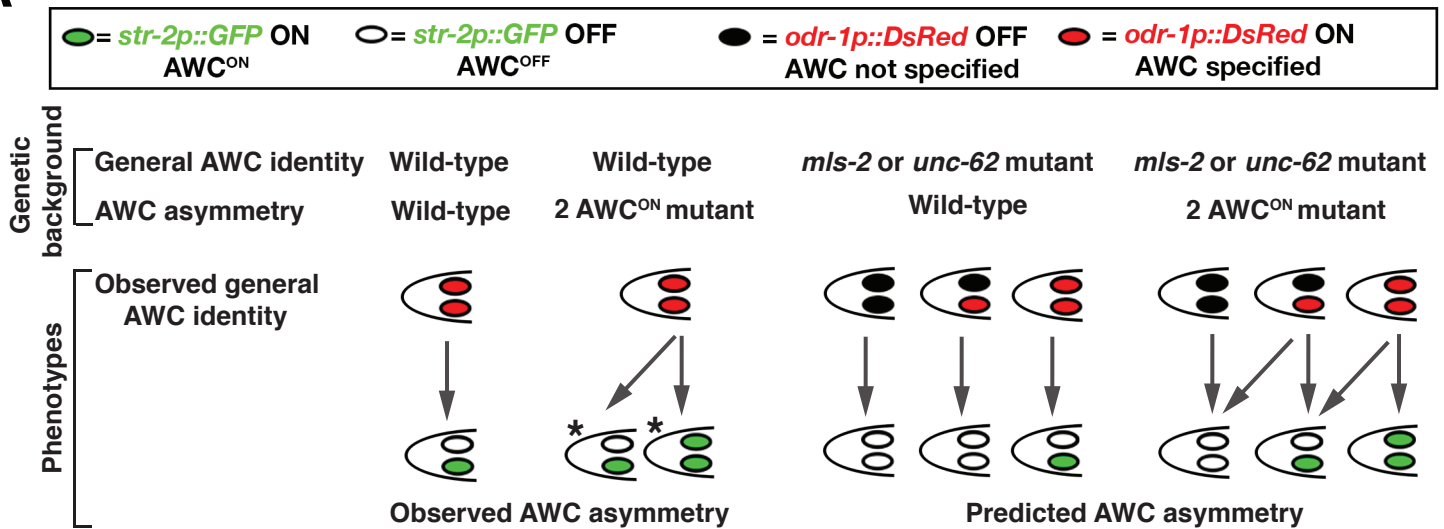


A



If general AWC identity genes (*mls-2* and *unc-62*) do not directly regulate AWC asymmetry

Predicted % AWC asymmetry phenotype in *mls-2*; 2AWC^{ON} double mutants or *unc-62*; 2AWC^{ON} double mutants

$$\text{Predicted \% 2 AWC}^{\text{ON}} = \% \text{ (red dot) } \times \% \text{ (green dot) }$$

$$\text{Predicted \% 1AWC}^{\text{ON}}/\text{1AWC}^{\text{OFF}} = (\% \text{ (red dot) } \times \% \text{ (green dot) }) + (\% \text{ (red dot) } \times \% \text{ (green dot) })$$

$$\text{Predicted \% 2AWC}^{\text{OFF}} = 100\% - [(\% \text{ (red dot) } \times \% \text{ (green dot) }) + (\% \text{ (red dot) } \times \% \text{ (green dot) }) + (\% \text{ (red dot) } \times \% \text{ (green dot) })]$$

B

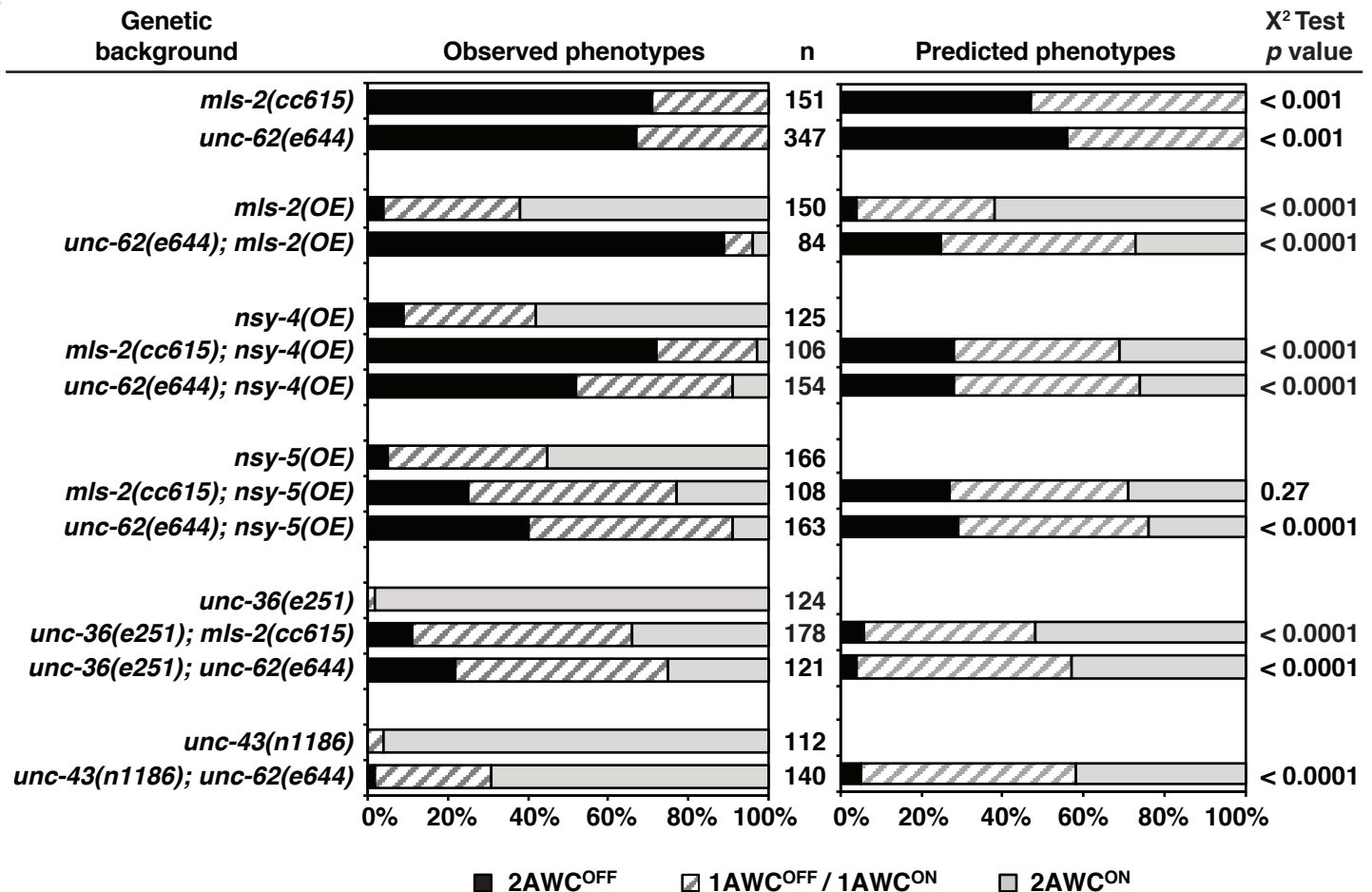


Figure S3. Statistical analysis supports that *mls-2* and *unc-62* directly regulate AWC asymmetry in addition to general AWC identity.

(A) The formula for estimating predicted AWC asymmetry phenotypes in *mls-2(cc615)*; 2AWC^{ON} or *unc-62(e644)*; 2AWC^{ON} double mutants is based on the observed penetrance of general identity phenotypes in *mls-2(cc615)* or *unc-62(e644)* mutants and the observed penetrance of AWC asymmetry phenotypes in 2AWC^{ON} single mutants (indicated by asterisks), if general AWC identity genes *mls-2* and *unc-62* do not directly regulate AWC asymmetry.

(B) Observed and predicted AWC asymmetry phenotypes, if *mls-2* and *unc-62* do not directly regulate AWC asymmetry. χ^2 test (2x3 contingency table) was used to calculate *p* values. In most cases, $p < 0.001$ or 0.0001, supporting that both *mls-2* and *unc-62* are directly required for AWC asymmetry. *mls-2(OE)* overexpresses the *mls-2* genomic coding region from the *nsy-5* promoter. *nsy-4(OE)* overexpresses *nsy-4* cDNA from the *odr-3* promoter (Chuang et al., 2007). *nsy-5(OE)* overexpresses the *nsy-5* genomic region that includes 5766 bp of the *nsy-5* promoter region, 5569 bp of the *nsy-5* coding region, and 1117 bp of the *nsy-5* 3' region (Chuang et al., 2007). n, total number of animals scored. 2AWC^{OFF}, *str-2p::GFP* is expressed in neither AWC cell; 1AWC^{OFF}/1AWC^{ON}, *str-2p::GFP* is expressed in only one of the two AWC cells; 2AWC^{ON}, *str-2p::GFP* is expressed in both AWC cells. The data of observed AWC asymmetry phenotypes is from Figure 3A.