

Supplementary Information

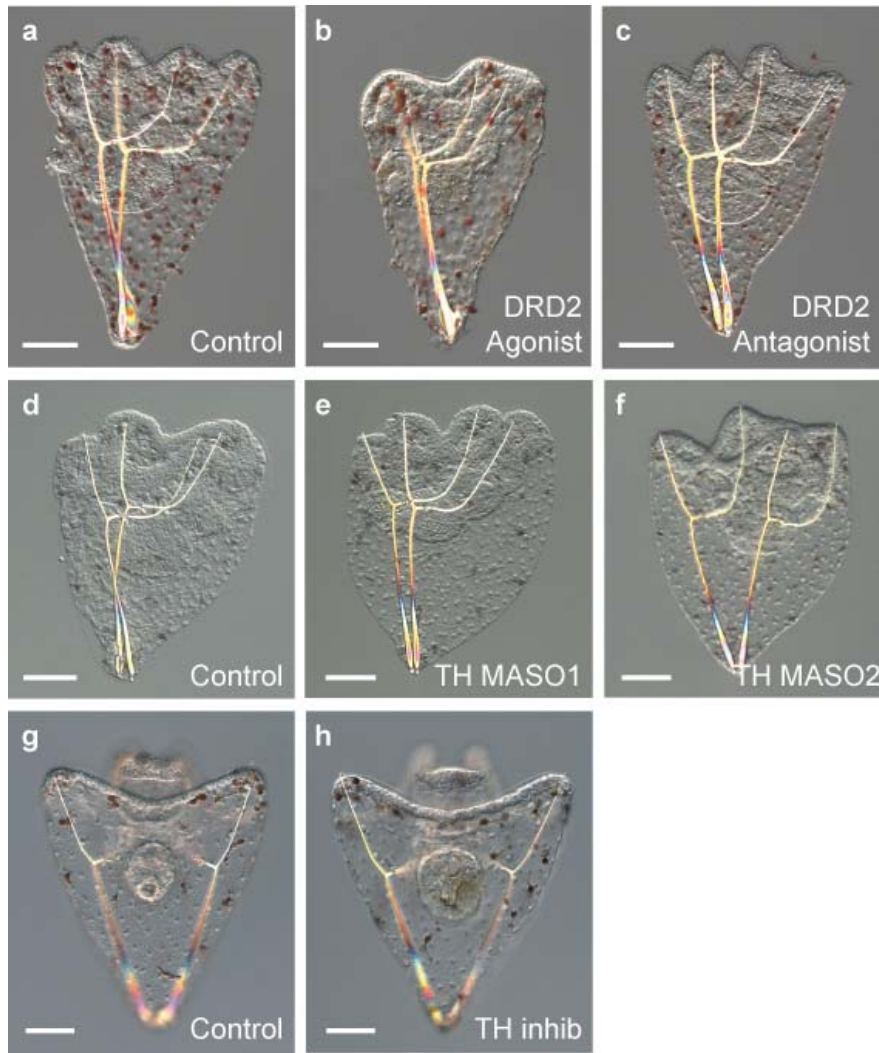
Rapid Adaptation to Food Availability by a Dopamine-Mediated Morphogenetic Response

Diane K. Adams¹, Mary A. Sewell², Robert C. Angerer¹, and Lynne M. Angerer¹

¹ *National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, MD 20892 USA.*

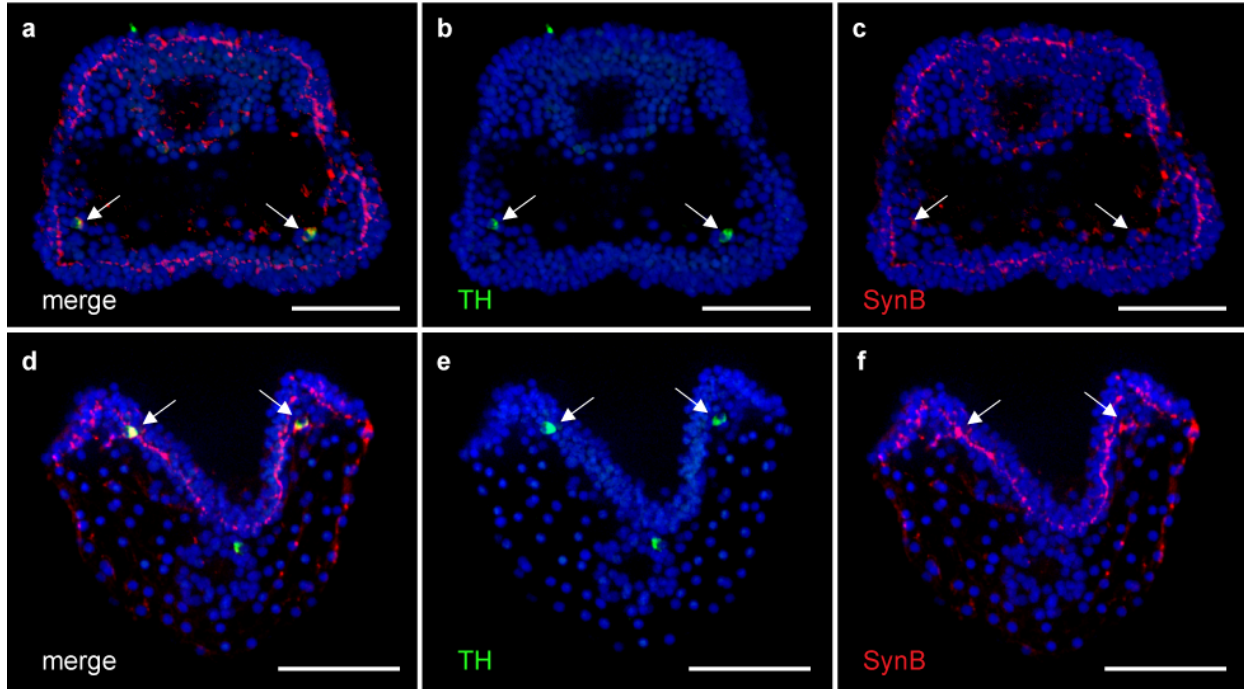
² *School of Biological Sciences, University of Auckland, Auckland 1142, New Zealand.*

Correspondence and requests for materials should be addressed to D.K.A. (email: adamsdi@mail.nih.gov).

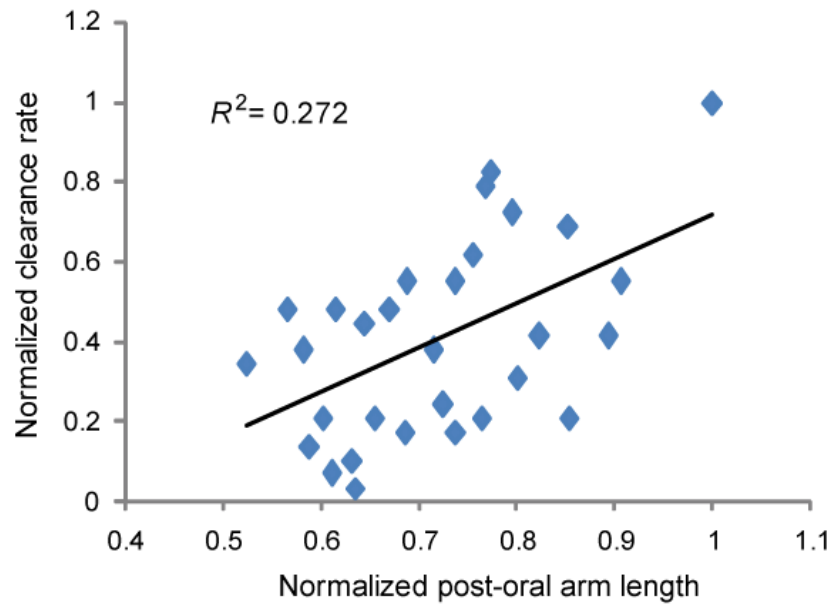


Supplementary Figure S1. Normal gross development and skeletal patterning.

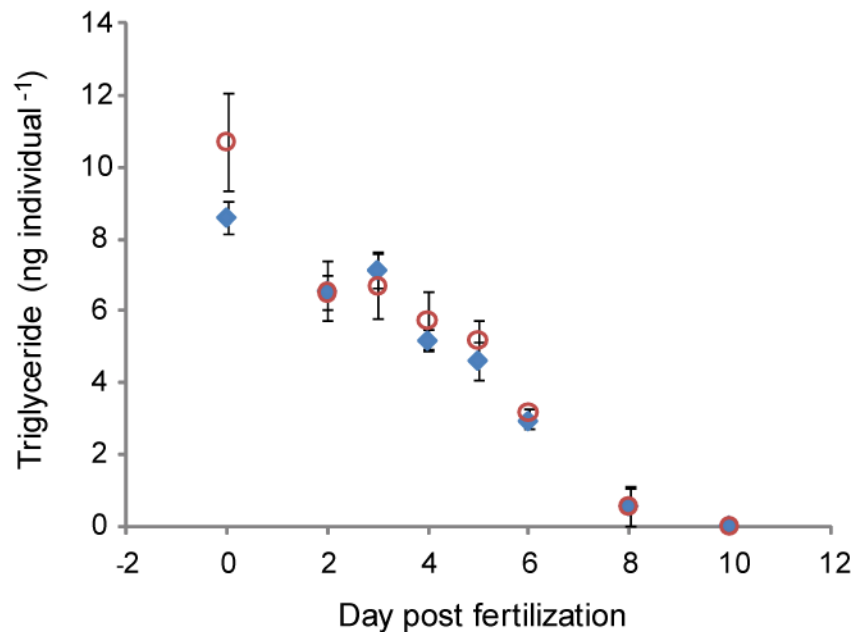
Differential interference contrast images of 5-day larvae showing normal gross development and skeletal patterning in all treatments. (a, d, g) Controls; (b) DRD2 agonist, quinpirole 50 μM ; (c) DRD2 antagonist, amisulpride 25 μM ; (e) TH MASO1, 0.4 mM; (f) TH MASO2, 0.15 mM; (h) TH inhibitor, α -Methyl-DL-tyrosine methyl ester hydrochloride, 10 nM. Scale bars, 50 μm . DRD2, dopamine receptor type-D2; TH, tyrosine hydroxylase; MASO, morpholino anti-sense oligonucleotide.



Supplementary Figure S2. Co-localization of Tyrosine Hydroxylase and Synaptotagmin B in the arm tips. (a-c) Oral view and (d-f) vegetal view of 96 h post-fertilization plutei. TH, Tyrosine Hydroxylase. SynB, Synaptotagmin B. Scale bars, 50 μm .



Supplementary Figure S3. Regression of clearance rate and post-oral arm length in feeding trials with a high concentration of food mimics, 4,000 beads ml^{-1} . Both variables were normalized relative to the maximum. Model I Regression, $R^2 = 0.272$, $\beta_1 = 1.116$, $P = 0.003$, $n = 30$.



Supplementary Figure S4. Use of maternal triglycerides through embryogenesis (days 0 – 5) and the early larval stage (days 6-10). Circles and diamonds denote replicate cultures. Model I Regression, $\beta_1 = -0.997 \pm 0.06$ S.D., $R^2 = 0.95$, $P < 0.0001$, $n = 16$. Error bars \pm S.E.M.

Post-oral arm	SS	df	MS	F-ratio	P-value
			46039.89		
Replicate	46039.890	1	0	85.988	< 0.001
			30868.78		
DRD2	30868.788	1	8	57.653	< 0.001
Algae	11653.661	1	11653.661	21.765	< 0.001
DRD2×Algae	3750.637	1	3750.637	7.005	0.008
Replicate×Algae	1017.780	1	1017.780	1.901	0.169
DRD2×Replicate	535.786	1	535.786	1.001	0.318
Replicate×DRD2×Algae	113.652	1	113.652	0.212	0.645
Error	194357.898	363	535.421		
Body rod					
Replicate	5359.382	1	5359.382	18.115	< 0.001
DRD2	2770.954	1	2770.954	9.366	0.002
Algae	305.124	1	305.124	1.031	0.311
DRD2×Algae	468.705	1	468.705	1.584	0.209
Replicate×Algae	874.169	1	874.169	2.955	0.087
DRD2×Replicate	319.474	1	319.474	1.080	0.299
Replicate×DRD2×Algae	588.375	1	588.375	1.989	0.159
Error	102071.800	345	295.860		

Supplementary Table S1. Model I ANOVA for perturbations with amisulpride, a selective dopamine type-D₂ receptor (DRD2) antagonist. Differences in the degrees of freedom were due to non-measurable skeletal elements due to breakage or exit from the plane of focus. SS, Sum of Squares; df, degrees of freedom; MS, Mean Square.

Post-oral arm	SS	df	MS	F-ratio	P-value
Replicate	2308.425	1	2308.425	4.844	0.029
TH MASO1	10597.750	1	10597.75	22.237	< 0.001
Algae	5730.493	1	5730.493	12.024	0.001
TH MASO1×Algae	9342.748	1	9342.748	19.604	< 0.001
Replicate×Algae	1831.687	1	1831.687	3.843	0.051
TH MASO1×Replicate	1860.678	1	1860.678	3.904	0.049
Replicate×TH MASO1×Algae	46.876	1	46.876	0.098	0.754
Error	136300.400	286	476.575		
Bodyrod					
Replicate	2724.590	1	2724.590	7.406	0.007
TH MASO1	1024.481	1	1024.481	2.785	0.096
Algae	231.370	1	231.370	0.629	0.428
TH MASO1×Algae	132.057	1	132.057	0.359	0.55
Replicate×Algae	22.403	1	22.403	0.061	0.805
TH MASO1×Replicate	1822.730	1	1822.730	4.955	0.027
Replicate×TH MASO1×Algae	1032.681	1	1032.681	2.807	0.095
Error	104845.40	285	367.879		

Supplementary Table S2. Model I ANOVA for perturbations with tyrosine hydroxylase morpholino 1 (TH MASO1). Differences in the degrees of freedom were due to non-measurable skeletal elements due to breakage or exit from the plane of focus. SS, Sum of Squares; df, degrees of freedom; MS, Mean Square.

Post-oral arm	SS	df	MS	F-ratio	P
			182456.40	420.30	
Replicate	182456.400	1	0	3	< 0.001
TH inhib	85.606	1	85.606	0.197	0.657
Algae	9665.322	1	9665.322	22.265	< 0.001
TH inhib×Algae	5950.604	1	5950.604	13.708	< 0.001
Replicate×Algae	763.367	1	763.367	1.758	0.186
TH inhib×Replicate	251.916	1	251.916	0.580	0.447
Replicate×TH inhib×Algae	118.249	1	118.249	0.272	0.602
Error	130231.900	300	434.106		
Bodyrod					
Replicate	17447.420	1	17447.420	57.554	< 0.001
TH inhib	195.288	1	195.288	0.644	0.423
Algae	0.005	1	0.005	0.000	0.997
TH inhib×Algae	18.217	1	18.217	0.060	0.807
Replicate×Algae	195.053	1	195.053	0.643	0.423
TH inhib×Replicate	143.105	1	143.105	0.472	0.493
Replicate×TH inhib×Algae	77.521	1	77.521	0.256	0.614
Error	79424.820	262	303.148		

Supplementary Table S3. Model I ANOVA for perturbations with tyrosine hydroxylase inhibitor, α -methyl-p-tyrosine. Differences in the degrees of freedom were due to non-measurable skeletal elements due to breakage or exit from the plane of focus. SS, Sum of Squares; df, degrees of freedom; MS, Mean Square.