Table S5. Signatures of positive selection in the primate *OR7D4*/*OR7D1* gene

A. Evidence for positive selection in the *OR7D4/OR7D1* gene using a site-specific approach

LRT	2Δ*l*	Df	P value	ω	*p* (%)
OR7D4 only					
M1 vs. M2	6.75	2	0.0343	2.1	18
M7 vs. M8	8.11	2	0.0174	2.1	18
OR7D4+OR7D1					
M1 vs. M2	7.57	2	0.0227	2.1	14
M7 vs. M8	12.05	2	0.0024	2.1	15

B. Parameter estimates and positively selected sites according to different site-specific models with F3x4 model of codon frequency for the OR7D4 only dataset

			Sites with ω > 1							
Model	***l***	**Parameters**	**NEB**				**BEB**			
M0	-2491.96	ω = 0.38			N/A				N/A	
		S = 0.90								
		κ = 2.91								
M1	-2469.15	ω_0 = 0.07			N/A				N/A	
		p_0 = 0.64								
		(ω_1 = 1)								
		(p_1 = 0.36)								
		S = 0.99								
		κ = 3.08								
M2	-2465.77	ω_0 = 0.16	**6**	**Y**	0.999++	2.117	**6**	**Y**	0.879+	2.771 ± 1.346
		p_0 = 0.82	8	D	0.515	1.17	19	E	0.597	2.014 ± 1.230
		(ω_1 = 1)	11	E	0.554	1.247	**21**	**P**	deletion	
		p_1 = 0	19	E	0.941	2.002	22	A	0.626	2.103 ± 1.277
		ω_2 = 2.11	**21**	**P**	deletion		86	D	0.502	1.752 ± 1.093
		(p_2 = 0.18)	22	A	0.948	2.016	96	G	0.544	1.867 ± 1.155
		S = 1.04	26	L	0.778	1.684	110	L	0.587	1.960 ± 1.103
		κ = 3.27	86	D	0.906	1.934	139	R	0.588	1.959 ± 1.092
			87	T	0.548	1.234	147	M	0.555	1.898 ± 1.176
			88	H	0.9	1.922	160	V	0.731	2.378 ± 1.314
			96	G	0.924	1.969	**170**	**L**	0.781+	2.521 ± 1.345
			110	**L**	0.982+	2.082	171	E	0.588	1.957 ± 1.107
			116	**T**	0.966+	2.051	**172**	**T**	deletion	
			139	**R**	0.983+	2.085	180	D	0.53	1.834 ± 1.150
			147	M	0.926	1.973	181	L	0.544	1.869 ± 1.161
			153	S	0.609	1.354	**194**	**I**	deletion	
			154	L	0.626	1.386	198	C	0.555	1.869 ± 1.034
			160	**V**	0.992++	2.102	220	K	0.573	1.953 ± 1.216
			164	L	0.897	1.917	232	A	0.75	2.431 ± 1.324
			170	**L**	0.995++	2.107	266	P	0.574	1.950 ± 1.200
			171	**E**	0.973+	2.065	**273**	**I**	0.892+	2.796 ± 1.336

			172	**T**	deletion		**281**	**V**	deletion	
			179	C	0.506	1.151	308	T	0.536	1.840 ± 1.134
			180	D	0.915	1.951				
			181	L	0.922	1.965				
			189	C	0.839	1.802				
			191	D	0.779	1.686				
			194	**I**	deletion					
			198	**C**	0.980+	2.079				
			202	L	0.898	1.919				
			220	K	0.93	1.981				
			227	S	0.897	1.917				
			232	**A**	0.993++	2.105				
			236	K	0.537	1.213				
			252	Y	0.521	1.181				
			266	P	0.933	1.988				
			272	N	0.828	1.781				
			273	**I**	1.000++	2.117				
			281	**V**	deletion					
			302	G	0.6	1.336				
			307	T	0.512	1.163				
			308	T	0.922	1.965				
			309	A	0.811	1.749				
			312	L	0.512	1.163				
M3	-2465.77	ω_0 = 0.16	**6**	**Y**	0.999++	2.117			N/A	
K = 2		p_0 = 0.82	8	D	0.515	1.17				
		ω_1 = 2.12	11	E	0.554	1.247				
		(p_1 = 0.18)	19	E	0.941	2.002				
		S = 1.04	**21**	**P**	deletion					
		κ = 3.27	22	A	0.948	2.016				
			26	L	0.778	1.684				
			86	D	0.906	1.934				
			87	T	0.548	1.234				
			88	H	0.9	1.922				
			96	G	0.924	1.969				
			110	**L**	0.982+	2.082				
			116	**T**	0.966+	2.051				
			139	**R**	0.983+	2.085				
			147	M	0.926	1.973				
			153	S	0.609	1.354				
			154	L	0.626	1.386				
			160	**V**	0.992++	2.102				
			164	L	0.897	1.917				
			170	**L**	0.995++	2.107				
			171	**E**	0.973+	2.065				
			172	**T**	deletion					
			179	C	0.506	1.151				
			180	D	0.915	1.951				
			181	L	0.922	1.965				
			189	C	0.839	1.802				
			191	D	0.779	1.686				

			194	**I**	deletion					
			198	**C**	0.980+	2.079				
			202	L	0.898	1.919				
			220	K	0.93	1.981				
			227	S	0.897	1.917				
			232	**A**	0.993++	2.105				
			236	K	0.537	1.213				
			252	Y	0.521	1.181				
			266	P	0.933	1.988				
			272	N	0.828	1.781				
			273	**I**	1.000++	2.117				
			281	**V**	deletion					
			302	G	0.6	1.336				
			307	T	0.512	1.163				
			308	T	0.922	1.965				
			309	A	0.811	1.749				
			312	L	0.512	1.163				
M7	-2469.84	p = 0.02 q = 0.03 S = 0.99 κ = 3.13	N/A				N/A			
M8	-2465.79	p = 19.46 q = 99.00 p_0 = 0.82 **ω_1 = 2.13** **(p_1 = 0.18)** S = 1.04 κ = 3.27	**6**	**Y**	0.999++	2.124	**6**	**Y**	0.958++	2.491 ± 1.027
			8	D	0.511	1.17	19	E	0.739	1.966 ± 1.106
			11	E	0.55	1.246	**21**	**P**	deletion	
			19	E	0.938	2.003	**22**	**A**	0.763+	2.032 ± 1.118
			21	**P**	deletion		86	D	0.648	1.733 ± 1.049
			22	A	0.945	2.018	88	H	0.639	1.714 ± 1.049
			26	L	0.769	1.675	96	G	0.69	1.840 ± 1.079
			86	D	0.901	1.932	**110**	**L**	0.757+	1.987 ± 1.044
			87	T	0.544	1.233	116	T	0.665	1.757 ± 0.992
			88	H	0.895	1.919	**139**	**R**	0.762+	1.993 ± 1.037
			96	G	0.919	1.968	147	M	0.699	1.864 ± 1.088
			110	**L**	0.979+	2.085	**160**	**V**	0.867+	2.280 ± 1.082
			116	**T**	0.962+	2.051	164	L	0.635	1.703 ± 1.043
			139	**R**	0.981+	2.088	**170**	**L**	0.9+	2.362 ± 1.071
			147	M	0.922	1.973	**171**	**E**	0.756+	1.980 ± 1.048
			153	S	0.598	1.341	**172**	**T**	deletion	
			154	L	0.622	1.386	180	D	0.674	1.803 ± 1.077
			160	**V**	0.991++	2.107	181	L	0.689	1.839 ± 1.082
			164	L	0.892	1.915	189	C	0.537	1.468 ± 0.959
			170	**L**	0.994++	2.113	**194**	**I**	deletion	
			171	**E**	0.970+	2.068	198	C	0.732	1.911 ± 1.013
			172	**T**	deletion		202	L	0.589	1.575 ± 0.961
			179	C	0.502	1.151	220	K	0.714	1.906 ± 1.103
			180	D	0.91	1.95	227	S	0.635	1.704 ± 1.046
			181	L	0.918	1.965	**232**	**A**	0.882+	2.315 ± 1.077
			189	C	0.831	1.796	266	P	0.717	1.911 ± 1.097
			191	D	0.77	1.677	272	N	0.515	1.414 ± 0.928
			194	**I**	deletion		**273**	**I**	0.965++	2.504 ± 1.020
			198	**C**	0.977+	2.081	**281**	**V**	deletion	

202	L	0.893	1.916	308	T	0.683	1.820 ± 1.070
220	K	0.926	1.981	309	A	0.511	1.413 ± 0.946
227	S	0.892	1.915				
232	**A**	0.992++	2.11				
236	K	0.533	1.213				
252	Y	0.517	1.181				
266	P	0.93	1.988				
272	N	0.82	1.774				
273	**I**	1.000++	2.124				
281	**V**	deletion					
302	G	0.596	1.335				
307	T	0.508	1.162				
308	T	0.917	1.964				
309	A	0.803	1.742				
312	L	0.508	1.163				

C. Parameter estimates and positively selected sites according to different site-specific models with F3x4 model of codon frequency for the OR7D4+OR7D1 dataset

			Sites with ω > 1							
model	***l***	**parameters**	**NEB**				**BEB**			
M0	-2861.29	ω = 0.35	N/A				N/A			
		S = 1.10								
		κ = 3.12								
M1	-2835.72	ω_0 = 0.11	N/A				N/A			
		p_0 = 0.71								
		(ω_1 = 1)								
		(p_1 = 0.29)								
		S = 1.20								
		κ = 3.26								
M2	-2831.94	ω_0 = 0.18	**6**	**Y**	0.987+	2.053	**6**	**Y**	0.827+	2.563 ± 1.188
		p_0 = 0.85	**21**	**P**	deletion		**21**	**P**	deletion	
		(ω_1 = 1)	19	E	0.824	1.765	22	A	0.534	1.851 ± 1.176
		p_1 = 0.01	22	A	0.872	1.851	88	H	0.537	1.850 ± 1.142
		ω_2 = 2.07	86	D	0.781	1.686	**139**	**R**	0.804+	2.500 ± 1.185
		(p_2 = 0.14)	88	H	0.892	1.887	160	V	0.608	2.030 ± 1.143
		S = 1.25	96	G	0.808	1.736	170	L	0.719	2.313 ± 1.209
		κ = 3.43	110	L	0.887	1.891	**172**	**T**	deletion	
			112	N	0.814	1.747	**194**	**I**	deletion	
			116	T	0.867	1.857	227	S	0.671	2.192 ± 1.190
			131	H	0.619	1.389	**232**	**A**	0.828+	2.567 ± 1.190
			139	**R**	0.986+	2.052	252	Y	0.724	2.327 ± 1.213
			147	M	0.822	1.761	**273**	**I**	0.914+	2.749 ± 1.134
			160	**V**	0.951+	1.996	**281**	**V**	deletion	
			164	L	0.75	1.631				
			170	**L**	0.969+	2.024				
			171	E	0.889	1.888				
			172	**T**	deletion					

			180	D	0.808	1.735	
			181	L	0.791	1.705	
			189	C	0.922	1.949	
			191	D	0.697	1.533	
			194	**I**	deletion		
			198	C	0.876	1.874	
			202	L	0.667	1.482	
			220	K	0.826	1.768	
			227	**S**	0.962+	2.013	
			232	**A**	0.987+	2.053	
			252	**Y**	0.969+	2.025	
			266	P	0.835	1.785	
			272	N	0.557	1.275	
			273	**I**	0.994++	2.062	
			281	**V**	deletion		
			308	T	0.816	1.75	
			312	L	0.509	1.169	
M3	-2831.94	ω_0 = 0.17	**6**	**Y**	0.997++	2.05	N/A
K = 3		p_0 = 0.71	19	E	0.844	1.766	
		ω_1 = 0.28	**21**	**P**	deletion		
		(p_1 = 0.14)	22	A	0.89	1.852	
		ω_2 = 2.05	86	D	0.801	1.687	
		(p_2 = 0.15)	88	H	0.911	1.889	
		S = 1.25	96	G	0.828	1.737	
		κ = 3.43	110	L	0.916	1.899	
			112	N	0.834	1.748	
			116	T	0.896	1.864	
			131	H	0.638	1.385	
			139	**R**	0.997++	2.049	
			147	M	0.842	1.762	
			160	**V**	0.970+	2	
			164	L	0.771	1.631	
			170	**L**	0.984+	2.025	
			171	E	0.913	1.894	
			172	**T**	deletion		
			180	D	0.828	1.736	
			181	L	0.811	1.705	
			189	C	0.947	1.957	
			191	D	0.717	1.531	
			194	**I**	deletion		
			198	C	0.906	1.883	
			202	L	0.69	1.481	
			220	K	0.846	1.769	
			227	**S**	0.979+	2.015	
			232	**A**	0.997++	2.05	
			252	**Y**	0.984+	2.025	
			266	P	0.855	1.786	
			272	N	0.576	1.269	
			273	**I**	1.000++	2.054	
			281	**V**	deletion		

			308	T	0.836	1.751				
			309	A	0.505	1.139				
			312	L	0.523	1.169				
M7	-2837.96	p = 0.21 q = 0.35 S = 1.19 κ = 3.28	N/A				N/A			
M8	-2831.94	p = 15.54 q = 68.17 p_0 = 0.85 **ω_1 = 2.05** **(p_1 = 0.15)** S = 1.25 κ = 3.43	**6**	**Y**	0.998++	2.048	**6**	**Y**	0.903+	2.841 ± 1.128
			19	E	0.846	1.766	**21**	**P**	deletion	
			21	**P**	deletion		22	A	0.541	1.899 ± 1.366
			22	A	0.892	1.851	88	H	0.55	1.913 ± 1.348
			86	D	0.803	1.688	**139**	**R**	0.888+	2.799 ± 1.149
			88	H	0.912	1.889	160	V	0.658	2.202 ± 1.334
			96	G	0.83	1.737	**170**	**L**	0.788+	2.556 ± 1.278
			110	L	0.918	1.901	**172**	**T**	deletion	
			112	N	0.836	1.748	**194**	**I**	deletion	
			116	T	0.899	1.866	227	S	0.735	2.414 ± 1.314
			131	H	0.64	1.385	**232**	**A**	0.904+	2.842 ± 1.128
			139	**R**	0.998++	2.047	**252**	**Y**	0.793+	2.569 ± 1.275
			147	M	0.843	1.762	**273**	**I**	0.967++	2.985 ± 1.010
			160	**V**	0.971+	1.999	**281**	**V**	deletion	
			164	L	0.773	1.631				
			170	**L**	0.985+	2.024				
			171	E	0.915	1.895				
			172	**T**	deletion					
			180	D	0.83	1.736				
			181	L	0.813	1.706				
			189	C	0.949	1.957				
			191	D	0.719	1.532				
			194	**I**	deletion					
			198	C	0.909	1.885				
			202	L	0.693	1.483				
			220	K	0.847	1.769				
			227	**S**	0.980+	2.014				
			232	**A**	0.998++	2.048				
			252	**Y**	0.985+	2.024				
			266	P	0.857	1.786				
			272	N	0.578	1.27				
			273	**I**	1.000++	2.052				
			281	**V**	deletion					
			308	T	0.838	1.752				
			309	A	0.507	1.139				
			312	L	0.525	1.169				

Site-specific likelihood analysis is used to determine whether any codon positions are associated with ω > 1, consistent with positive Darwinian selection. Two datasets, OR7D4 only and OR7D4+OR7D1, are used. In A), nested neutral models, M1 and M7, are compared to selection models, M2 and M8, respectively. P values are computed using 2Δ*l* as a chi-square value. Significant P values are seen in all tests for positive selection in both datasets. dN/dS (ω) of the

positively-selected site class and proportion of sites (*p*) with the dN/dS ratio for positive selection are listed. The F3x4 codon frequency model was used. In B) and C), complete site-specific likelihood analysis with detailed parameter estimates are shown for site-specific models using the B) OR7D4 only and C) OR7D4+OR7D1 datasets. Sites predicted to be under positive selection ($\omega > 1$) using NEB and BEB under different site-specific models were shown with a posterior probability and predicted ω (or $\omega \pm$ S.E.M. for BEB). LRT, likelihood ratio test. $2\Delta l$, twice the difference between the log likelihood scores of the two models compared. Df, degrees of freedom. NEB, naïve empirical Bayes. BEB, Bayes empirical Bayes. *l*, log likelihood score. *p*, proportion of sites with the corresponding ω. S, tree length. κ, transition-transversion rate ratio. p and q are parameters of beta-distribution used in M7 and M8. ω and *p* values in the parentheses are fixed rather than estimated. For NEB, + posterior probability > 0.95, ++ posterior probability > 0.99. For BEB, + posterior probability > 0.75, ++ posterior probability > 0.95.