

Table 1. Likelihood ratio test for ω values in Fig. 4

Null model			Alternative model			Likelihood ratio test*		
model	np	lnL	model	np	lnL	Δnp	$2\Delta \ln L$	p value
$\omega_I = \omega_2 = \omega_3 = \omega_{I5}, \omega_{r.b.}$	197	-818769	$\omega_I, \omega_2, \omega_3, \omega_{I5}, \omega_{r.b.}$	200	-8167.84	3	39.70	1.2×10^{-8}
$\omega_I = \omega_2, \omega_3, \omega_{I5}, \omega_{r.b.}$	199	-8168.44	$\omega_I, \omega_2, \omega_3, \omega_{I5}, \omega_{r.b.}$	200	-8167.84	1	1.21	0.27
$\omega_I = \omega_3, \omega_2, \omega_{I5}, \omega_{r.b.}$	199	-8167.89	$\omega_I, \omega_2, \omega_3, \omega_{I5}, \omega_{r.b.}$	200	-8167.84	1	0.10	0.76
$\omega_I = \omega_{I5}, \omega_2, \omega_3, \omega_{r.b.}$	199	-8178.40	$\omega_I, \omega_2, \omega_3, \omega_{I5}, \omega_{r.b.}$	200	-8167.84	1	21.11	4.3×10^{-6}
$\omega_I, \omega_2 = \omega_3, \omega_{I5}, \omega_{r.b.}$	199	-8169.23	$\omega_I, \omega_2, \omega_3, \omega_{I5}, \omega_{r.b.}$	200	-8167.84	1	2.79	0.095
$\omega_I, \omega_2 = \omega_{I5}, \omega_3, \omega_{r.b.}$	199	-8180.30	$\omega_I, \omega_2, \omega_3, \omega_{I5}, \omega_{r.b.}$	200	-8167.84	1	24.91	6.0×10^{-7}
$\omega_I, \omega_2, \omega_3 = \omega_{I5}, \omega_{r.b.}$	199	-8174.37	$\omega_I, \omega_2, \omega_3, \omega_{I5}, \omega_{r.b.}$	200	-8167.84	1	13.05	3.0×10^{-4}
$\omega_{Cho} = \omega_{Act} = \omega_{Sar}, \omega_{r.b.}$	197	-8175.41	$\omega_{Cho}, \omega_{Act}, \omega_{Sar}, \omega_{r.b.}$	199	-8134.83	2	81.16	2.4×10^{-18}
$\omega_{Cho} = \omega_{Act}, \omega_{Sar}, \omega_{r.b.}$	198	-8149.98	$\omega_{Cho}, \omega_{Act}, \omega_{Sar}, \omega_{r.b.}$	199	-8134.83	1	30.30	3.7×10^{-8}
$\omega_{Cho} = \omega_{Sar}, \omega_{Act}, \omega_{r.b.}$	198	-8136.04	$\omega_{Cho}, \omega_{Act}, \omega_{Sar}, \omega_{r.b.}$	199	-8134.83	1	2.42	0.12
$\omega_{Cho}, \omega_{Act} = \omega_{Sar}, \omega_{r.b.}$	198	-8168.56	$\omega_{Cho}, \omega_{Act}, \omega_{Sar}, \omega_{r.b.}$	199	-8134.83	1	67.47	2.1×10^{-16}
$\omega_{Sar1} = \omega_{Sar2} = \omega_{Sar3}, \omega_{r.b.}$	197	-8150.04	$\omega_{Sar1}, \omega_{Sar2}, \omega_{Sar3}, \omega_{r.b.}$	199	-8143.60	2	12.89	0.0016
$\omega_{Sar1} = \omega_{Sar2}, \omega_{Sar3}, \omega_{r.b.}$	198	-8145.54	$\omega_{Sar1}, \omega_{Sar2}, \omega_{Sar3}, \omega_{r.b.}$	199	-8143.60	1	3.89	0.049
$\omega_{Sar1} = \omega_{Sar3}, \omega_{Sar2}, \omega_{r.b.}$	198	-8150.01	$\omega_{Sar1}, \omega_{Sar2}, \omega_{Sar3}, \omega_{r.b.}$	199	-8143.60	1	12.82	0.00034
$\omega_{Sar1}, \omega_{Sar2} = \omega_{Sar3}, \omega_{r.b.}$	198	-8144.39	$\omega_{Sar1}, \omega_{Sar2}, \omega_{Sar3}, \omega_{r.b.}$	199	-8143.60	1	1.58	0.21

*p values were calculated using χ^2 tests for each $2\Delta \ln L$. Δnp is the degree of freedom for each test.

np, number of parameters; lnL, log likelihood; $\omega_{r.b.}$, ω value of remaining branches for each model

Table 2. RELAX tests for *sox15* in several lineages of jawed vertebrates

Lineage	Reference	Test	LRT	p value*	k**
Gnathostomata	<i>sox3</i>	<i>sox15</i>	8.69	0.0032	0.71
Chondrichthyes	<i>sox3</i>	<i>sox15</i>	37.77	8.0×10^{-10}	0.031
Actinopterygii	<i>sox3</i>	<i>sox15</i>	2.84	0.092	0.76
Sarcopterygii	<i>sox3</i>	<i>sox15</i>	25.95	3.5×10^{-7}	0.50

*p values were calculated using χ^2_1 tests for each LRT. **k means a relaxation ($k < 1$) or intensification ($k > 1$) parameter. LRT, likelihood ratio test

Table 3. Statistical analyses of branch and RELAX tests for the HMG box of *sox15* in several lineages of amniotes

Branch model with codeml				RELAX				
Null	Alt	LRT	p value*	Ref.	Test	k	LRT	p value*
$\omega_{\text{Eut}} = \omega_{\text{Mar}}$	$\omega_{\text{Eut}}, \omega_{\text{Mar}}$	7.17	0.00741	ω_{Eut}	ω_{Mar}	0.732	3.30	0.0691
$\omega_{\text{Mar}} = \omega_{\text{Md}}$	$\omega_{\text{Mar}}, \omega_{\text{Md}}$	9.28	0.00231	ω_{Mar}	ω_{Md}	0.327	6.73	0.00947
$\omega_{\text{Mar}} = \omega_{\text{Sh}}$	$\omega_{\text{Mar}}, \omega_{\text{Sh}}$	7.08	0.00780	ω_{Mar}	ω_{Sh}	0.447	4.60	0.0320
$\omega_{\text{Mar}} = \omega_{\text{Gl}}$	$\omega_{\text{Mar}}, \omega_{\text{Gl}}$	9.59	0.00196	ω_{Mar}	ω_{Gl}	0.193	9.03	0.00266
$\omega_{\text{Tes}} = \omega_{\text{Squ}}$	$\omega_{\text{Tes}}, \omega_{\text{Squ}}$	3.13	0.0769	ω_{Tes}	ω_{Squ}	0.761	5.32	0.0211

* χ^2_1 test for the LRT value. Eut, Mar, Tes, Md, Sh, Gl, and Squ represent eutheria, marsupialia, testudines, *Monodelphis domestica*, *Sarcophilus harrisii*, *Gymnodelphus leadbeateri*, and squamata, respectively (see Fig. 5). LRT, likelihood rate test; Ref., Reference