

Supplementary Material

for

The heterogeneous selection landscape of genome evolution in prokaryotes

by

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Supplementary Figures

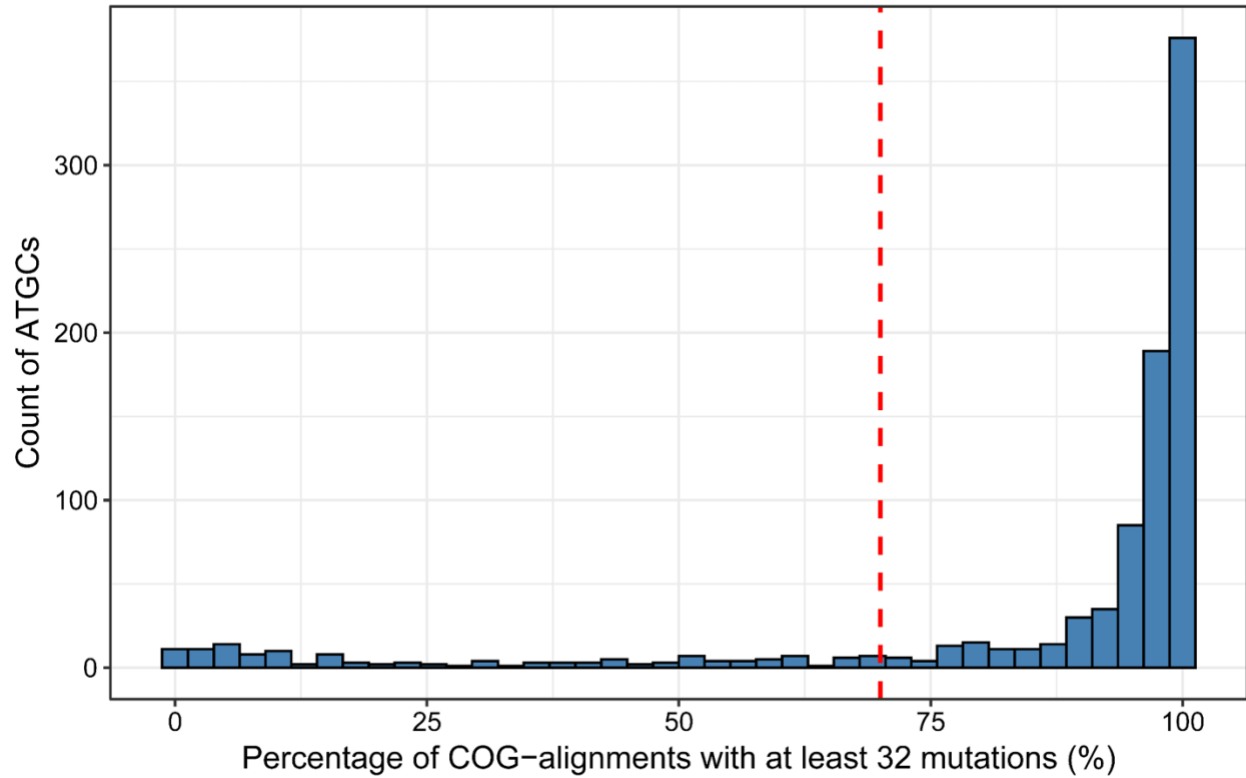


Figure S1. Distribution of genetic diversity in alignments across ATGCs. Histogram shows the distribution COG alignments with at least 32 mutations across ATGCs, whereas the dashed red line depicts the 70% cutoff that was used to filter out genetically homogeneous ATGCs.

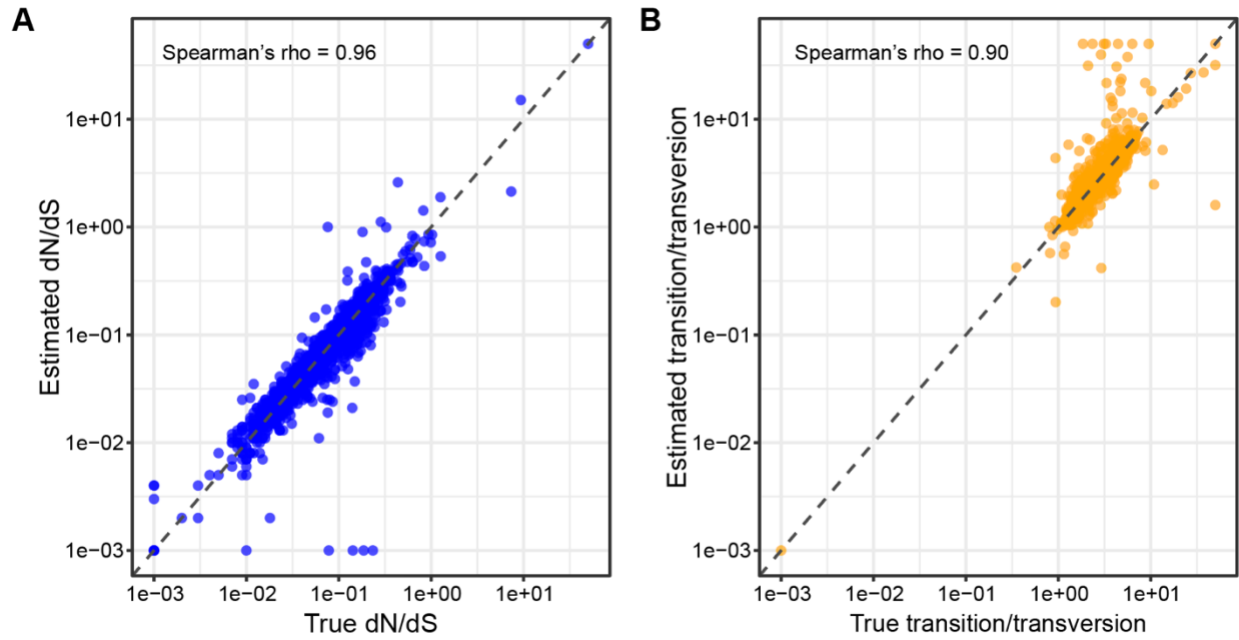


Figure S2. Validation of (A) dN/dS and (B) transition/transversion estimation by IQTree across 2,724 simulated alignments

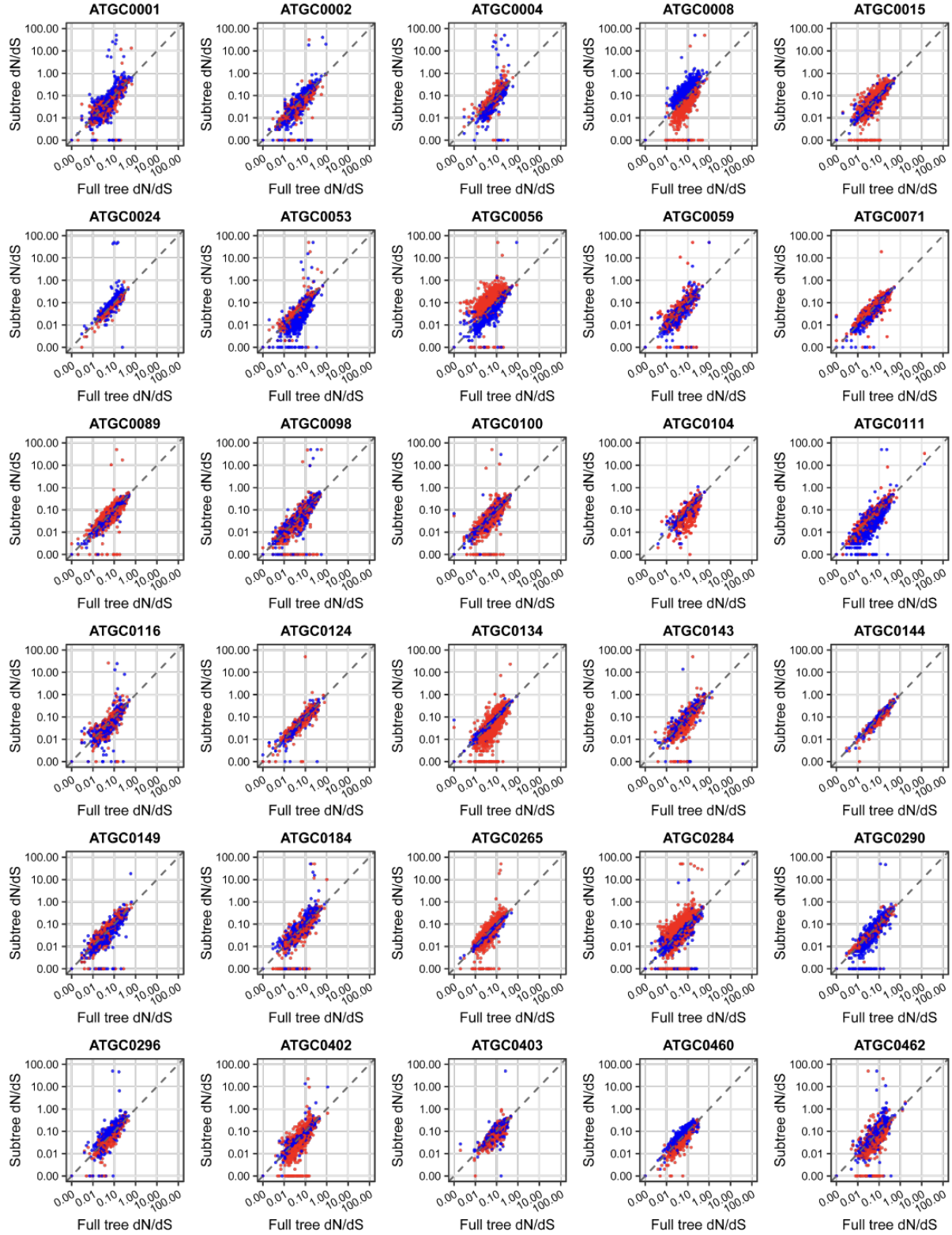


Figure S3. Pairwise comparisons of dN/dS estimates between subtrees and full trees of 30 “splittable” ATGCs. Each point represents dN/dS value of COG derived from two subtrees of the same ATGC (red and blue). The dashed line indicates a 1:1 relationship.

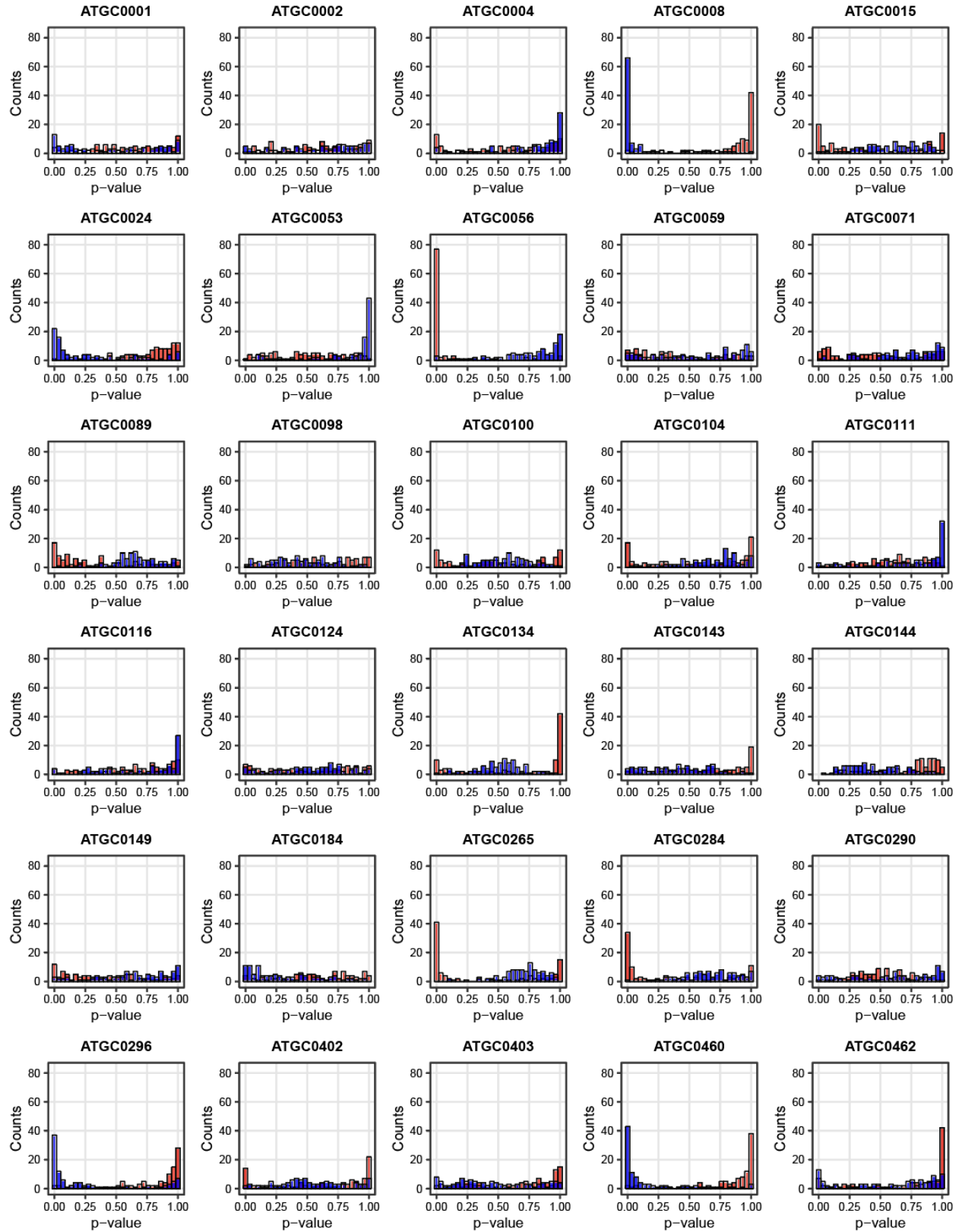


Figure S4. Bootstrap analysis of interclade variation in splittable ATGCs. Histograms show the distribution of p-values for two subtrees of each splittable ATGC (red and blue), based on

100 randomly selected COGs. For each subtree, the p-value represents the proportion of bootstrap replicates in which the subtree's dN/dS value exceeded that of the corresponding replicate derived from the full ATGC alignment. A p-value of 0 indicates that the subtree's dN/dS never exceeded the full-tree value, whereas a p-value of 1 indicates that it did so across all bootstrap replicates.

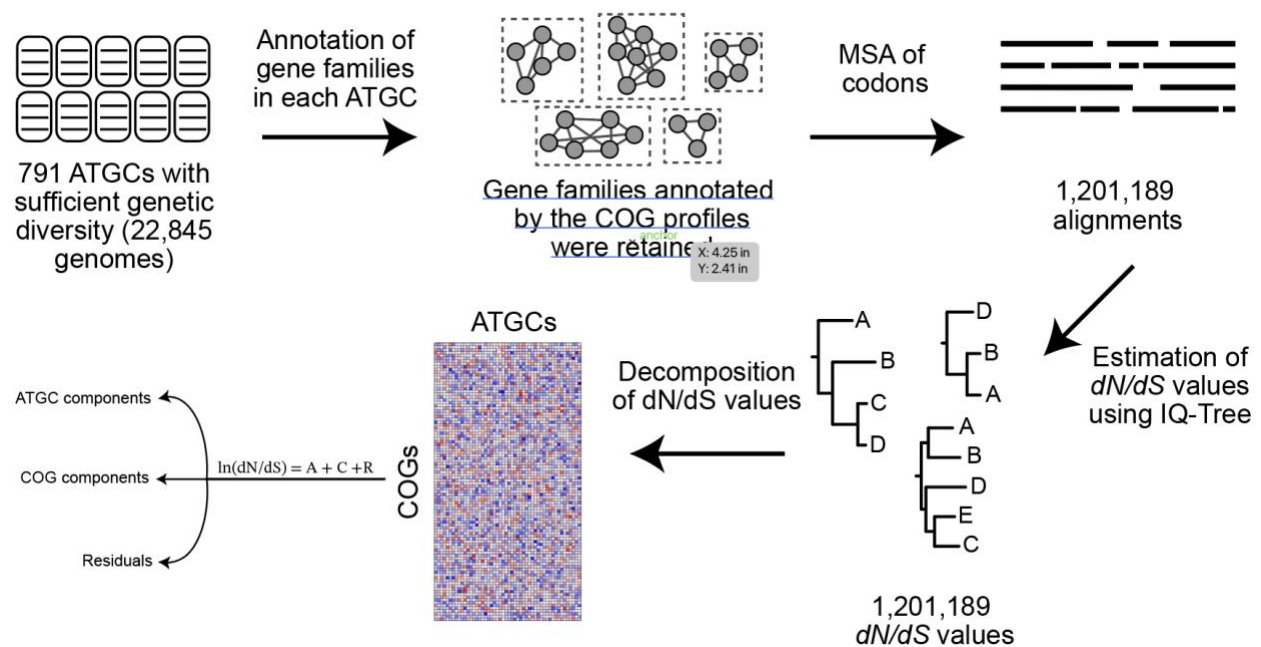


Figure S5. Overview of the workflow for estimating lineage-specific and gene-specific selective constraints.

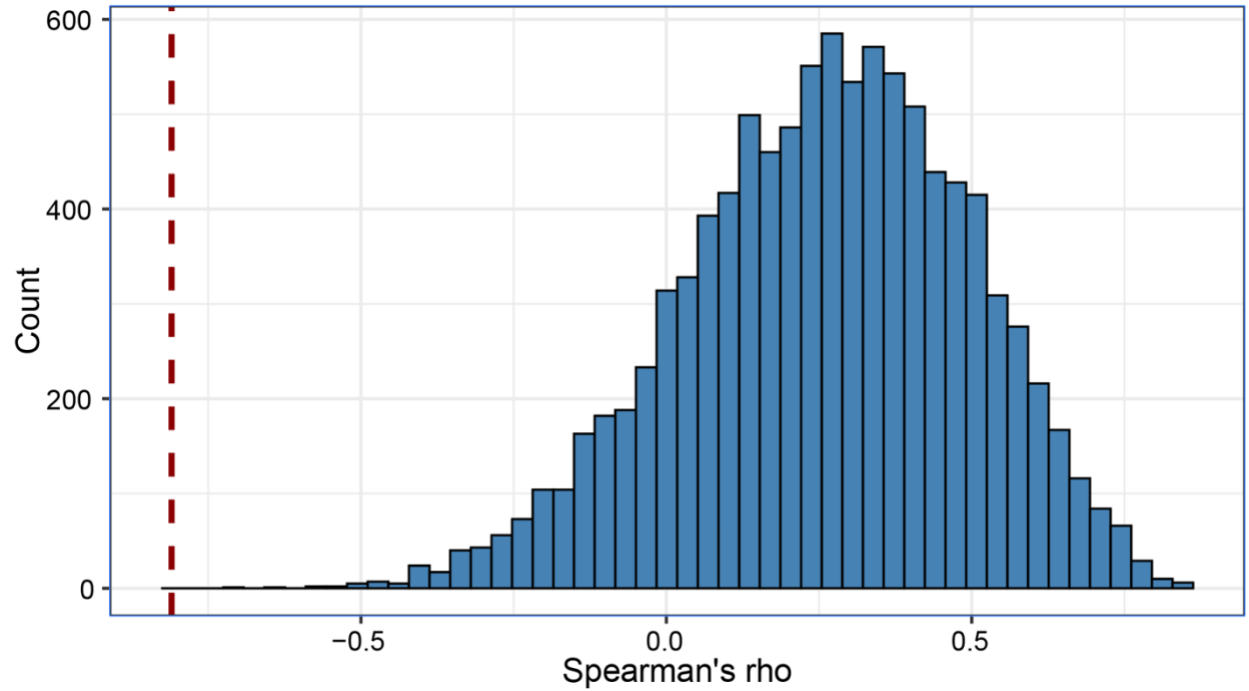


Figure S6. Bootstrap test of correlation strength in Archaea versus Bacteria. Histogram shows the distribution of Spearman's correlation coefficients between genome size and ATGC-specific constraint obtained from 10,000 random bootstrap resamples of 19 bacterial ATGCs. The dashed red line denotes the observed correlation for Archaea (Spearman's $\rho = -0.82$).

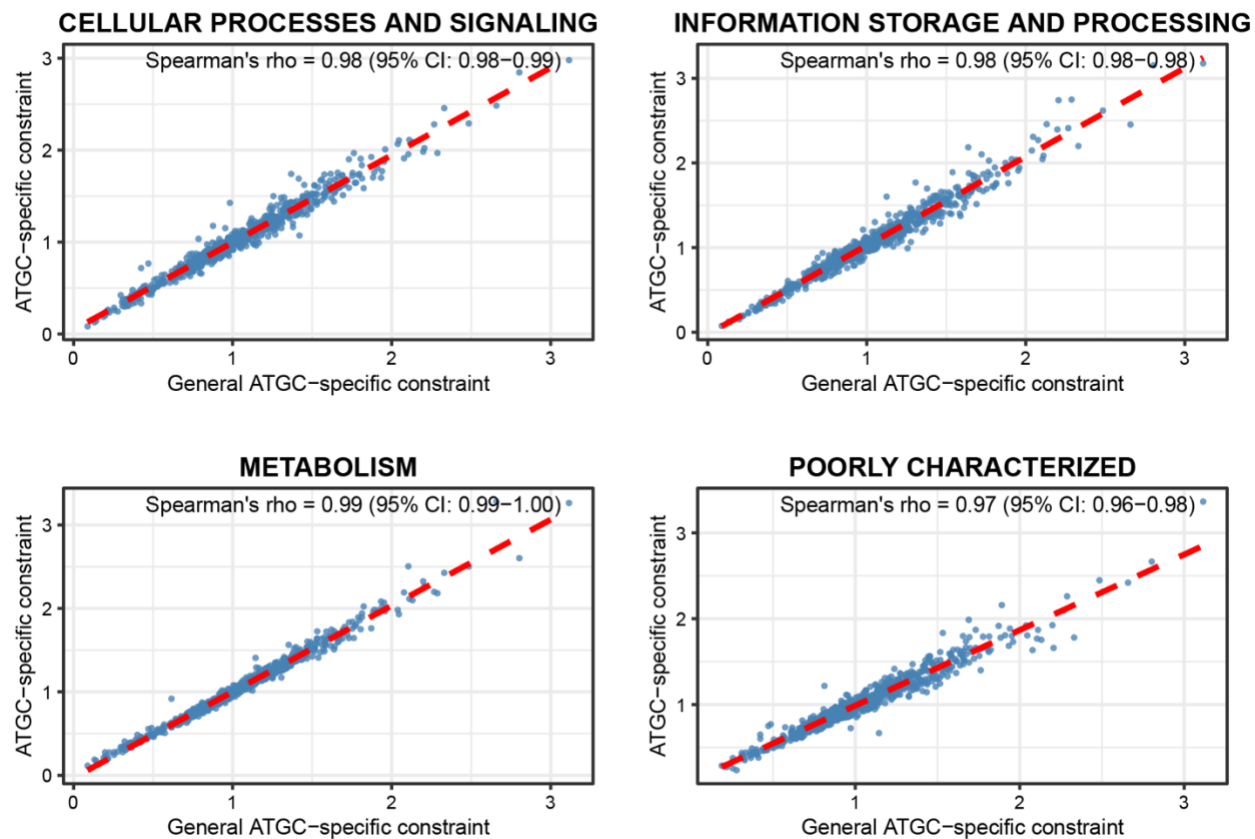


Figure S7. Correlation between genome-wide and functional class ATGC-specific constraints.

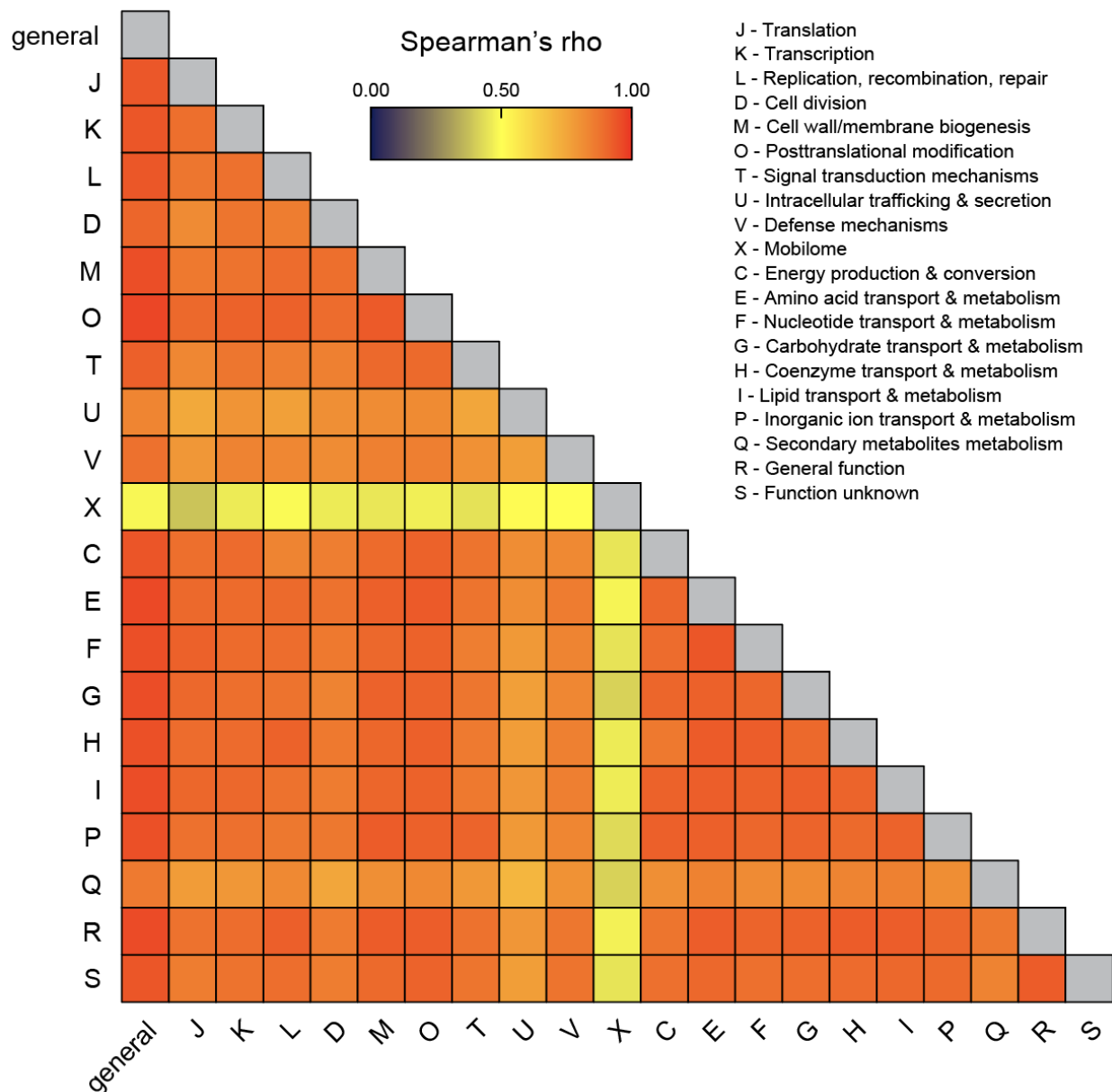


Figure S8. Heatmap of correlations between ATGC-specific constraints across individual COG functional categories and genome-wide ('general') estimates. Only ATGCs with dN/dS estimates available for at least 10 COGs were included in the analysis, and only COG functional groups represented by at least 500 ATGCs were retained for decomposition analyses. In all cases, the Spearman's correlation coefficients are statistically significant.

Supplementary Tables

Table S1. Summary of genome and evolutionary parameters estimated for 791 ATGCs.

ATGC ID	Genome Size	Constraint	Gain Rate	Loss Rate	Flux Rate
ATGC0001	4961446	1.00	32788.22	34692.33	0.95
ATGC0002	5659878	1.15	40070.08	31550.28	1.27
ATGC0003	2098294	0.85	5763.31	7697.84	0.75
ATGC0004	1899037	0.67	4996.96	6686.70	0.75
ATGC0005	2144862	0.84	5180.88	4659.26	1.11
ATGC0007	2548542	0.78	12650.56	12291.49	1.03
ATGC0008	1860070	0.70	16631.09	17388.03	0.96
ATGC0009	1995667	0.90	6162.79	6491.00	0.95
ATGC0010	2031692	0.45	9796.56	9084.50	1.08
ATGC0012	2106259	1.40	7018.05	4423.48	1.59
ATGC0014	5751681	0.78	35903.69	34402.46	1.04
ATGC0015	4102385	0.79	17596.58	13545.55	1.30
ATGC0016	3592666	0.69	9704.52	10357.78	0.94
ATGC0017	3816932	0.69	14610.73	12065.18	1.21
ATGC0018	4327255	0.67	64669.88	34003.03	1.90
ATGC0019	5450197	0.77	61696.16	43951.76	1.40
ATGC0020	3581994	0.49	26861.06	22596.60	1.19
ATGC0021	1050220	0.75	1479.92	1518.51	0.97
ATGC0022	1168962	0.42	2727.51	3828.40	0.71
ATGC0024	4419298	0.67	11589.39	13628.92	0.85
ATGC0028	6140828	0.84	7053.17	6437.50	1.10
ATGC0030	5075529	1.18	18594.59	12907.01	1.44
ATGC0031	6995345	1.20	5995.91	5679.72	1.06
ATGC0032	977134	0.70	866.82	890.08	0.97
ATGC0035	1049305	0.93	4717.61	4818.93	0.98
ATGC0036	919490	0.81	288.89	282.60	1.02
ATGC0037	985495	0.53	29464.64	43324.88	0.68
ATGC0039	741809	0.98	1141.12	1054.73	1.08
ATGC0044	1283764	0.25	21145.72	17690.84	1.20
ATGC0046	1302786	0.22	18429.19	18806.17	0.98
ATGC0047	1198154	0.57	949.80	1012.34	0.94
ATGC0050	1625134	0.41	3445.76	3779.49	0.91
ATGC0051	2196973	0.51	18166.67	15402.24	1.18
ATGC0052	2819430	0.86	30349.14	26151.69	1.16
ATGC0053	2552560	0.97	8393.99	7934.27	1.06

ATGC0055	2605960	0.80	7881.75	5858.46	1.35
ATGC0056	3039024	1.10	8322.10	8902.72	0.93
ATGC0057	3310792	1.05	22915.35	21077.60	1.09
ATGC0059	1966342	1.23	8554.03	7007.75	1.22
ATGC0060	2102630	0.83	26344.59	18087.40	1.46
ATGC0061	1910306	0.33	52844.87	57096.62	0.93
ATGC0062	2098598	0.37	58714.67	50776.39	1.16
ATGC0063	2111012	0.83	30979.18	22405.77	1.38
ATGC0064	2551652	1.60	620.43	470.02	1.32
ATGC0065	2594790	0.84	2781.36	2428.47	1.15
ATGC0066	2145019	0.74	5148.27	5384.29	0.96
ATGC0067	2370577	0.54	1625.09	1720.80	0.94
ATGC0069	3282708	0.56	2266.27	2165.76	1.05
ATGC0070	2368334	0.62	654.22	471.97	1.39
ATGC0071	5994216	1.14	16432.57	12774.21	1.29
ATGC0072	6704980	1.16	97441.76	41906.65	2.33
ATGC0073	4563432	1.39	9993.36	6811.95	1.47
ATGC0075	6179442	1.10	14929.18	13379.27	1.12
ATGC0078	6479828	1.16	9837.56	11270.97	0.87
ATGC0079	5238364	1.21	11653.93	10363.35	1.12
ATGC0081	4089027	0.61	27762.36	21505.89	1.29
ATGC0082	3347523	0.81	37177.35	29745.33	1.25
ATGC0083	4642420	0.90	9744.48	7326.33	1.33
ATGC0088	7154488	0.77	25342.19	31914.30	0.79
ATGC0089	7526082	0.96	35178.25	47494.61	0.74
ATGC0091	7241186	0.90	15344.67	10787.92	1.42
ATGC0093	2655201	0.62	19273.66	21170.39	0.91
ATGC0097	3834490	0.88	6439.87	5655.02	1.14
ATGC0098	5232355	1.37	46580.69	30082.72	1.55
ATGC0099	4908144	1.47	12401.61	11127.77	1.11
ATGC0100	4962647	1.23	17893.12	16567.61	1.08
ATGC0101	4714731	1.26	17118.16	14440.95	1.19
ATGC0103	5472828	1.53	8481.69	6937.30	1.22
ATGC0104	2326070	0.52	5591.38	6675.85	0.84
ATGC0107	1674184	0.75	1719.92	1498.04	1.15
ATGC0108	2954278	1.52	11722.46	7989.19	1.47
ATGC0109	4088961	0.99	5105.49	5908.78	0.86
ATGC0110	5389650	1.02	11092.85	8883.85	1.25
ATGC0111	4808748	1.33	15016.58	11834.24	1.27
ATGC0112	4388462	2.05	15878.49	11254.06	1.41

ATGC0113	5073466	1.18	7149.30	4756.86	1.50
ATGC0114	1887933	0.89	3375.77	2437.34	1.39
ATGC0115	2340216	0.72	33656.07	20905.29	1.61
ATGC0116	2524779	0.89	5101.44	5923.79	0.86
ATGC0117	2145996	0.88	5449.83	4821.92	1.13
ATGC0118	2326664	1.00	1024.52	1252.05	0.82
ATGC0120	5002082	1.24	8237.53	5448.12	1.51
ATGC0121	5278067	1.47	1366.40	760.90	1.80
ATGC0122	6872475	0.81	16214.38	17123.27	0.95
ATGC0123	6742135	0.92	15377.06	18009.45	0.85
ATGC0124	6877215	0.85	16083.26	17970.33	0.89
ATGC0126	5676673	1.00	16510.66	12135.92	1.36
ATGC0130	3907473	0.88	9115.53	6521.69	1.40
ATGC0133	3895750	0.76	7046.81	5142.31	1.37
ATGC0134	5067146	1.00	19973.65	23251.13	0.86
ATGC0135	4636005	1.22	12319.55	9273.40	1.33
ATGC0136	3311836	0.93	13599.15	18939.77	0.72
ATGC0137	2216603	0.65	6502.98	9034.01	0.72
ATGC0138	1893705	0.74	3027.16	3771.67	0.80
ATGC0139	7888977	0.83	18521.06	20239.53	0.92
ATGC0141	8835682	0.76	19376.44	17933.99	1.08
ATGC0143	1695084	0.64	7671.11	6317.33	1.21
ATGC0144	905827	0.44	3728.37	2615.81	1.43
ATGC0145	1328234	0.30	49940.25	17861.73	2.80
ATGC0146	1860725	0.64	4014.58	4007.02	1.00
ATGC0147	1746697	0.98	2727.64	1847.10	1.48
ATGC0149	4019831	1.27	25617.70	23888.38	1.07
ATGC0150	2093784	1.14	5219.72	3312.05	1.58
ATGC0155	646449	0.37	244.60	173.24	1.41
ATGC0157	3247995	1.24	18309.43	14590.58	1.25
ATGC0159	2522885	0.70	5089.26	5924.97	0.86
ATGC0160	2495938	0.91	5579.95	3170.95	1.76
ATGC0161	2744312	1.48	3429.12	2635.49	1.30
ATGC0162	2963612	0.67	100172.98	66980.48	1.50
ATGC0163	3011798	0.55	113861.84	135556.88	0.84
ATGC0165	4606604	1.01	7848.54	6444.29	1.22
ATGC0166	4320012	0.93	4804.20	2577.86	1.86
ATGC0167	4281685	0.93	5066.64	3666.12	1.38
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ATGC0169	2374850	0.73	9480.58	8548.94	1.11

ATGC0173	5371816	0.91	6950.69	5344.66	1.30
ATGC0174	3792700	0.94	8211.97	5188.69	1.58
ATGC0177	1663938	0.73	1495.36	1027.02	1.46
ATGC0180	1924674	0.61	2852.85	2254.22	1.27
ATGC0181	2739610	0.68	8523.05	6169.91	1.38
ATGC0182	2895001	0.69	18858.32	11617.80	1.62
ATGC0183	4107424	1.06	66748.72	94868.90	0.70
ATGC0184	3447086	0.71	19262.88	14875.40	1.29
ATGC0185	4160292	0.53	12468.22	9755.16	1.28
ATGC0187	2277260	1.44	20046.96	13338.42	1.50
ATGC0188	5746272	0.92	60372.41	79647.56	0.76
ATGC0189	6803198	0.99	20865.88	19279.37	1.08
ATGC0190	4653851	1.45	6002.80	6931.69	0.87
ATGC0192	1885386	0.71	2615.31	2394.79	1.09
ATGC0193	2050591	0.77	4670.58	4734.68	0.99
ATGC0194	3764261	0.92	14335.69	10211.69	1.40
ATGC0196	2179788	1.05	15640.79	11172.92	1.40
ATGC0199	5822107	0.83	23072.30	20944.61	1.10
ATGC0201	1955442	0.46	2808.96	3430.88	0.82
ATGC0204	6895682	0.73	12858.14	13301.20	0.97
ATGC0206	4750213	0.79	29128.93	19991.78	1.46
ATGC0207	3924697	0.67	15578.81	15475.69	1.01
ATGC0210	1401460	0.68	7039.27	4553.74	1.55
ATGC0211	5316784	0.95	9598.61	11739.79	0.82
ATGC0212	3659940	0.91	10225.13	6453.15	1.58
ATGC0213	5632330	0.97	14620.28	9902.26	1.48
ATGC0216	5527842	1.11	12237.96	20650.92	0.59
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ATGC0223	638504	0.26	771.21	560.54	1.38
ATGC0224	2637428	0.44	9370.81	10806.71	0.87
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ATGC0229	8529284	0.83	20616.85	27772.25	0.74
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ATGC0234	3294124	1.33	7238.77	6397.12	1.13
ATGC0235	4351630	1.09	6766.42	6745.36	1.00
ATGC0236	2837083	2.27	2971.19	1738.57	1.71
ATGC0237	2379373	0.43	34095.82	28644.28	1.19

ATGC0239	3877096	0.86	40936.89	32608.30	1.26
ATGC0241	9289672	0.90	23342.42	20018.15	1.17
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ATGC0244	3194182	0.81	2565.10	2386.37	1.07
ATGC0245	3071888	0.54	15457.87	10461.54	1.48
ATGC0246	1230379	0.32	1572.62	1464.35	1.07
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ATGC0248	3762895	0.93	30583.37	26806.03	1.14
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ATGC0251	790674	0.32	230.47	233.34	0.99
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ATGC0284	4102900	1.39	18598.13	13296.21	1.40
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ATGC0290	3765752	0.97	14111.41	10801.74	1.31
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ATGC0293	2836999	1.08	6959.60	6017.61	1.16
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ATGC0301	4712992	1.10	3977.69	3689.42	1.08
ATGC0304	2528077	0.93	19881.22	9143.04	2.17
ATGC0305	2390967	1.05	2218.18	2113.50	1.05
ATGC0307	2874062	1.21	11367.00	5921.55	1.92
ATGC0308	2646794	1.94	4578.28	3654.44	1.25
ATGC0309	1563032	1.04	3474.49	1624.14	2.14
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ATGC0312	1967004	1.02	4063.93	2957.57	1.37
ATGC0313	7272014	0.85	41825.75	44102.86	0.95
ATGC0314	9482704	1.07	30591.31	26656.59	1.15
ATGC0315	8324904	0.89	19539.12	18171.71	1.08
ATGC0317	8951748	1.40	21495.15	13308.48	1.62

ATGC0318	5756799	0.86	8440.92	6344.23	1.33
ATGC0320	6515693	0.94	11110.15	9496.08	1.17
ATGC0321	2296570	1.73	6823.56	5274.23	1.29
ATGC0322	1389513	1.38	2708.05	1773.19	1.53
ATGC0324	712385	1.14	1935.11	992.10	1.95
ATGC0325	807195	1.53	1140.98	658.95	1.73
ATGC0328	897443	2.66	638.60	346.01	1.85
ATGC0330	2521219	0.55	2074.22	2277.72	0.91
ATGC0333	3173955	0.97	1329.60	973.36	1.37
ATGC0336	4177197	1.22	7966.89	6591.27	1.21
ATGC0337	4867548	1.06	3590.60	2935.92	1.22
ATGC0338	5634694	1.50	2829.11	2418.77	1.17
ATGC0339	3696846	0.91	5305.75	6013.56	0.88
ATGC0340	6565735	1.18	13077.44	12013.14	1.09
ATGC0342	2125626	0.79	1415.47	760.65	1.86
ATGC0344	3807884	0.94	29783.07	16773.09	1.78
ATGC0345	6148198	0.73	10719.50	8195.00	1.31
ATGC0346	4579117	0.68	40064.27	25776.25	1.55
ATGC0348	2863518	0.67	4621.12	3856.00	1.20
ATGC0352	4685234	0.90	15776.48	19466.45	0.81
ATGC0353	8274043	0.74	18160.24	21548.60	0.84
ATGC0354	8472196	0.81	17189.66	18189.16	0.95
ATGC0356	8223505	0.93	19010.00	15453.13	1.23
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ATGC0358	7070328	1.19	30985.43	31177.75	0.99
ATGC0359	7105405	0.83	7631.68	7401.38	1.03
ATGC0361	5621332	0.76	8073.29	5386.02	1.50
ATGC0364	4709076	1.61	10628.94	6661.97	1.60
ATGC0366	4745670	0.70	25143.88	14657.60	1.72
ATGC0367	2909547	1.03	7966.82	9289.76	0.86
ATGC0368	3618118	1.00	30353.47	20316.31	1.49
ATGC0373	3377510	1.20	5896.54	4293.49	1.37
ATGC0374	4679364	1.30	7348.25	6902.20	1.06
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ATGC0378	2957548	1.35	6576.85	4171.57	1.58
ATGC0379	3638672	0.96	8022.08	5606.29	1.43
ATGC0381	6798722	1.22	11177.05	7251.05	1.54
ATGC0382	5685386	1.14	5087.44	3447.32	1.48
ATGC0383	8841474	0.94	28238.05	30193.77	0.94

ATGC0385	2115460	0.67	10812.51	6431.03	1.68
ATGC0386	2034560	1.12	4745.84	2946.50	1.61
ATGC0387	4577275	1.36	4331.26	2957.62	1.46
ATGC0388	3824196	1.87	8482.98	6114.64	1.39
ATGC0389	3305193	1.43	2678.13	1770.28	1.51
ATGC0390	4984172	0.90	13550.33	8939.46	1.52
ATGC0392	4373091	0.76	8054.79	6379.71	1.26
ATGC0393	5585899	1.11	8111.61	6229.63	1.30
ATGC0394	5513615	1.06	10794.26	9137.46	1.18
ATGC0396	2399175	1.28	7039.24	4526.25	1.56
ATGC0397	2779391	0.90	3891.06	2655.77	1.47
ATGC0400	3261108	1.25	12279.39	10018.79	1.23
ATGC0402	6433952	1.07	21005.54	21570.44	0.97
ATGC0403	5458602	0.66	10491.12	9641.33	1.09
ATGC0406	1907984	0.61	355.30	254.59	1.40
ATGC0408	6561336	0.90	14975.37	12197.58	1.23
ATGC0409	9472622	1.21	23270.63	21927.13	1.06
ATGC0410	3638176	0.99	8430.25	4565.26	1.85
ATGC0411	4181119	0.94	36953.30	27035.23	1.37
ATGC0413	3168302	0.67	2957.34	3029.81	0.98
ATGC0414	7110136	0.94	11769.23	9781.43	1.20
ATGC0415	2415716	0.78	2974.00	1744.19	1.71
ATGC0416	4379414	1.14	14603.48	9636.50	1.52
ATGC0417	2434262	0.72	1598.29	1232.56	1.30
ATGC0418	6680451	1.02	12666.42	9709.09	1.30
ATGC0421	7014538	0.94	14996.63	12105.15	1.24
ATGC0422	7390548	1.58	28894.09	21101.05	1.37
ATGC0430	1780614	1.81	4518.32	3089.62	1.46
ATGC0432	465712	0.43	571.66	383.00	1.49
ATGC0451	4989538	1.32	19670.93	19055.64	1.03
ATGC0452	5095054	1.10	35821.60	24048.23	1.49
ATGC0453	4792334	0.99	17387.50	11829.10	1.47
ATGC0454	3394565	0.83	4689.20	4070.74	1.15
ATGC0455	1590458	0.90	1834.89	1297.17	1.41
ATGC0456	2803335	0.69	8804.15	8414.14	1.05
ATGC0457	4147522	1.04	5190.91	4486.69	1.16
ATGC0459	4921682	1.13	5506.88	5243.46	1.05
ATGC0460	5106030	1.03	5083.56	5551.22	0.92
ATGC0461	1482279	0.21	17216.35	16731.86	1.03
ATGC0462	2011032	0.88	3649.51	4341.16	0.84

ATGC0463	4685386	1.28	9659.00	9840.60	0.98
ATGC0464	4924702	0.91	20827.06	18628.25	1.12
ATGC0465	4074222	1.40	28309.28	21438.66	1.32
ATGC0466	4627770	1.47	11742.46	7254.50	1.62
ATGC0467	3723098	1.24	7245.34	8072.28	0.90
ATGC0468	4935337	1.19	17364.51	17765.74	0.98
ATGC0469	4882630	1.40	12704.59	9986.37	1.27
ATGC0470	5419421	1.53	6329.41	6173.22	1.03
ATGC0471	7485129	0.82	20282.20	20861.03	0.97
ATGC0472	4248142	1.00	6315.51	5264.34	1.20
ATGC0473	3544508	1.32	6948.98	5658.48	1.23
ATGC0474	2807142	0.57	4081.47	4464.23	0.91
ATGC0475	1277820	0.87	1698.64	1508.33	1.13
ATGC0476	3852411	1.45	5475.57	3647.56	1.50
ATGC0477	4546882	0.94	5552.54	5535.58	1.00
ATGC0478	2044097	1.25	7501.48	5504.24	1.36
ATGC0479	4143808	1.52	10170.79	7558.02	1.35
ATGC0480	2841718	0.75	8519.09	7954.01	1.07
ATGC0481	2658717	0.72	2997.16	3019.54	0.99
ATGC0482	2136444	0.71	3612.49	2186.78	1.65
ATGC0483	3634864	1.42	5402.76	5218.15	1.04
ATGC0484	1093116	0.31	6689.39	3225.24	2.07
ATGC0485	1862338	0.77	6285.73	5930.23	1.06
ATGC0486	2949392	0.79	8648.09	6109.26	1.42
ATGC0487	4919668	1.12	8091.34	6851.60	1.18
ATGC0488	9249796	0.88	31024.85	30564.31	1.02
ATGC0489	5488077	0.85	11116.71	9179.57	1.21
ATGC0490	4501378	1.68	12285.27	8455.48	1.45
ATGC0491	4014743	0.74	4273.22	3264.35	1.31
ATGC0492	2837190	1.15	32835.15	17110.64	1.92
ATGC0493	5179960	0.71	63146.24	47252.91	1.34
ATGC0494	4830299	1.20	70806.26	24816.11	2.85
ATGC0496	190740	0.14	555.23	480.80	1.15
ATGC0497	271421	0.09	651.45	1291.86	0.50
ATGC0498	5582097	1.21	8166.52	6692.78	1.22
ATGC0499	5539937	0.80	20953.37	17116.87	1.22
ATGC0500	2716119	1.22	2319.05	2008.10	1.15
ATGC0501	1932531	0.77	1253.56	1546.45	0.81
ATGC0502	2501198	0.91	6016.20	5180.53	1.16
ATGC0503	2314355	0.71	1629.96	1746.29	0.93

ATGC0504	6123005	1.05	19380.46	16937.21	1.14
ATGC0505	5461560	1.24	27666.39	24951.40	1.11
ATGC0506	4565821	0.88	7974.73	7177.52	1.11
ATGC0507	8828441	0.72	30038.96	26401.99	1.14
ATGC0508	10125106	0.83	19756.94	17325.85	1.14
ATGC0509	5770288	1.27	8891.29	7485.33	1.19
ATGC0510	6194848	1.08	7956.85	7544.29	1.05
ATGC0511	4642888	0.98	50652.32	39760.48	1.27
ATGC0512	2414982	1.05	4014.03	2998.28	1.34
ATGC0513	5303410	1.07	9043.54	7150.04	1.26
ATGC0514	5259057	0.92	2731.94	2442.79	1.12
ATGC0515	1943768	0.76	9455.17	6698.56	1.41
ATGC0516	5056766	0.76	10790.58	6436.47	1.68
ATGC0517	4647428	0.68	13246.69	14653.67	0.90
ATGC0518	4187153	0.78	5244.38	4776.00	1.10
ATGC0519	6143576	0.83	10986.56	9387.73	1.17
ATGC0520	5362622	0.53	21259.97	16277.80	1.31
ATGC0521	3281994	0.93	8418.10	5267.33	1.60
ATGC0522	2416187	1.15	4858.42	3872.88	1.25
ATGC0524	6223742	0.90	6929.27	6298.19	1.10
ATGC0525	4576670	1.00	9230.17	7536.43	1.22
ATGC0526	4651252	1.16	6848.74	5333.43	1.28
ATGC0527	2301850	0.50	3667.71	2599.61	1.41
ATGC0530	2275603	0.98	10804.44	7977.04	1.35
ATGC0531	8110698	0.95	16872.10	15421.08	1.09
ATGC0535	4556624	0.79	5256.62	5044.71	1.04
ATGC0536	3307202	0.62	2713.07	2262.55	1.20
ATGC0537	5386144	1.71	11766.38	8185.23	1.44
ATGC0538	11328784	0.71	54313.31	59442.97	0.91
ATGC0539	3764118	0.78	6940.88	6124.95	1.13
ATGC0540	2754290	0.66	2466.72	1724.05	1.43
ATGC0541	5103923	0.46	47630.05	36095.30	1.32
ATGC0542	1111523	0.40	1815.21	3050.46	0.60
ATGC0543	5427866	1.51	6724.73	5246.57	1.28
ATGC0544	7078281	1.22	7731.33	8352.07	0.93
ATGC0545	4196542	1.81	4941.36	3964.46	1.25
ATGC0546	7111375	0.92	13582.46	12673.06	1.07
ATGC0547	3734239	0.66	4711.49	4426.60	1.06
ATGC0548	12022941	0.86	34771.01	32461.79	1.07
ATGC0549	3282664	0.80	14661.35	11257.01	1.30

ATGC0550	2944264	0.98	1955.46	1263.14	1.55
ATGC0551	8262537	0.89	12156.29	11406.06	1.07
ATGC0552	5416158	1.33	10503.82	8673.91	1.21
ATGC0553	2536550	1.12	2694.73	2153.73	1.25
ATGC0554	6393864	0.96	8939.24	6939.14	1.29
ATGC0555	351863	0.22	239.84	209.74	1.14
ATGC0556	8236870	0.81	17899.82	14763.65	1.21
ATGC0557	6570934	0.92	14814.80	10417.48	1.42
ATGC0558	4742384	2.20	8077.35	5158.59	1.57
ATGC0559	4036106	1.02	3089.73	2877.13	1.07
ATGC0560	7720132	1.03	7820.09	6648.93	1.18
ATGC0563	4751181	1.42	13570.31	13070.24	1.04
ATGC0564	5104519	0.62	39074.57	33852.34	1.15
ATGC0565	3763593	1.49	6350.36	3447.04	1.84
ATGC0566	853179	0.79	975.07	712.03	1.37
ATGC0567	2717368	0.73	7000.24	5237.30	1.34
ATGC0568	1734658	0.37	37995.42	37376.48	1.02
ATGC0569	3628592	1.28	8790.08	9333.59	0.94
ATGC0570	2132299	1.32	2025.28	1520.26	1.33
ATGC0571	8653730	0.51	40276.37	27266.32	1.48
ATGC0572	7716609	1.22	11651.88	11380.39	1.02
ATGC0573	4790868	1.24	5863.44	6559.43	0.89
ATGC0574	5930964	0.68	10551.22	7906.46	1.33
ATGC0575	5005459	1.62	8027.66	5806.09	1.38
ATGC0576	465742	0.35	117.45	128.32	0.92
ATGC0577	613221	0.32	782.98	599.54	1.31
ATGC0578	4807151	0.96	7952.93	6311.29	1.26
ATGC0580	6717976	1.55	27279.69	20052.39	1.36
ATGC0581	3971838	0.81	5560.47	4550.67	1.22
ATGC0582	641328	0.41	178.34	116.07	1.54
ATGC0583	2459210	0.81	5801.44	4293.55	1.35
ATGC0584	1842238	0.65	1360.93	1017.03	1.34
ATGC0585	6352364	1.42	11826.93	8296.42	1.43
ATGC0586	3563508	0.74	3008.89	2168.65	1.39
ATGC0587	3617198	0.92	3582.72	2888.57	1.24
ATGC0588	2336942	0.89	5067.60	3867.04	1.31
ATGC0589	7673653	0.88	12318.35	10492.38	1.17
ATGC0590	2529018	0.46	966.53	576.82	1.68
ATGC0591	2280350	0.77	2903.53	1997.25	1.45
ATGC0592	4273636	0.50	6407.93	4209.47	1.52

ATGC0595	1081404	0.75	2036.51	1093.02	1.86
ATGC0596	2725214	0.68	15745.09	12354.74	1.27
ATGC0597	3104561	0.89	5671.97	4118.94	1.38
ATGC0599	1377933	0.40	32744.60	25157.65	1.30
ATGC0600	2272942	0.81	1991.66	1784.51	1.12
ATGC0601	1561431	0.39	2761.22	1929.49	1.43
ATGC0602	5335236	0.94	12658.01	11528.90	1.10
ATGC0603	3504888	0.89	3210.94	2912.65	1.10
ATGC0604	4926765	0.76	5087.59	3867.81	1.32
ATGC0605	4704737	0.85	6582.79	6495.13	1.01
ATGC0606	5349645	0.73	5604.11	4733.79	1.18
ATGC0607	4208346	0.86	4816.72	4095.34	1.18
ATGC0608	4786552	0.94	4215.36	3042.44	1.39
ATGC0609	3340250	0.81	6253.40	4094.52	1.53
ATGC0611	1676668	0.95	8105.70	6677.27	1.21
ATGC0612	2060749	0.92	15566.57	11488.64	1.35
ATGC0613	4164094	0.84	9477.70	9291.55	1.02
ATGC0614	4548320	2.08	14005.24	11032.22	1.27
ATGC0615	3636562	1.51	3058.84	3090.41	0.99
ATGC0616	1294232	0.33	15496.29	15378.28	1.01
ATGC0617	4527698	1.91	4670.28	5175.06	0.90
ATGC0618	5834304	1.40	3485.70	2610.53	1.34
ATGC0619	5078349	1.34	14646.46	9110.45	1.61
ATGC0620	3973645	0.62	35781.35	26400.99	1.36
ATGC0621	3121500	0.77	3399.13	2294.05	1.48
ATGC0622	2747629	0.89	3407.82	2393.20	1.42
ATGC0623	2760158	1.47	4808.44	3727.89	1.29
ATGC0624	4782835	1.04	8871.05	7099.13	1.25
ATGC0625	3301706	0.87	7987.74	5044.07	1.58
ATGC0626	2500831	0.61	975.47	677.50	1.44
ATGC0627	2734414	1.09	2421.24	1706.99	1.42
ATGC0628	4520065	1.41	1923.32	1354.46	1.42
ATGC0629	1889132	0.74	1478.60	990.13	1.49
ATGC0630	445540	0.34	48.51	60.67	0.80
ATGC0631	6862428	0.90	6328.61	5994.21	1.06
ATGC0636	2127051	0.36	31267.74	22997.83	1.36
ATGC0637	1850487	1.36	2300.52	1372.89	1.68
ATGC0639	5946826	1.13	18913.54	13262.59	1.43
ATGC0641	4195186	1.29	5723.44	8185.32	0.70
ATGC0642	1660278	0.77	3520.67	2560.04	1.38

ATGC0643	8270461	0.93	20634.00	16539.50	1.25
ATGC0644	3825112	0.86	7553.68	4812.87	1.57
ATGC0645	8068143	1.06	15074.59	11369.39	1.33
ATGC0646	4338868	1.11	7060.54	4610.08	1.53
ATGC0647	2744227	1.07	1444.66	1137.79	1.27
ATGC0648	4669365	1.44	5188.67	5247.65	0.99
ATGC0649	6922031	1.00	9007.95	7031.47	1.28
ATGC0650	2243615	0.64	2928.95	2009.87	1.46
ATGC0651	3380543	1.05	8800.40	6234.34	1.41
ATGC0652	1344614	1.18	743.65	546.89	1.36
ATGC0653	4090129	0.96	6006.92	3427.93	1.75
ATGC0654	4204657	0.83	10101.90	7076.19	1.43
ATGC0655	6641645	0.77	11059.04	7605.18	1.45
ATGC0656	4370890	1.31	2653.38	2193.43	1.21
ATGC0657	3459201	0.85	5034.19	4938.01	1.02
ATGC0658	4674473	0.67	10900.36	6095.36	1.79
ATGC0662	6112670	1.58	33357.63	23229.09	1.44
ATGC0664	3361142	1.22	8250.89	5776.52	1.43
ATGC0665	3736407	1.31	40328.22	17795.35	2.27
ATGC0668	4873239	2.11	14786.33	9318.33	1.59
ATGC0669	5242548	1.58	8114.25	6442.45	1.26
ATGC0670	6907772	1.27	25265.45	19607.03	1.29
ATGC0671	2409765	0.84	8273.59	5217.45	1.59
ATGC0672	3404760	1.00	4125.58	2737.27	1.51
ATGC0673	5344972	0.84	12854.80	8363.21	1.54
ATGC0674	4464988	1.19	10661.86	7946.22	1.34
ATGC0676	2360808	1.43	2681.45	1908.58	1.40
ATGC0677	2011862	1.02	1594.89	1235.95	1.29
ATGC0678	7166266	0.98	22060.52	13269.88	1.66
ATGC0679	2876572	1.15	5695.21	4095.41	1.39
ATGC0680	4348337	1.42	2188.67	1355.60	1.61
ATGC0681	4655991	0.83	16077.95	12441.89	1.29
ATGC0682	2853072	0.93	6539.27	3835.73	1.70
ATGC0683	6633666	0.91	15313.71	12722.85	1.20
ATGC0684	5117558	1.66	7398.76	7310.89	1.01
ATGC0685	4507116	1.14	6042.18	4302.26	1.40
ATGC0686	6135478	1.09	9353.93	8981.11	1.04
ATGC0687	9059812	0.89	22675.43	17484.80	1.30
ATGC0688	169219	0.47	102.58	86.98	1.18
ATGC0689	2374864	0.86	1777.01	1605.71	1.11

ATGC0690	4395968	0.77	3350.10	2351.30	1.42
ATGC0691	3893206	0.69	2765.48	2385.68	1.16
ATGC0692	3951517	1.18	6190.09	4232.65	1.46
ATGC0693	3180673	1.64	4351.68	3233.96	1.35
ATGC0694	3450279	1.42	4496.51	2763.96	1.63
ATGC0699	3827531	1.96	27326.48	5071.53	5.39
ATGC0700	2599652	1.05	19017.02	12609.01	1.51
ATGC0702	4851806	1.21	18577.37	14135.04	1.31
ATGC0703	2314753	1.36	2342.13	1610.00	1.45
ATGC0704	4041318	1.27	11428.46	10914.07	1.05
ATGC0705	4141447	2.48	9080.85	5603.97	1.62
ATGC0706	6224392	1.43	16757.31	11228.00	1.49
ATGC0707	6612542	0.69	27436.39	18848.17	1.46
ATGC0708	5230650	1.56	17679.79	13491.79	1.31
ATGC0709	4018990	1.11	14929.02	12767.42	1.17
ATGC0710	4996294	0.97	22916.53	14108.31	1.62
ATGC0711	8027492	1.21	10951.74	7792.23	1.41
ATGC0712	6607828	1.12	16534.05	11672.42	1.42
ATGC0713	6661285	1.73	20605.18	14387.72	1.43
ATGC0714	723970	0.19	16075.38	7970.99	2.02
ATGC0715	3362333	1.14	2429.14	1796.16	1.35
ATGC0716	3584812	0.98	5109.84	3879.58	1.32
ATGC0717	2182100	1.10	2186.59	1465.27	1.49
ATGC0718	919993	2.11	1133.01	660.79	1.71
ATGC0719	3424893	1.26	2470.53	1724.57	1.43
ATGC0720	4839879	1.17	4469.00	3671.23	1.22
ATGC0722	3827697	1.15	3941.87	3096.11	1.27
ATGC0723	4255835	1.70	6363.35	5263.39	1.21
ATGC0724	6147290	1.06	4373.11	3057.29	1.43
ATGC0725	9240166	0.86	21594.01	17108.74	1.26
ATGC0726	1986154	0.96	539.80	376.93	1.43
ATGC0727	7424241	0.82	21798.11	16273.71	1.34
ATGC0728	1796606	1.49	1946.67	1210.60	1.61
ATGC0729	3979593	0.90	3475.90	2690.77	1.29
ATGC0730	4876443	1.95	5992.24	3723.96	1.61
ATGC0731	3370341	1.75	2521.58	1855.89	1.36
ATGC0732	2496444	0.63	3498.27	2296.04	1.52
ATGC0733	6049186	0.82	8886.74	8833.99	1.01
ATGC0734	4376059	1.25	6728.30	4189.15	1.61
ATGC0735	2702994	0.73	7145.83	4696.07	1.52

ATGC0736	2287213	1.16	1656.62	932.06	1.78
ATGC0737	5697957	1.46	10760.10	7851.23	1.37
ATGC0738	3684270	1.45	5743.18	4978.53	1.15
ATGC0739	4378193	1.58	6019.08	4071.18	1.48
ATGC0740	4491948	0.91	4497.66	3552.20	1.27
ATGC0745	6415420	1.76	26851.97	14588.57	1.84
ATGC0746	4214921	1.38	14304.01	10388.98	1.38
ATGC0750	6101332	2.80	34355.21	28354.98	1.21
ATGC0752	3312578	0.52	21796.34	13517.78	1.61
ATGC0755	2897281	1.21	2708.37	1656.65	1.63
ATGC0757	2376036	1.14	3376.28	2448.31	1.38
ATGC0758	2633957	0.82	6180.34	3292.52	1.88
ATGC0759	4083035	1.29	7297.43	6571.68	1.11
ATGC0760	2509910	1.10	3049.74	2069.54	1.47
ATGC0762	1459038	1.11	919.47	653.68	1.41
ATGC0763	3355004	1.52	8141.60	5088.35	1.60
ATGC0764	635111	0.40	1556.81	1120.01	1.39
ATGC0766	1753385	0.56	11923.31	7906.38	1.51
ATGC0767	4657691	1.34	10882.00	7820.23	1.39
ATGC0768	713367	0.95	5829.20	3861.57	1.51
ATGC0769	3542126	1.80	3669.55	2510.72	1.46
ATGC0770	3481664	1.53	11168.81	8071.60	1.38
ATGC0771	5226988	1.21	12464.01	8782.34	1.42
ATGC0772	140963	0.20	148.70	184.31	0.81
ATGC0773	2287249	1.06	3725.29	2218.44	1.68
ATGC0774	779363	0.37	159.45	233.90	0.68
ATGC0775	4918994	1.56	7496.06	4832.85	1.55
ATGC0776	8881052	1.03	17761.32	11698.53	1.52
ATGC0777	3923376	1.04	10152.57	6498.69	1.56
ATGC0778	5688986	0.73	29385.80	19666.87	1.49
ATGC0779	5047056	1.79	4865.07	2975.58	1.64
ATGC0780	3864079	0.92	4937.95	3599.31	1.37
ATGC0781	5826844	1.15	14683.95	10701.14	1.37
ATGC0782	2784822	0.94	1812.24	1179.31	1.54
ATGC0783	5014524	1.15	6817.66	4988.55	1.37
ATGC0784	2980819	1.05	3831.33	2516.81	1.52
ATGC0785	1509068	1.10	1980.17	1208.51	1.64
ATGC0786	152118	0.13	270.63	211.68	1.28
ATGC0787	3954950	1.05	6742.14	4499.61	1.50
ATGC0789	4915216	1.15	4570.24	2993.51	1.53

ATGC0790	1603582	0.87	1890.06	1047.05	1.81
ATGC0791	8577674	1.09	3329.51	2385.30	1.40
ATGC0792	6669322	0.87	15853.19	10936.78	1.45
ATGC0793	5089458	1.07	5242.05	3790.96	1.38
ATGC0794	2548057	0.93	2945.29	1577.08	1.87
ATGC0795	4120638	2.33	4001.60	2932.64	1.36
ATGC0796	3844970	0.64	15516.57	9915.86	1.56
ATGC0797	6038404	1.04	6840.44	3968.46	1.72
ATGC0798	235831	0.32	84.23	79.45	1.06
ATGC0799	4519234	2.04	7171.09	3890.64	1.84
ATGC0800	7100882	0.73	18972.52	13053.88	1.45
ATGC0801	8055216	1.01	12591.25	9745.04	1.29
ATGC0802	3967624	1.15	7502.62	6246.85	1.20
ATGC0803	5705613	1.21	7038.48	5280.38	1.33
ATGC0805	3965954	0.99	3499.75	1763.76	1.98
ATGC0806	5896700	0.78	7463.01	5444.66	1.37
ATGC0807	6732154	0.69	20288.55	13110.74	1.55
ATGC0808	651313	0.47	161.22	135.97	1.19
ATGC0809	4026314	0.83	12267.57	9685.41	1.27
ATGC0810	6263730	0.83	7289.21	5392.78	1.35
ATGC0811	3269948	0.49	14260.27	9827.61	1.45
ATGC0812	4503894	1.17	3800.83	2723.88	1.40
ATGC0813	5984850	1.37	8957.93	6883.27	1.30
ATGC0814	9285790	0.89	23989.33	17075.27	1.40
ATGC0815	1456516	0.88	11040.93	8997.50	1.23
ATGC0816	7884676	0.93	15699.33	9858.83	1.59
ATGC0817	4738752	0.89	4766.90	3098.33	1.54
ATGC0818	1524413	0.78	1785.30	1212.51	1.47
ATGC0819	2714388	0.76	3410.41	2215.35	1.54
ATGC0820	1805545	1.16	5490.10	3903.54	1.41
ATGC0831	2795601	1.66	14935.85	8547.19	1.75
ATGC0835	2483714	1.17	2349.16	1934.27	1.21
ATGC0838	4487867	1.28	48952.51	18371.19	2.66
ATGC0840	1744112	0.92	5270.01	4865.63	1.08
ATGC0844	1984762	1.36	6022.43	3414.47	1.76
ATGC0845	3571790	1.21	8536.37	5197.17	1.64
ATGC0846	6472987	0.80	40896.39	27123.42	1.51
ATGC0847	5913780	2.13	5086.51	3919.32	1.30
ATGC0848	1752258	0.74	8435.69	5704.21	1.48
ATGC0849	6272366	1.64	15025.88	11574.19	1.30

ATGC0851	7816689	1.14	12883.19	7882.22	1.63
ATGC0852	8073621	0.94	36589.20	25607.78	1.43
ATGC0853	3917759	1.07	9103.94	5019.55	1.81
ATGC0855	479868	0.49	589.68	477.00	1.24
ATGC0857	5306277	1.19	11476.97	6263.30	1.83
ATGC0858	3590716	1.66	5659.54	3131.42	1.81
ATGC0859	1660951	0.73	3053.83	2184.14	1.40
ATGC0860	2921657	1.57	4531.60	4537.25	1.00
ATGC0861	7945061	0.82	18126.48	16907.00	1.07
ATGC0862	6221248	2.21	5106.87	2636.57	1.94
ATGC0863	4992805	1.69	10001.90	6131.99	1.63
ATGC0864	6119030	0.97	8822.41	7210.19	1.22
ATGC0865	4741350	1.20	3037.51	2013.82	1.51
ATGC0866	3349943	1.49	3680.90	3092.75	1.19
ATGC0867	4329931	1.34	2850.56	1653.91	1.72
ATGC0868	4052258	1.67	5026.78	3115.15	1.61
ATGC0869	4040012	0.73	8066.07	6679.55	1.21
ATGC0871	5080660	1.13	7937.40	5527.11	1.44
ATGC0872	5076637	1.34	4764.85	3707.46	1.29
ATGC0873	7171767	1.41	4340.25	2783.96	1.56
ATGC0874	9320089	1.02	23609.27	17885.07	1.32
ATGC0875	5788809	0.81	9665.51	6040.28	1.60
ATGC0876	5218828	1.78	7986.23	4436.40	1.80
ATGC0877	9306871	0.66	14891.67	10419.16	1.43
ATGC0878	5921869	1.93	5730.48	3398.16	1.69
ATGC0879	3360630	1.41	7496.98	4679.48	1.60
ATGC0880	1160484	0.88	15949.47	7746.51	2.06
ATGC0881	2663111	1.12	2930.82	1940.40	1.51
ATGC0882	3478815	1.16	4870.28	3230.05	1.51
ATGC0883	7169141	1.11	13972.88	9132.44	1.53
ATGC0884	6734763	0.76	3971.63	2911.95	1.36
ATGC0885	3166259	0.91	5697.67	3547.03	1.61
ATGC0886	3870385	0.72	7512.22	5101.54	1.47
ATGC0887	3545181	1.64	728.05	426.38	1.71
ATGC0888	5366977	0.68	8200.62	5228.78	1.57
ATGC0889	5260882	1.08	3554.88	2199.48	1.62
ATGC0890	6421998	1.02	11658.88	7867.20	1.48
ATGC0891	2854808	0.79	3940.73	2449.27	1.61
ATGC0892	4507493	0.68	4919.14	3143.28	1.56
ATGC0893	2415533	0.95	1611.28	946.03	1.70

ATGC0894	4961663	1.10	3453.17	2550.81	1.35
ATGC0895	4264855	0.81	4238.92	2771.78	1.53
ATGC0896	3271299	1.32	3110.90	2263.43	1.37
ATGC0897	9899183	0.80	18829.42	14738.07	1.28
ATGC0898	7772587	0.82	14228.99	9515.81	1.50
ATGC0899	9621721	0.90	17999.32	12915.67	1.39
ATGC0900	4519151	1.54	5901.09	4311.01	1.37
ATGC0901	2391777	1.12	8466.87	5996.34	1.41
ATGC0902	1375770	0.71	1537.72	1009.73	1.52
ATGC0903	5838389	0.92	13784.28	8693.62	1.59
ATGC0904	5693067	0.76	11697.50	7386.13	1.58
ATGC0905	632370	0.31	281.95	161.72	1.74
ATGC0906	8033415	1.02	9831.17	7007.56	1.40
ATGC0907	8112061	1.15	19248.41	15376.84	1.25
ATGC0908	8188347	1.21	8824.02	6809.78	1.30
ATGC0909	4786507	1.27	4676.63	4131.57	1.13
ATGC0910	6240880	0.93	8783.65	5337.13	1.65
ATGC0911	4171110	0.73	6631.21	3601.44	1.84
ATGC0913	136065	0.30	66.46	80.86	0.82
ATGC0914	7965264	0.87	17854.46	12223.40	1.46
ATGC0915	2504349	0.96	4608.73	3018.79	1.53
ATGC0916	4009526	1.08	1895.11	953.27	1.99
ATGC0917	517860	0.35	188.05	100.61	1.87
ATGC0918	2810923	0.90	5336.68	3102.19	1.72
ATGC0919	8308430	0.85	15219.40	10511.06	1.45
ATGC0920	5576178	0.62	6893.17	4510.48	1.53
ATGC0940	1380398	1.89	1822.96	1403.52	1.30
ATGC0944	1731110	0.82	14018.62	9092.69	1.54
ATGC0946	2739240	1.36	11544.88	6756.96	1.71
ATGC0948	9929346	1.32	60567.99	43586.11	1.39
ATGC0952	2158673	0.92	3348.08	1899.61	1.76
ATGC0953	2192574	0.86	13403.53	7834.05	1.71
ATGC0954	3446446	1.61	5484.70	4287.39	1.28
ATGC0955	9734476	0.83	49763.22	30207.71	1.65
ATGC0956	4423100	1.47	10982.99	7257.81	1.51
ATGC0957	4766714	1.33	10556.35	7709.45	1.37
ATGC0958	3784450	0.85	15841.79	10807.39	1.47
ATGC0959	5781564	1.58	15882.42	12305.64	1.29
ATGC0960	4747744	1.14	16041.35	11206.00	1.43
ATGC0961	756527	0.28	7063.01	4531.86	1.56

ATGC0962	2366130	0.81	8607.17	4674.11	1.84
ATGC0964	2691371	1.34	4137.25	3033.25	1.36
ATGC0965	5493098	1.75	18346.93	13088.76	1.40
ATGC0966	2500544	0.97	4995.51	3023.97	1.65
ATGC0967	1854966	1.20	5321.04	2595.59	2.05
ATGC0968	1792919	1.23	3153.45	1964.06	1.61
ATGC0969	7062790	1.66	10160.35	6346.57	1.60
ATGC0970	7456404	1.07	8364.13	5715.09	1.46
ATGC0971	3385517	1.01	10393.12	6362.14	1.63
ATGC0972	8181934	0.82	34878.06	21931.53	1.59
ATGC0973	8012773	0.97	18256.25	10729.74	1.70
ATGC0974	4787829	0.80	10985.88	6612.09	1.66
ATGC0975	5899149	0.94	12831.05	8660.19	1.48
ATGC0976	4090554	0.85	19092.68	11777.24	1.62
ATGC0977	3479000	1.13	5239.99	3178.06	1.65
ATGC0978	174016	0.42	174.12	95.38	1.83
ATGC0979	10164010	0.97	42434.86	26434.87	1.61
ATGC0980	3631970	1.27	4745.50	2944.46	1.61
ATGC0981	3247380	1.24	2278.94	1512.91	1.51
ATGC0982	3972953	0.88	9629.18	5918.49	1.63
ATGC0984	1615932	1.69	1052.82	637.94	1.65
ATGC0985	5312864	0.98	36040.06	25538.50	1.41
ATGC0986	3442520	0.97	10616.49	4383.37	2.42
ATGC0987	648141	0.49	431.45	319.21	1.35
ATGC0988	3455784	1.45	5876.45	3421.32	1.72
ATGC0989	3736022	1.44	2132.79	1259.04	1.69
ATGC0990	8222268	0.92	39862.77	30465.45	1.31
ATGC0991	4891382	0.87	10397.10	6238.93	1.67
ATGC0992	4028836	1.37	4221.24	2399.63	1.76
ATGC0993	7664578	1.26	28366.46	19276.91	1.47
ATGC0994	820033	0.57	252.40	163.94	1.54
ATGC0995	465038	0.39	138.64	78.03	1.78
ATGC0996	4803625	1.62	11403.73	6624.10	1.72
ATGC0997	5457572	1.06	6044.76	3798.82	1.59
ATGC0998	3749545	0.80	3245.41	2002.81	1.62
ATGC0999	4320269	1.88	5813.48	2854.88	2.04
ATGC1000	4363290	1.72	4913.65	3425.90	1.43
ATGC1001	643968	0.36	157.37	143.74	1.09
ATGC1002	5206770	1.69	3598.99	2383.66	1.51
ATGC1003	4293232	1.67	10344.46	5400.93	1.92

ATGC1004	7520872	1.13	21665.65	12133.54	1.79
ATGC1005	4570058	1.35	8129.62	4673.26	1.74
ATGC1006	5836284	1.65	1826.49	1259.10	1.45
ATGC1007	4376282	1.50	3445.82	2223.54	1.55
ATGC1008	2653044	0.74	1870.26	1117.59	1.67
ATGC1009	7174823	0.97	11639.12	8267.60	1.41
ATGC1010	2636834	0.98	2490.44	1436.76	1.73
ATGC1011	3887657	1.27	4980.44	2777.74	1.79
ATGC1012	4316928	1.40	5990.67	3844.93	1.56
ATGC1013	7451216	1.04	27178.84	16615.20	1.64
ATGC1014	6620423	0.86	12914.74	8757.48	1.47
ATGC1015	6006526	1.31	5517.67	3806.75	1.45
ATGC1016	4431096	1.22	3564.83	2202.40	1.62
ATGC1017	4147522	1.23	6183.59	3293.27	1.88
ATGC1018	9974036	1.00	7335.16	4168.25	1.76
ATGC1019	4263354	0.95	7197.73	5327.29	1.35
ATGC1020	7387177	0.80	10090.08	6466.58	1.56
ATGC1021	3278404	1.31	2251.90	1434.02	1.57
ATGC1022	6863786	1.00	6129.42	3751.96	1.63
ATGC1023	7790908	0.91	1992.65	1404.78	1.42
ATGC1024	4529080	0.89	8716.77	4970.59	1.75
ATGC1025	6187229	0.95	4123.47	2637.61	1.56
ATGC1026	5134005	0.81	20560.60	13179.99	1.56
ATGC1027	4761506	1.18	12127.93	6522.41	1.86
ATGC1028	5063997	1.77	7443.67	4293.04	1.73
ATGC1029	3276692	0.98	5042.25	3277.16	1.54
ATGC1030	3845378	1.00	7187.85	4886.55	1.47
ATGC1031	9887354	0.85	16947.39	11117.21	1.52
ATGC1032	4988435	1.24	4339.26	2574.29	1.69
ATGC1033	5740952	1.18	5169.64	3155.48	1.64
ATGC1034	3402498	1.44	3183.09	1770.85	1.80
ATGC1035	3680998	0.98	5727.45	4047.03	1.42
ATGC1036	6166834	0.72	12034.63	7535.89	1.60
ATGC1037	4817150	0.88	11044.24	6644.15	1.66
ATGC1038	4774789	1.02	5222.81	2619.69	1.99
ATGC1039	5113117	1.81	1988.07	1276.86	1.56
ATGC1040	4927880	1.58	2492.79	1757.22	1.42
ATGC1041	2331134	1.18	3401.78	1916.49	1.78
ATGC1042	2241290	0.56	3772.04	2147.90	1.76
ATGC1043	4056935	1.47	3332.50	1632.35	2.04

ATGC1044	3440210	0.92	7665.66	4052.76	1.89
ATGC1045	111994	0.62	168.22	115.65	1.45
ATGC1046	1433312	1.37	845.31	533.08	1.59
ATGC1047	3469576	1.25	2158.67	1514.65	1.43
ATGC1048	5546236	0.80	3316.08	2207.98	1.50
ATGC1049	4048450	1.42	5037.13	3912.80	1.29
ATGC1050	4971048	1.01	6104.35	3645.05	1.67
ATGC1051	4377195	1.61	9034.64	6138.59	1.47
ATGC1052	3902732	1.37	2555.15	1759.47	1.45
ATGC1053	2619513	0.66	2700.74	1526.50	1.77
ATGC1054	4428978	0.50	4070.29	2608.03	1.56
ATGC1055	4587509	1.28	6558.45	4119.27	1.59
ATGC1056	4602856	1.02	8484.98	5089.37	1.67
ATGC1057	3659726	0.70	4491.31	2899.71	1.55
ATGC1058	1247771	0.20	4752.78	921.10	5.16
ATGC1059	1099220	3.12	1315.18	797.94	1.65
ATGC1060	3515026	0.88	9969.16	6336.98	1.57
ATGC1061	3073103	0.73	5017.90	3073.87	1.63
ATGC1062	6186282	1.20	6580.99	3785.90	1.74
ATGC1063	5082926	1.08	8966.27	5630.85	1.59
ATGC1064	2907314	0.38	2703.97	1212.73	2.23
ATGC1065	2755522	1.26	4570.81	2902.63	1.57
ATGC1066	6453736	0.99	8803.44	5617.45	1.57
ATGC1067	5188586	0.71	2726.62	1680.40	1.62
ATGC1068	653158	0.42	268.46	210.74	1.27
ATGC1069	5014828	0.98	1679.62	1020.80	1.65
ATGC1070	2901872	1.59	4328.29	2863.30	1.51
ATGC1071	9687506	0.87	29406.49	21031.98	1.40
ATGC1072	3409622	0.94	2707.54	1800.95	1.50
ATGC1073	4310163	0.88	6243.38	3586.10	1.74
ATGC1074	3852812	0.82	9008.00	5176.60	1.74
ATGC1075	3635750	0.87	2270.92	1758.24	1.29
ATGC1078	1642612	1.42	3225.23	1759.39	1.83
ATGC1079	2121360	1.31	4528.41	2616.71	1.73
ATGC1080	2525132	0.97	10676.35	5853.50	1.82
ATGC1081	4806776	0.72	8748.85	5680.72	1.54

Table S2. Estimates of selective constraints in 30 splittable ATGCs.

ATGC ID	Constraint - Subtree 1	Constraint - Subtree 2	Ratio
ATGC0056	1.37	0.47	2.94
ATGC0008	1.13	0.39	2.91
ATGC0053	1.63	0.96	1.71
ATGC0284	1.56	1.02	1.52
ATGC0134	1.42	0.98	1.45
ATGC0460	1.29	0.89	1.45
ATGC0296	0.95	0.68	1.39
ATGC0462	1.18	0.88	1.34
ATGC0004	0.82	0.65	1.27
ATGC0111	1.78	1.42	1.25
ATGC0149	1.48	1.18	1.25
ATGC0024	0.75	0.61	1.23
ATGC0184	0.74	0.61	1.22
ATGC0143	0.71	0.61	1.17
ATGC0265	1.16	1.00	1.17
ATGC0104	0.62	0.53	1.15
ATGC0144	0.50	0.44	1.14
ATGC0089	1.03	0.91	1.13
ATGC0402	1.22	1.10	1.10
ATGC0403	0.70	0.64	1.09
ATGC0059	1.28	1.17	1.09
ATGC0001	1.18	1.08	1.09
ATGC0071	1.23	1.14	1.07
ATGC0015	0.82	0.76	1.07
ATGC0116	1.01	0.94	1.07
ATGC0290	1.04	0.97	1.07
ATGC0002	1.25	1.18	1.06
ATGC0100	1.28	1.26	1.01
ATGC0098	1.44	1.42	1.01
ATGC0124	0.87	0.86	1.00

Table S3. Correlation between genome size and ATGC-specific selective constraint across various prokaryotic clades. Only clades consisting of more than 15 genomes were included

Taxon	Count	Spearman's ρ	CI lower	CI upper	p value
Bacteria	772	0.28	0.20	0.35	6.07E-15
Archaea	19	-0.82	-0.93	-0.64	1.78E-05
<i>Pseudomonadota</i>	323	0.38	0.27	0.49	1.10E-12
<i>Actinomycetota</i>	152	-0.09	-0.26	0.09	2.54E-01
<i>Bacillota</i>	144	0.00	-0.15	0.17	9.86E-01
<i>Bacteroidota</i>	60	0.35	0.09	0.59	5.60E-03
<i>Campylobacterota</i>	20	0.21	-0.35	0.61	3.80E-01
<i>Cyanobacteriota</i>	19	-0.17	-0.55	0.28	4.82E-01
<i>Mycoplasmata</i>	17	0.07	-0.44	0.60	7.79E-01
<i>Gammaproteobacteria</i>	172	0.53	0.39	0.65	7.10E-14
<i>Actinomycetes</i>	149	-0.07	-0.24	0.11	3.99E-01
<i>Bacilli</i>	109	0.12	-0.07	0.31	2.12E-01
<i>Alphaproteobacteria</i>	92	0.30	0.09	0.51	3.43E-03
<i>Betaproteobacteria</i>	58	0.32	0.01	0.55	1.55E-02
<i>Flavobacteriia</i>	36	0.58	0.26	0.80	2.00E-04
<i>Clostridia</i>	26	-0.01	-0.40	0.42	9.78E-01
<i>Bacillales</i>	61	-0.33	-0.52	-0.12	9.35E-03
<i>Enterobacterales</i>	58	0.48	0.19	0.69	1.38E-04
<i>Lactobacillales</i>	48	0.31	-0.01	0.56	3.13E-02
<i>Hyphomicrobiales</i>	45	0.06	-0.27	0.40	7.03E-01
<i>Mycobacteriales</i>	43	0.41	0.09	0.66	7.01E-03
<i>Micrococcales</i>	42	0.04	-0.31	0.39	7.95E-01
<i>Burkholderiales</i>	41	-0.13	-0.47	0.22	4.04E-01
<i>Kitasatosporales</i>	37	-0.27	-0.55	0.08	1.04E-01
<i>Eubacteriales</i>	23	-0.19	-0.57	0.26	3.73E-01
<i>Pseudomonadales</i>	23	0.00	-0.40	0.42	9.89E-01
<i>Alteromonadales</i>	18	0.12	-0.55	0.64	6.39E-01
<i>Vibrionales</i>	17	0.32	-0.24	0.75	2.13E-01
<i>Lactobacillaceae</i>	28	0.38	-0.02	0.67	4.79E-02
<i>Bacillaceae</i>	23	0.19	-0.27	0.54	3.83E-01
<i>Microbacteriaceae</i>	22	-0.05	-0.51	0.47	8.28E-01
<i>Enterobacteriaceae</i>	21	0.50	0.00	0.75	1.99E-02
<i>Flavobacteriaceae</i>	21	0.29	-0.18	0.64	2.07E-01
<i>Pseudomonadaceae</i>	19	0.14	-0.30	0.56	5.81E-01
<i>Burkholderiaceae</i>	17	-0.21	-0.67	0.42	4.11E-01
<i>Mycobacteriaceae</i>	16	0.56	0.01	0.87	2.54E-02

