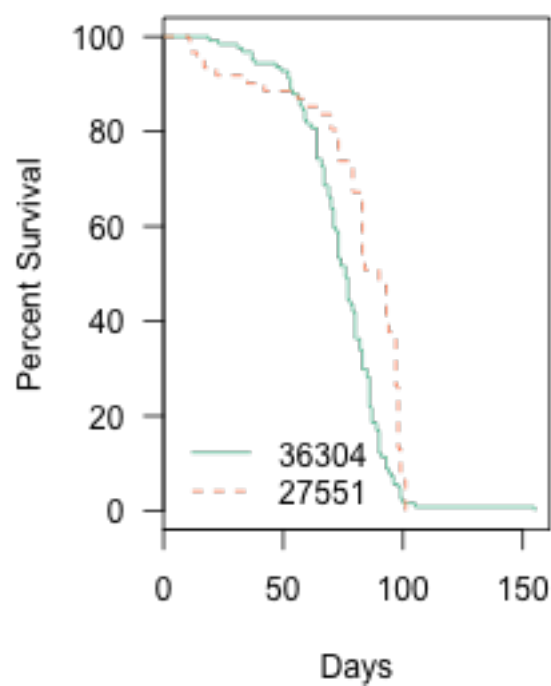## Survival of 34073 with 24B-GAL4 Driver

8

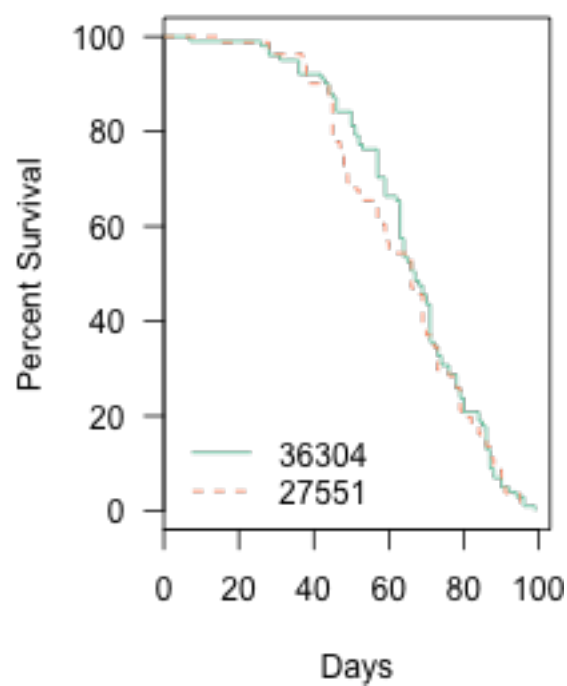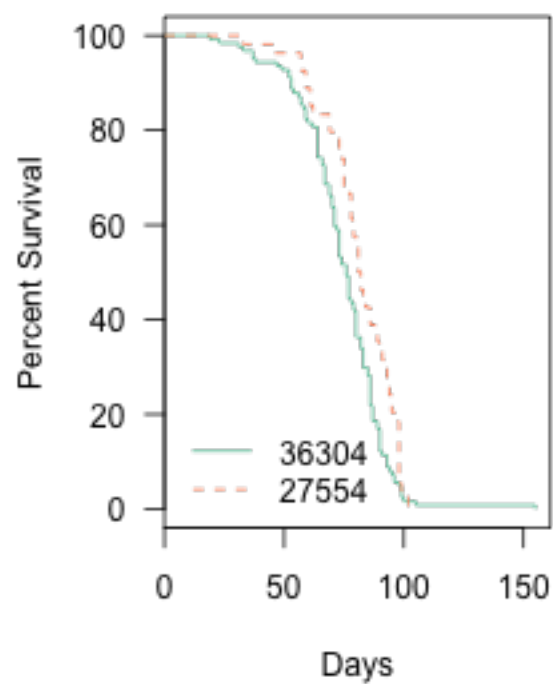Survival of 34340 with 24B-GAL4 Driver
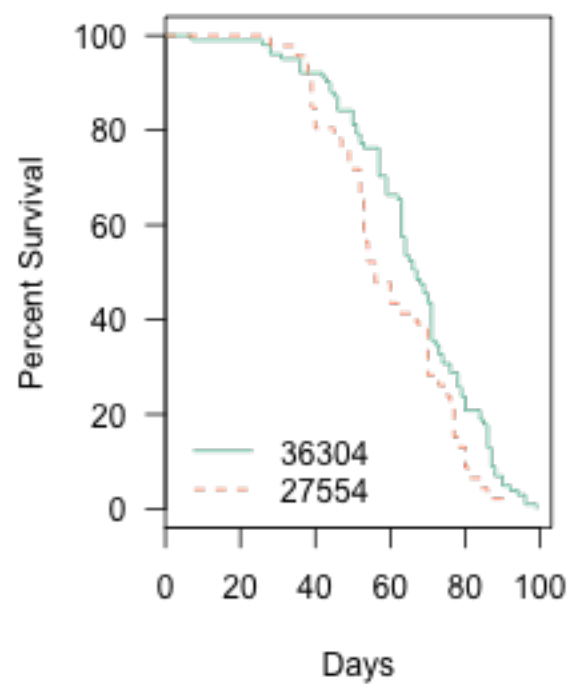
25975 female

25975 male

27551 female

27551 male

27554 female

27554 male

34073 female
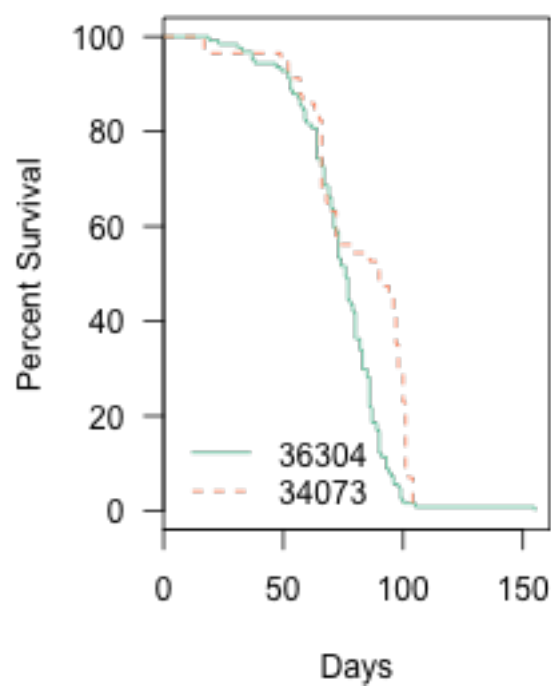
34073 male
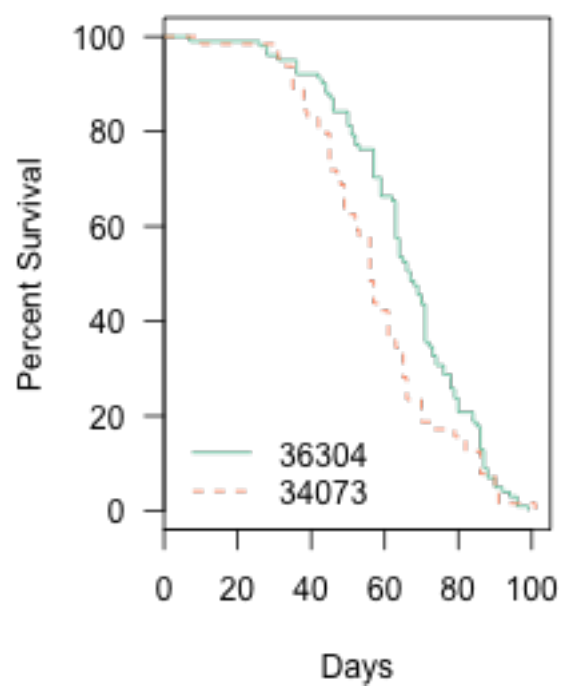
34340 female
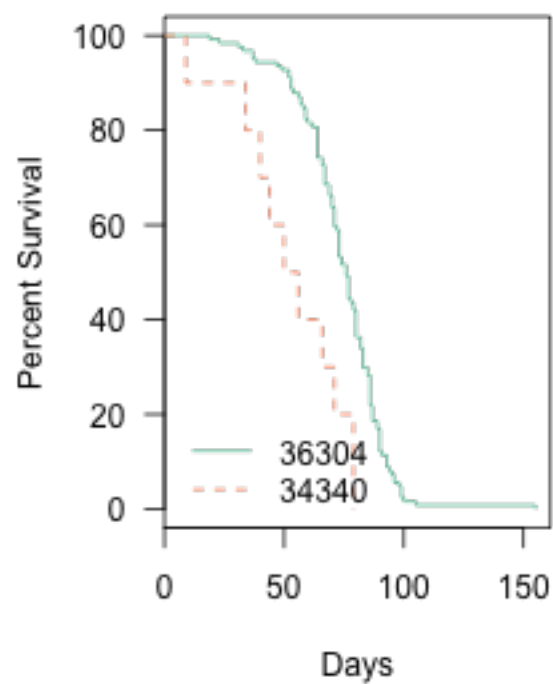
34340 male
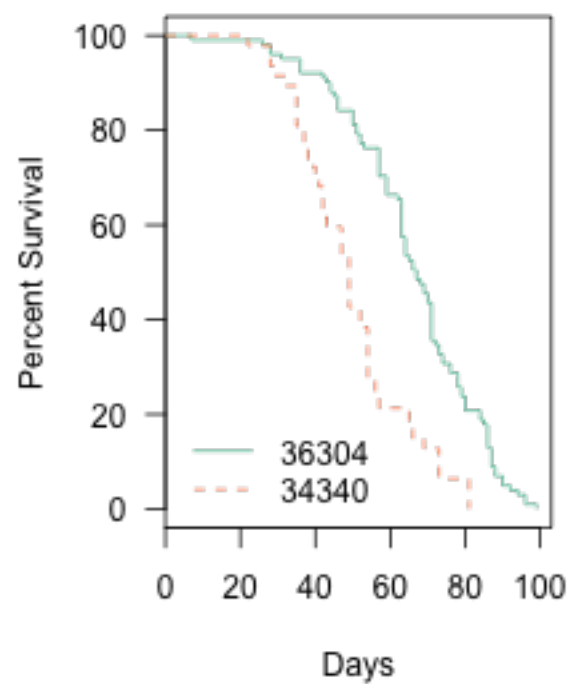
Table 4: UAS Level Tests for 24B-Gal4 Drivers

	n	logtest.p	waldtest.p	sctest.p
36304	NA	NA	NA	NA
25975	291	0.0012544	0.0018383	0.0017014
27551	367	0.0208122	0.0218350	0.0215273
27554	325	0.2681544	0.2719850	0.2716462
34073	346	0.0581304	0.0607235	0.0603195
34340	282	0.0000000	0.0000000	0.0000000

Table 5: UAS and Gender Level Tests for 24B-Gal4 Drivers

	n	logtest.p	waldtest.p	sctest.p
female 36304	NA	NA	NA	NA
male 36304	NA	NA	NA	NA
female 25975	168	0.000294054	0.000499263	0.000415450
male 25975	123	0.063911798	0.052066030	0.050012278
female 27551	185	0.000078321	0.000118024	0.000095685
male 27551	182	0.562147821	0.561551164	0.561427958
female 27554	178	0.015224195	0.017577936	0.016912379
male 27554	147	0.017618991	0.014771812	0.014005598
female 34073	181	0.000049950	0.000083672	0.000068421
male 34073	165	0.028979399	0.026531128	0.025760116
female 34340	134	0.001739391	0.000273395	0.000107367
male 34340	148	0.000000252	0.000000051	0.000000015

Hazard Ratios and Summary Tables

Table 6: Hazard Ratios for All Comparasons

group	Coef	SE	Hazard.Ratio	p	padj
25975	-0.44645	0.14331	1.56276	0.00184	0.00414
25975.female	-0.62812	0.18043	1.87408	0.00050	0.00123
25975.male	0.46476	0.23925	0.62829	0.05207	0.06390
27551	-0.25092	0.10942	1.28521	0.02184	0.02948
27551.female	-0.62422	0.16213	1.86678	0.00012	0.00040
27551.male	0.08732	0.15041	0.91638	0.56155	0.56155
27554	-0.13321	0.12127	1.14249	0.27199	0.29374
27554.female	-0.39276	0.16542	1.48107	0.01758	0.02637
27554.male	0.44430	0.18224	0.64128	0.01477	0.02493
34073	-0.22341	0.11912	1.25033	0.06072	0.07128
34073.female	-0.68169	0.17330	1.97721	0.00008	0.00038
34073.male	0.35884	0.16176	0.69849	0.02653	0.03411
34340	1.26360	0.15854	0.28264	0.00000	0.00000
34340.female	1.23500	0.33935	0.29083	0.00027	0.00074
34340.male	1.02805	0.18867	0.35770	0.00000	0.00000
Atg5	-0.25092	0.10942	1.28521	0.02184	0.02948
Atg5.female	-0.62422	0.16213	1.86678	0.00012	0.00040
Atg5.male	0.08732	0.15041	0.91638	0.56155	0.56155
Atg8a	1.26360	0.15854	0.28264	0.00000	0.00000

group	Coef	SE	Hazard.Ratio	p	padj
Atg8a.female	1.23500	0.33935	0.29083	0.00027	0.00074
Atg8a.male	1.02805	0.18867	0.35770	0.00000	0.00000
Atg8b	-0.13321	0.12127	1.14249	0.27199	0.29374
Atg8b.female	-0.39276	0.16542	1.48107	0.01758	0.02637
Atg8b.male	0.44430	0.18224	0.64128	0.01477	0.02493
HLH106	-0.30339	0.10341	1.35444	0.00335	0.00695
HLH106.female	-0.67425	0.14205	1.96256	0.00000	0.00001
HLH106.male	0.36866	0.14800	0.69166	0.01274	0.02457

Session Information

```
## R version 3.2.2 (2015-08-14)
## Platform: x86_64-apple-darwin13.4.0 (64-bit)
## Running under: OS X 10.11.3 (El Capitan)
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
## [1] survival_2.38-3   RColorBrewer_1.1-2 tidyr_0.3.1
## [4] dplyr_0.4.3       lubridate_1.5.0    RCurl_1.95-4.7
## [7] bitops_1.0-6      knitr_1.11
##
## loaded via a namespace (and not attached):
##  [1] Rcpp_0.12.2     assertthat_0.1  digest_0.6.8    R6_2.1.1
##  [5] DBI_0.3.1       formatR_1.2.1   magrittr_1.5    evaluate_0.8
##  [9] highr_0.5.1     stringi_1.0-1   lazyeval_0.1.10 rmarkdown_0.8.1
## [13] splines_3.2.2   tools_3.2.2     stringr_1.0.0   parallel_3.2.2
## [17] yaml_2.1.13     htmltools_0.2.6
```