

1 **Table R1:** Testes Expression Datasets (Barrett *et al.* 2012)

<i>Species</i>	GEO Accession	Reference
<i>Bos taurus</i>	GSM1020728 & GSM1020746	Merkin <i>et al.</i> (2012)
<i>Callithrix jacchus</i>	GSM1227961, GSM1227962 & GSM1227963	Cortez <i>et al.</i> (2014)
<i>Canis lupus familiaris</i>	GSM747469 & GSM1359286	Derti <i>et al.</i> (2012), Vandewege <i>et al.</i> (2016)
<i>Eptesicus fuscus</i>	GSM1359287	Vandewege <i>et al.</i> (2016)
<i>Equus caballus</i>	GSM1139276 & GSM1359288	Coleman <i>et al.</i> (2013), Vandewege <i>et al.</i> (2016)
<i>Gorilla gorilla</i>	GSM752663	Brawand <i>et al.</i> (2011)
<i>Homo sapiens</i>	GSM752707 & GSM752708	Brawand <i>et al.</i> (2011)
<i>Macaca mulatta</i>	GSM752642 & GSM752643	Brawand <i>et al.</i> (2011)
<i>Mus musculus</i>	GSM752629 & GSM752630	Brawand <i>et al.</i> (2011)
<i>Ovis aries</i>	GSM1666944 & GSM1666936	Guan <i>et al.</i> (2017)
<i>Pan paniscus</i>	GSM752690	Brawand <i>et al.</i> (2011)
<i>Pan troglodytes</i>	GSM752678	Brawand <i>et al.</i> (2011)
<i>Pongo pygmaeus</i>	GSM1858310 & GSM1858311	Carelli <i>et al.</i> (2016)
<i>Rattus norvegicus</i>	GSM1278058	Cortez <i>et al.</i> (2014)
<i>Sus scrofa</i>	GSM1902350, GSM2033157 & GSM2033163	Li <i>et al.</i> (2016), Yang <i>et al.</i> (2017)
<i>Tupaia chinensis</i>	GSM957062	Fan <i>et al.</i> (2013)

Table R2: NCBI Reference Genomes (O’Leary *et al.* 2015)

<i>Species</i>	Assembly	RefSeq Accession	WGS Project Reference
<i>Bos taurus</i>	Bos_taurus_UMD_3.1.1	GCF_000003055.6	Zimin <i>et al.</i> (2009)
<i>Callithrix jacchus</i>	Callithrix_jacchus-3.2	GCF_000004665.1	-
<i>Canis lupus familiaris</i>	CanFam3.1	GCF_000002285.3	Lindblad-Toh <i>et al.</i> (2005)
<i>Eptesicus fuscus</i>	EptFus1.0	GCF_000308155.1	-
<i>Equus caballus</i>	EquCab2.0	GCF_000002305.2	Wade <i>et al.</i> (2009)
<i>Gorilla gorilla</i>	gorGor4	GCF_000151905.2	Sally <i>et al.</i> (2012)
<i>Homo sapiens</i>	GRCh38.p10	GCF_000001405.36	-
<i>Macaca mulatta</i>	Mmul_8.0.1	GCF_000772875.2	Zimin <i>et al.</i> (2014)
<i>Mus musculus</i>	GRCm38.p5	GCF_000001635.25	-
<i>Ovis aries</i>	Oar_v4.0	GCF_000298735.2	Consortium <i>et al.</i> (2010)
<i>Pan paniscus</i>	panpan1.1	GCF_000258655.2	Prüfer <i>et al.</i> (2012)
<i>Pan troglodytes</i>	Pan_tro_3.0	GCF_000001515.7	Consortium <i>et al.</i> (2005)
<i>Pongo abelii</i>	P_pygmaeus_2.0.2	GCF_000001545.4	Locke <i>et al.</i> (2011)
<i>Rattus norvegicus</i>	Rnor_6.0	GCF_000001895.5	Consortium and others (2004)
<i>Sus scrofa</i>	Sscrofa11.1	GCF_000003025.6	-
<i>Tupaia chinensis</i>	TupChi_1.0	GCF_000334495.1	Fan <i>et al.</i> (2013)

3 **Table R3:** Ensembl Reference Genomes (Zerbino *et al.* 2017)

<i>Species</i>	<i>Assembly</i>	<i>RefSeq Accession</i>	<i>WGS Project Reference</i>
<i>Bos taurus</i>	Bos_taurus_UMD_3.1	GCF_000003055.3	Zimin <i>et al.</i> (2009)
<i>Callithrix jacchus</i>	Callithrix_jacchus-3.2	GCF_000004665.1	-
<i>Canis lupus familiaris</i>	CanFam3.1	GCF_000002285.3	Lindblad-Toh <i>et al.</i> (2005)
<i>Eptesicus fuscus</i>	-	-	-
<i>Equus caballus</i>	EquCab2.0	GCF_000002305.2	Wade <i>et al.</i> (2009)
<i>Gorilla gorilla</i>	gorGor3.1	GCF_000151905.1	-
<i>Homo sapiens</i>	GRCh38.p10	GCF_000001405.36	-
<i>Macaca mulatta</i>	Mmul_8.0.1	GCF_000772875.2	Zimin <i>et al.</i> (2014)
<i>Mus musculus</i>	GRCm38.p5	GCF_000001635.25	-
<i>Ovis aries</i>	Oar_v3.1	GCF_000298735.1	Consortium <i>et al.</i> (2010)
<i>Pan paniscus</i>	panpan1.1	GCF_000258655.2	Prüfer <i>et al.</i> (2012)
<i>Pan troglodytes</i>	CHIMP2.1.4	GCF_000001515.6	Consortium <i>et al.</i> (2005)
<i>Pongo abelii</i>	PPYG2	GCF_000001545.4	Locke <i>et al.</i> (2011)
<i>Rattus norvegicus</i>	Rnor_6.0	GCF_000001895.5	Consortium and others (2004)
<i>Sus scrofa</i>	Sscrofa11.1	GCF_000003025.6	-
<i>Tupaia chinensis</i>	-	-	-

4 **Table S1:** Sequence divergence between Human (*Homo sapiens*) and Rhesus Macaque (*Macaca mulatta*)
5 (Yang and Nielsen 2000; Yang 2007).

<i>Gene</i>	<i>bp</i>	ω	<i>S</i>	<i>N</i>	<i>t</i>	κ	<i>dN</i>	<i>dS</i>
A)								
<i>HORMAD1</i>	1182	0.0901	273.9	908.1	0.0443	3.8819	0.0044 +- 0.0022	0.0490 +- 0.0137
<i>MEI4</i>	1167	0.7252	331	824	0.0822	4.6295	0.0247 +/- 0.0056	0.0341 +/- 0.0104
<i>REC114</i>	864	0.3239	237.2	557.8	0.0974	2.9455	0.0200 +/- 0.0061	0.0618 +/- 0.0168
<i>IHO1</i>	1797	0.6608	509	1273	0.0951	3.6035	0.0276 +- 0.0047	0.0418 +- 0.0094
<i>SPO11</i>	1188	0.1434	291.2	896.8	0.0872	2.5317	0.0118 +/- 0.0036	0.0823 +/- 0.0178
B)								
<i>HORMAD2</i>	921	0.295	256.7	664.3	0.0531	4.2164	0.0106 +- 0.0040	0.0360 +- 0.0121
<i>MRE11</i>	2124	0.0392	479.4	1644.6	0.0597	2.6154	0.0030 +- 0.0014	0.0778 +- 0.0135
<i>NBS1</i>	2265	0.4155	553.7	1705.3	0.0804	5.0955	0.0199 +- 0.0035	0.0480 +- 0.0097
<i>RAD50</i>	3969	0.0714	1118.7	2817.3	0.0401	5.0903	0.0028 +- 0.0010	0.0399 +- 0.0062
<i>BRCC3</i>	951	0.0979	264	609	0.028	4.6	0.0025 +- 0.0020	0.0252 +- 0.0100
C)								
<i>DMC1</i>	1020	0.0000	273.7	746.3	0.0335	5.1279	0.0000 +- 0.0000	0.0416 +- 0.0127
<i>RAD51</i>	1017	0.0000	306.5	710.5	0.0398	6.7467	0.0000 +- 0.0000	0.0441 +- 0.0124
<i>SPATA22</i>	1089	0.4523	247.8	841.2	0.0879	3.6505	0.0230 +- 0.0053	0.0508 +- 0.0150
<i>MEIOB</i>	1413	0.2462	348.9	1064.1	0.0927	4.3887	0.0176 +- 0.0041	0.0715 +- 0.0151
<i>MCMD2</i>	2043	0.2108	534	1509	0.0635	7.8547	0.0107 +- 0.0027	0.0507 +- 0.0101
D)								
<i>REC8</i>	1701	0.477	497	1138	0.1293	2.8869	0.0323 +- 0.0054	0.0678 +- 0.0122
<i>RAD21L</i>	1680	0.6334	427.5	1237.5	0.0735	5.6876	0.0213 +- 0.0042	0.0337 +- 0.0091
<i>SYCP1</i>	2928	0.3676	761.6	2166.4	0.0628	4.8307	0.0145 +- 0.0026	0.0393 +- 0.0074
<i>SYCP2</i>	4590	0.3873	1070.7	3519.3	0.0854	5.994	0.0208 +- 0.0025	0.0537 +- 0.0074
<i>TEX12</i>	369	0.1349	80.2	288.8	0.05	1.9678	0.0070 +- 0.0049	0.0516 +- 0.0260
E)								
<i>TEX11</i>	2775	0.9068	805.9	1933.1	0.0897	7.8022	0.0290 +- 0.0040	0.0320 +- 0.0064
<i>SHOC1</i>	4332	0.7225	1203	3129	0.0865	9.5737	0.0261 +- 0.0029	0.0361 +- 0.0057
<i>RNF212</i>	816	0.387	243.2	572.8	0.1342	4.996	0.0304 +- 0.0074	0.0785 +- 0.0189
<i>RNF212B</i>	900	0.2566	255.6	644.4	0.0685	3.4122	0.0125 +- 0.0044	0.0488 +- 0.0143

<i>Gene</i>	<i>bp</i>	ω	<i>S</i>	<i>N</i>	<i>t</i>	κ	<i>dN</i>	<i>dS</i>
<i>MSH4</i>	2808	0.2635	731.3	2073.7	0.058	7.5194	0.0112 +- 0.0023	0.0425 +- 0.0079
<i>MSH5</i>	2502	0.2106	728.7	1770.3	0.0643	3.9993	0.0102 +- 0.0024	0.0486 +- 0.0085
F)								
<i>MER3</i>	4305	0.3247	987.6	3317.4	0.0703	7.0099	0.0159 +- 0.0022	0.0488 +- 0.0074
<i>CNTD1</i>	990	0.6803	335.3	651.7	0.065	8.0721	0.0187 +- 0.0054	0.0274 +- 0.0092
<i>HEI10</i>	1059	0.3235	241.5	589.5	0.0329	5.9591	0.0068 +- 0.0034	0.0211 +- 0.0095
<i>MLH1</i>	2268	0.0924	602.3	1665.7	0.0522	2.4752	0.0048 +- 0.0017	0.0521 +- 0.0097
<i>MLH3</i>	4368	0.4919	1209.8	3149.2	0.0949	6.4296	0.0246 +- 0.0028	0.0500 +- 0.0067
<i>MUS81</i>	1653	0.1299	465.8	1187.2	0.1106	5.7915	0.0128 +- 0.0033	0.0983 +- 0.0158

6 **Table S2:** PAML of 32 recombination genes using the gene tree (Yang 2007).

<i>Gene</i>	<i>bp</i>	<i>N</i>	ω	<i>M</i>	<i>M1-M2</i>	<i>p-value</i>	<i>M7-M8</i>	<i>p-value</i>	<i>M8a-M8</i>	<i>p-value</i>
A)										
<i>HORMAD1</i>	1212	16	0.3037	7	0	<i>1.000</i>	3.135	<i>0.2086</i>	—	—
<i>MEI4</i>	1170	16	0.4310	7	0	<i>1.000</i>	0.058	<i>0.9715</i>	—	—
<i>REC114</i>	870	15	0.4237	7	0	<i>1.000</i>	4.1874	<i>0.1232</i>	—	—
<i>IHO1</i>	1824	16	0.7099	8	13.384	<i>0.0012</i>	17.714	<i>0.0001</i>	14.707	<i>0.0001</i>
<i>SPO11</i>	1188	15	0.1701	7	0	<i>1.000</i>	4.697	<i>0.0955</i>	—	—
B)										
<i>HORMAD2</i>	981	15	0.3290	1	0	<i>1.000</i>	3.881	<i>0.1436</i>	—	—
<i>MRE11</i>	2136	16	0.1686	8	0.636	<i>0.7277</i>	12.014	<i>0.0025</i>	4.822	<i>0.0281</i>
<i>NBS1</i>	2289	15	0.4185	8	0	<i>1.000</i>	12.899	<i>0.0016</i>	4.298	<i>0.0382</i>
<i>RAD50</i>	3936	16	0.0322	1	0	<i>1.000</i>	0.5615	<i>0.7552</i>	—	—
<i>BRCC3</i>	954	15	0.0601	7	0	<i>1.000</i>	0.573	<i>0.7509</i>	—	—
C)										
<i>DMC1</i>	1020	15	0.0365	7	0	<i>1.000</i>	4.288	<i>0.1172</i>	—	—
<i>RAD51</i>	1017	16	0.0322	1	0	<i>1.000</i>	0.562	<i>0.7552</i>	—	—
<i>SPATA22</i>	1101	16	0.4932	7	0	<i>1.000</i>	0.200	<i>0.9049</i>	—	—
<i>MEIOB</i>	1425	16	0.2340	7	0	<i>1.000</i>	0.221	<i>0.8955</i>	—	—
<i>MCMD2</i>	2052	16	0.2242	7	0	<i>1.000</i>	0.610	<i>0.7370</i>	—	—
D)										
<i>REC8</i>	1833	16	0.3698	8	0	<i>1.000</i>	14.690	<i>0.0006</i>	5.927	<i>0.0149</i>
<i>RAD21L</i>	1686	15	0.503	8	12.124	<i>0.0023</i>	32.050	<i>>0.0001</i>	12.049	<i>0.0005</i>
<i>SYCP1</i>	3015	16	0.4337	8	8.711	<i>0.0128</i>	26.860	<i>>0.0001</i>	9.243	<i>0.0024</i>
<i>SYCP2</i>	4650	16	0.5572	8	11.584	<i>0.0031</i>	37.200	<i>>0.0001</i>	15.838	<i>0.0001</i>
<i>TEX12</i>	369	14	0.2297	7	0.0565	<i>0.9721</i>	1.549	<i>0.4610</i>	—	—
E)										
<i>TEX11</i>	2844	15	0.8483	8	60.872	<i>>0.0001</i>	82.665	<i>>0.0001</i>	61.141	<i>>0.0001</i>
<i>SHOC1</i>	4644	16	0.6113	8	12.447	<i>0.0020</i>	30.561	<i>>0.0001</i>	15.645	<i>0.0001</i>
<i>RNF212</i>	948	16	0.5014	8	0	<i>1.000</i>	16.366	<i>0.0003</i>	5.202	<i>0.0226</i>
<i>RNF212B</i>	906	14	0.4066	7	0	<i>1.000</i>	0.500	<i>0.7788</i>	—	—
<i>MSH4</i>	2814	16	0.2132	8	16.608	<i>0.0002</i>	39.447	<i>>0.0001</i>	23.238	<i>>0.0001</i>

<i>Gene</i>	<i>bp</i>	<i>N</i>	ω	<i>M</i>	<i>M1-M2</i>	<i>p-value</i>	<i>M7-M8</i>	<i>p-value</i>	<i>M8a-M8</i>	<i>p-value</i>
<i>MSH5</i>	2565	15	0.1642	7	0	<i>1.000</i>	4.214	<i>0.1216</i>	—	—
F)										
<i>MER3</i>	4458	16	0.3633	8a	0	<i>1.000</i>	12.838	<i>0.0016</i>	3.109	<i>0.0779</i>
<i>CNTD1</i>	1026	15	0.2496	7	0	<i>1.000</i>	0.936	<i>0.6263</i>	—	—
<i>HEI10</i>	831	15	0.1226	7	0	<i>1.000</i>	0.250	<i>0.8826</i>	—	—
<i>MLH1</i>	2313	15	0.1652	8a	0	<i>1.000</i>	12.221	<i>0.0022</i>	0.280	<i>0.5970</i>
<i>MLH3</i>	4419	16	0.4444	7	0	<i>1.000</i>	3.757	<i>0.1528</i>	—	—
<i>MUS81</i>	1665	16	0.2124	7	0	<i>1.000</i>	0.628	<i>0.7304</i>	—	—

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