miRNA	N	Measure of pixel intensity	Time window (hours post-hatch)	Slope R^2	Mean R^2	Joint R^2	Joint 95% CI
let-7	283	99th percentile	72–233	0.002	0.007	0.013	[-0.016, 0.040]
lin-4	197	Mean over 99th percentile	72–212	0.162	0.014	**0.165 (+)**	[0.071, 0.26]
mir-1	72	Maximum (head)	72–192	0.086	0.002	0.091	[-0.035, 0.19]
mir-47	408	Maximum	72–201	0.257	0.104	**0.287 (+)**	[0.22, 0.35]
mir-51	83	Maximum	72–236	0.002	0.015	0.015	[-0.067, 0.11]
mir-59	104	95th percentile (vulva)	72–150	0.044	0.031	0.067	[-0.037, 0.14]
mir-60	218	99th percentile	72–210	0.117	0.101	**0.174 (+)**	[0.061, 0.27]
mir-63	138	99th percentile	72–231	0.121	0.025	0.138	[0.036, 0.24]
mir-79	86	Maximum	72–120	0.035	0.002	0.038	[-0.043, 0.11]
mir-84	142	99th percentile	72–231	0.006	0.059	0.059	[-0.04, 0.15]
mir-85	184	99th percentile	72–172	0.177	0.041	**0.177 (+)**	[0.10, 0.26]
mir-90	173	95th percentile	72–221	0.101	0.142	**0.172 (+)**	[0.076, 0.29]
mir-228	151	Mean over 99th percentile	72–170	0.122	0.019	0.125	[0.039, 0.22]
mir-240-786	160	95th percentile	72–228	0.178	0.187	**0.232 (-)**	[0.13, 0.33]
mir-241	97	99th percentile (head)	72–120	0.023	0.013	0.039	[-0.035, 0.10]
mir-242	98	Maximum	72–204	0.004	0.031	0.037	[-0.040, 0.11]
mir-243	343	Mean	72–176	0.305	0.091	**0.326 (+)**	[0.25, 0.40]
mir-246	193	95th percentile	72–200	0.120	0.024	0.128	[0.053, 0.20]
mir-360	87	Maximum	72–191	0.018	0.018	0.027	[-0.044, 0.093]
mir-788	187	Maximum	72–96	0.010	0.003	0.010	[-0.023, 0.039]
mir-793	177	Maximum	72–237	0.158	0.046	**0.169 (+)**	[0.079, 0.26]
mir-794	91	Maximum	72–96	0.001	0.055	0.058	[-0.045, 0.15]

Table S1: Fixed-time-window correlation of *PmiRNA*::GFP reporter expression with lifespan. A joint regression of slope and average expression against lifespan was performed using a window starting at 72 hours post-hatch and ending at the 90% survival timepoint. R^2 values exceeding 0.15 are indicated by **bolded** text. The 95% confidence interval (CI) for each joint correlation coefficient is also shown. The direction of correlation, derived from the individual regression on slope and mean expression (which we observed to always correlate in the same direction), is indicated by (+) or (-), respectively.

miRNA	N	Measure of pixel intensity	Time window (days post-hatch)	Slope R^2	Mean R^2	Joint R^2	Joint 95% CI
let-7	307	99th percentile	6.0–7.5	0.014	0.024	0.036	[-0.007, 0.081]
lin-4	209	Mean over 99th percentile	4.5–8.0	0.200	0.021	**0.203 (+)**	[0.114, 0.293]
mir-1	79	Maximum (head)	6.0–7.5	0.102	0.025	0.117	[0.009, 0.237]
mir-47	433	Maximum	5.0–8.0	0.125	0.165	**0.290 (+)**	[0.219, 0.363]
mir-51	87	Maximum	8.0–8.5	0.025	0.048	0.098	[-0.016, 0.210]
mir-59	104	95th percentile (vulva)	4.5–6.5	0.002	0.092	0.092	[-0.017, 0.187]
mir-60	227	99th percentile	7.5–8.0	0.017	0.177	**0.189 (+)**	[0.073, 0.302]
mir-63	147	99th percentile	3.0–9.0	0.109	0.019	0.124	[0.033, 0.219]
mir-79	86	Maximum	3.5–4.0	0.005	0.010	0.025	[-0.033, 0.076]
mir-84	157	99th percentile	3.0–7.5	0.024	0.023	0.091	[-0.005, 0.172]
mir-85	194	99th percentile	4.0–6.5	0.115	0.048	0.146	[0.065, 0.228]
mir-90	181	95th percentile	8.0–8.5	0.014	0.215	**0.229 (+)**	[0.120, 0.347]
mir-228	164	Mean over 99th percentile	5.5–6.5	0.059	0.059	0.110	[0.036, 0.193]
mir-240-786	172	95th percentile	7.5–8.5	0.043	0.268	**0.291 (-)**	[0.167, 0.415]
mir-241	97	99th percentile (head)	3.0–3.5	0.013	0.037	0.051	[-0.040, 0.142]
mir-242	107	Maximum	4.5–5.5	0.096	0.012	0.096	[-0.008, 0.192]
mir-243	360	Mean	4.5–7.0	0.203	0.160	**0.325 (+)**	[0.255, 0.399]
mir-246	205	95th percentile	7.0–7.5	0.025	0.134	**0.181 (+)**	[0.087, 0.277]
mir-360	87	Maximum	4.0–5.0	0.061	0.009	0.071	[-0.025, 0.160]
mir-788	187	Maximum	3.0–3.5	0.000	0.005	0.006	[-0.029, 0.037]
mir-793	186	Maximum	5.5–9.5	0.120	0.070	**0.161 (+)**	[0.074, 0.243]
mir-794	91	Maximum	3.0–3.5	0.009	0.082	0.093	[-0.032, 0.209]

Table S2: Correlation of *PmiRNA*::GFP reporters with lifespan using a sliding window and 95% survival endpoint. A joint regression of slope and average expression against lifespan was performed using a sliding time window (minimum width of 12 hours) beginning at 3 days post-hatch and ending at the 95% survival timepoint. The optimal time window and highest correlation achieved is reported. R^2 values exceeding 0.15 are indicated by **bolded** text. The 95% confidence interval (CI) for each joint correlation coefficient is also shown. The direction of correlation, derived from the individual regression on slope and mean expression (which we observed to always correlate in the same direction), is indicated by (+) or (-), respectively.

Reporter	N	Measure of pixel intensity	Time window (hours post-hatch)	Slope R^2	Mean R^2	Joint R^2	Joint 95% CI
cpna-2	65	99th percentile	168–192 (S)	0.112	0.006	0.123	[0.007, 0.242]
cpna-2	64	99th percentile	72–196 (F)	0.007	0.017	0.018	[-0.081, 0.093]
myo-2	171	Maximum	108–156 (S)	0.107	0.005	0.112	[0.024, 0.191]
myo-2	163	Maximum	72–168 (F)	0.069	0.009	0.071	[0.004, 0.144]

Table S3: Correlation with lifespan of promoter::GFP reporters for two non-miRNA promoters. A joint regression on slope and average expression against lifespan was performed using a sliding 12-hour window beginning at 3 days post-hatch (indicated by 'S'). The optimal time window and highest correlation achieved is reported as the joint regression R^2. Results from using a fixed window from 3 days post-hatch to the 90% survival timepoint (indicated by 'F') are also shown.

miRNA	N	Measure of pixel intensity	Time window (hours post-hatch)	Maximal expression R^2	p-value	Day of max expression R^2	p-value
let-7	283	99th percentile	72–233	0.000	0.989	0.001	0.681
lin-4	197	Mean over 99th percentile	72–212	0.000	0.853	0.001	0.638
mir-1	72	Maximum (head)	72–192	0.012	0.307	0.010	0.353
mir-47	408	Maximum	72–201	0.000	0.779	0.020	0.004
mir-51	83	Maximum	72–236	0.030	0.116	0.001	0.798
mir-59	104	95th percentile (vulva)	72–150	0.000	0.912	0.002	0.670
mir-60	218	99th percentile	72–210	0.003	0.425	0.025	0.019
mir-63	138	99th percentile	72–231	0.002	0.640	0.000	0.956
mir-79	86	Maximum	72–120	0.020	0.190	0.008	0.402
mir-84	142	99th percentile	72–231	0.005	0.397	0.005	0.388
mir-85	184	99th percentile	72–172	0.010	0.169	0.070	0.000
mir-90	173	95th percentile	72–221	0.013	0.138	0.028	0.028
mir-228	151	Mean over 99th percentile	72–170	0.022	0.071	0.027	0.044
mir-240-786	160	95th percentile	72–228	0.122	0.000	0.030	0.028
mir-241	97	99th percentile (head)	72–120	0.009	0.347	0.000	0.905
mir-242	98	Maximum	72–204	0.002	0.669	0.000	0.878
mir-243	343	Mean	72–176	0.001	0.534	0.028	0.002
mir-246	193	95th percentile	72–200	0.011	0.142	0.042	0.004
mir-360	87	Maximum	72–191	0.000	0.916	0.007	0.438
mir-788	187	Maximum	72–96	0.006	0.299	0.001	0.682
mir-793	177	Maximum	72–237	0.004	0.400	0.002	0.517
mir-794	91	Maximum	72–96	0.050	0.032	0.000	0.855

Table S4: Correlation coefficients and p-values for regression of lifespan against the whole-life maximum value of *PmiRNA*::GFP expression (measured as noted), or the day that that maximum value was achieved.

miRNA	N	Time window (hours post-hatch)	GFP slope R^2	GFP mean R^2	AF slope R^2	AF mean R^2	Summed R^2	Joint R^2
lin-4	197	72–212	0.162	0.014	0.140	0.037	0.353	0.302
mir-47	408	72–201	0.257	0.104	0.062	0.030	0.453	0.313
mir-60	218	72–210	0.117	0.101	0.145	0.059	0.421	0.241
mir-90	184	72–172	0.101	0.142	0.076	0.084	0.403	0.304
mir-228	173	72–221	0.122	0.019	0.090	0.100	0.331	0.204
mir-240-786	160	72–228	0.178	0.187	0.009	0.031	0.405	0.237
mir-243	343	72–176	0.305	0.091	0.216	0.060	0.672	0.408
mir-246	193	72–200	0.120	0.024	0.101	0.058	0.303	0.191
mir-793	177	72–237	0.158	0.046	0.094	0.043	0.341	0.258

Table S5: Correlation coefficients for *PmiRNA*::GFP (slope and average), autofluorescence (slope and average of 95th percentile intensity), and joint *PmiRNA*::GFP and autofluorescence regression against lifespan.

Experiment	N	Measure of pixel intensity	Time window (hours post-hatch)	Slope R^2	Mean R^2	Joint R^2	Joint 95% CI
let-7_20170526	101	99th percentile	72–213	0.004	0.001	0.004	[-0.029, 0.047]
let-7_20170517	100	99th percentile	72–208	0.042	0.001	0.045	[-0.048, 0.127]
let-7_20170216	48	99th percentile	72–217	0.005	0.047	0.320	[0.148, 0.520]
let-7_20170208	31	99th percentile	72–182	0.078	0.401	0.401	[0.180,0.691]
lin-4_20171222	99	Mean over 99th percentile	72–209	0.075	0.013	0.124	[-0.024, 0.275]
lin-4_20171219	97	Mean over 99th percentile	72–214	0.152	0.004	0.152	[-0.034, 0.133]
mir-1_20170518	72	Maximum (head)	72–192	0.084	0.002	0.086	[-0.026, 0.182]
mir-47_20190213	74	Maximum	72–185	0.041	0.205	0.261	[0.137, 0.416]
mir-47_20181101	79	Maximum	72–196	0.246	0.203	0.404	[0.293, 0.547]
mir-47_20180511	89	Maximum	72–196	0.208	0.082	0.234	[0.072, 0.416]
mir-47_20170728	96	Maximum	72–201	0.196	0.127	0.419	[0.294, 0.562]
mir-47_20170504	71	Maximum	72–213	0.219	0.000	0.226	[0.066, 0.394]
mir-51_20180530	83	Maximum	72–236	0.004	0.016	0.016	[-0.068, 0.110]
mir-59_20170811	104	95th percentile (vulva)	72–144	0.026	0.026	0.064	[-0.031, 0.137]
mir-60_20180917	109	99th percentile	72–204	0.064	0.101	0.145	[-0.007, 0.277]
mir-60_20180518	111	99th percentile	72–208	0.184	0.114	0.249	[0.135, 0.386]
mir-63_20161215	62	99th percentile	72–245	0.061	0.004	0.068	[-0.077, 0.199]
mir-63_20161202	75	99th percentile	72–229	0.019	0.029	0.249	[0.088, 0.429]
mir-79_20171027	86	Maximum	72–120	0.034	0.001	0.034	[-0.045, 0.097]
mir-84_20181018	77	99th percentile	72–214	0.015	0.012	0.015	[-0.077, 0.096]
mir-84_20180928	65	99th percentile	72–236	0.045	0.073	0.115	[-0.028, 0.307]
mir-85_20180914	87	99th percentile	72–207	0.138	0.040	0.145	[0.025, 0.260]
mir-85_20180525	97	99th percentile	72–181	0.214	0.066	0.220	[0.083, 0.362]
mir-90_20190430	89	95th percentile	72–212	0.027	0.151	0.177	[0.045, 0.333]
mir-90_20180928	80	95th percentile	72–218	0.087	0.070	0.114	[-0.031, 0.248]
mir-228_20180914	73	Mean over 99th percentile	72–218	0.125	0.008	0.139	[-0.001, 0.288]

mir-228_20180504	77	Mean over 99th percentile	72–176	0.223	0.048	0.223	[0.046, 0.393]
mir-240-786_20181004	100	95th percentile	72–228	0.219	0.242	0.258	[0.127, 0.399]
mir-240-786_20181128	60	95th percentile	72–212	0.234	0.160	0.237	[0.065, 0.435]
mir-241_20170809	97	99th percentile (head)	72–120	0.027	0.013	0.039	[-0.048, 0.103]
mir-242_20181105	98	Maximum	72–204	0.012	0.034	0.036	[-0.047, 0.103]
mir-243_20190122	90	Mean	72–184	0.453	0.084	0.479	[0.341, 0.631]
mir-243_20181107	109	Mean	72–200	0.193	0.068	0.255	[0.116, 0.388]
mir-243_20180613	60	Mean	72–166	0.342	0.001	0.363	[0.210, 0.524]
mir-243_20171128	82	Mean	72–181	0.244	0.286	0.331	[0.160, 0.554]
mir-246_20180612	100	95th percentile	72–184	0.214	0.101	0.223	[0.100, 0.366]
mir-246_20171116	93	95th percentile	72–209	0.091	0.039	0.104	[0.007, 0.201]
mir-360_20180418	87	Maximum	72–191	0.018	0.018	0.027	[-0.051, 0.103]
mir-788_20180427	100	Maximum	72–96	0.018	0.005	0.018	[-0.035, 0.072]
mir-788_20171027	87	Maximum	72–96	0.030	0.011	0.041	[-0.048, 0.123]
mir-793_20190606	79	Maximum	72–235	0.084	0.026	0.119	[0.005, 0.235]
mir-793_20181121	97	Maximum	72–238	0.205	0.063	0.219	[0.058, 0.375]
mir-794_20190320	91	Maximum	72–96	0.005	0.057	0.059	[-0.044, 0.153]

Table S6: Regression results from individual biological replicates using raw data. A joint regression on slope and average expression against lifespan was performed using a window starting at 72 hours post-hatch and ending at the 90% survival timepoint.