

Table S1. Detail information of Z-DNA motifs predicted on nBMST. ZP1 in chickens and TG19 in Pigeon show high similarity to each other in length, composition and sequence.

Chicken				
Name	Length	Repeat	Sequence	Score
ZP1	40	TG	TGTGTGTGTGTGTGTGTGTGTGTGT GTGTGTGTGTGTGTGTGCG	80
ZP3	14	CA	CACACACACACACA	19
ZP6	25	TG	GTGCGTGTGCACGTGTGTGTGC ACA	91
ZP7	12	CA	CACGCACACACA	38
ZP4	22	TG	CACGTGTGTGTGTGCGTGTGCA	75
Pigeon				
Name	Length	Repeat	Sequence	Score
TG19	38	TG	GTGTGTGTGTGTGTGTGCGTGTGTG TGCGCACACACGTGT	121
1	19	CA	ACGCACGCACGCACACACA	93
2	17	CA	ACACACACACGCACACA	46
3	14	CA	ACACACACACACAC	19
4	20	TG	TGTGTGTGTGTGTGTGTGCGCA	61
5	12	CA	GCACACGCACGC	71

Table S2. Phylogenetic linear regression model fitting result of Z-DNA density and predictors.

Predictor	Model	All species			Non-Passeriformes			Passeriformes		
		logLik	AIC	AICw	logLik	AIC	AICw	logLik	AIC	AICw
Genome size	BM	-708.6	1423.3	0	-349.7	705.4	0.00087	-276.7	559.5	0
	OU	-649.7	1307.4	0.04109	-349.2	706.5	0.0005	-257.5	523.1	0.84553
	lambda	-646.5	1301.1	0.95891	-341.6	691.3	0.99863	-259.3	526.5	0.15447
Body mass	BM	-710.9	1427.9	0	-353.1	712.3	0	-283.0	571.9	0
	OU	-649.9	1307.9	0.99797	-349.2	706.5	0.00006	-265.5	539.0	0.96267
	lambda	-656.2	1320.3	0.00203	-339.4	686.9	0.99994	-268.7	545.5	0.03733
Egg mass	BM	-576	1158	0	-282.4	570.8	0.03269	-212.1	430.3	0
	OU	-520.7	1049.4	0.99894	-279.0	566.1	0.34276	-198.4	404.7	0.92414
	lambda	-527.5	1063.1	0.00106	-278.4	564.9	0.62455	-200.8	409.7	0.07586
Deve_T	BM	-602.8	1211.5	0	-290.6	587.2	0.17979	-230.8	467.7	0
	OU	-550	1108	0.99683	-290.2	588.3	0.12669	-214.4	436.9	0.8909
	lambda	-555.7	1119.5	0.00317	-288.4	584.9	0.69352	-216.6	441.1	0.1091
Incu_T	BM	-602.5	1211.0	0	-290	586	0.18214	-231.3	468.7	0
	OU	-548.1	1104.1	0.99842	-289	586	0.18214	-215.5	439.0	0.94268
	lambda	-554.5	1117.0	0.00158	-287.7	583.5	0.63572	-218.3	444.6	0.05732
Fled_T	BM	-602.8	1211.5	0	-291	588	0.20761	-230.0	466.1	0
	OU	-551.2	1110.4	0.99223	-290.7	589.4	0.1031	-213.6	435.3	0.86989
	lambda	-556.1	1120.1	0.00777	-288.8	585.6	0.68929	-215.6	439.1	0.13011
Deve_T	BM	-600.6	1207.2	0	-290.5	587.0	0.03062	-228.7	463.4	0

(bodymass_adj)	OU	-544.7	1097.4	0.99932	-288.4	584.7	0.0967	-215.2	438.4	0.95026
	lambda	-552	1112	0.00068	-286.2	580.3	0.87269	-218.2	444.3	0.04974
Incu_T	BM	-601	1208	0	-290.1	586.1	0.04673	-229.5	465.0	0
(bodymass_adj)	OU	-545.5	1098.9	0.99942	-288.3	584.5	0.104	-215.5	438.9	0.95026
	lambda	-552.9	1113.8	0.00058	-286.1	580.3	0.84927	-218.4	444.8	0.04974
Fled_T	BM	-600.4	1206.8	0	-291.2	588.4	0.03243	-227.8	461.6	0
(bodymass_adj)	OU	-544.4	1096.7	0.99913	-289.2	586.4	0.08817	-214.8	437.6	0.95026
	lambda	-551.4	1110.8	0.00087	-286.9	581.8	0.8794	-217.8	443.5	0.04974
Deve_T	BM	-575.5	1157.0	0	-283.9	573.9	0.01131	-211.1	428.3	0
(eggmass_adj)	OU	-519	1046	0.99877	-279.6	567.3	0.30652	-197.7	403.5	0.91293
	lambda	-525.7	1059.4	0.00123	-278.9	565.7	0.68217	-200.1	408.2	0.08707
Incu_T	BM	-575.8	1157.6	0	-282.8	571.7	0.0201	-212.1	430.2	0
(eggmass_adj)	OU	-520	1048	0.99909	-279.1	566.2	0.31437	-198.2	404.5	0.92056
	lambda	-527	1062	0.00091	-278.4	564.7	0.66553	-200.7	409.4	0.07944
Fled_T	BM	-575.6	1157.2	0	-285	576	0.02859	-210.2	426.4	0
(eggmass_adj)	OU	-519	1046	0.99797	-282.3	572.6	0.1565	-197.1	402.1	0.90887
	lambda	-525.2	1058.4	0.00203	-280.7	569.3	0.81491	-199.3	406.7	0.09112

Table S3. Phylogenetic linear regression model fitting result of STR density and predictors.

Predictor	Model	All species			Non-Passeriformes			Passeriformes		
		logLik	AIC	AICw	logLik	AIC	AICw	logLik	AIC	AICw
Genome size	BM	-973.1	1952.2	0	-624.2	1254.5	0	-340.3	686.6	0.00001
	OU	-951.3	1910.6	0	-604.3	1216.6	0.00003	-332.1	672.2	0.01799
	lambda	-932.8	1873.6	1	-593.9	1195.7	0.99997	-328.1	664.2	0.982
Body mass	BM	-967.7	1941.4	0	-624.3	1254.6	0	-337.2	680.4	0.00001
	OU	-945.7	1899.3	0	-604.4	1216.9	0.00003	-327.4	662.9	0.09112
	lambda	-928.7	1865.5	1	-594	1196	0.99997	-325.2	658.3	0.90886
Egg mass	BM	-777.5	1561.0	0	-522.6	1051.3	0	-251.4	508.9	0.00001
	OU	-757.1	1522.2	0	-506.3	1020.5	0.00015	-239.9	487.8	0.51249
	lambda	-743.8	1495.6	1	-497.4	1002.9	0.99985	-239.9	487.9	0.4875
Deve_T	BM	-812.6	1631.2	0	-535.2	1076.4	0	-273.0	552.1	0.00002
	OU	-791.8	1591.6	0	-517.7	1043.4	0.00014	-261.7	531.3	0.57443
	lambda	-777.7	1563.4	1	-508.8	1025.6	0.99986	-262.0	531.9	0.42555
Incu_T	BM	-812.3	1630.6	0	-535.3	1076.6	0	-272.1	550.2	0.00002
	OU	-791.9	1591.7	0	-518	1044	0.00012	-260.9	529.7	0.52497
	lambda	-777.9	1563.7	1	-509	1026	0.99988	-261.0	529.9	0.47501
Fled_T	BM	-812.5	1631.0	0	-535.1	1076.3	0	-273.3	552.5	0.00002
	OU	-791.7	1591.4	0	-517.6	1043.2	0.00014	-262.3	532.5	0.43781
	lambda	-777.7	1563.3	1	-508.8	1025.5	0.99986	-262	532	0.56217
Deve_T	BM	-812.6	1631.2	0	-535.3	1076.7	0	-273.4	552.7	0.00003

(bodymass_adj)	OU	-791.8	1591.6	0	-518.1	1044.2	0.00011	-263.1	534.1	0.3318
	lambda	-777.9	1563.7	1	-509	1026	0.99989	-262.3	532.7	0.66817
Incu_T	BM	-812.6	1631.2	0	-535.3	1076.6	0	-273.4	552.7	0.00003
(bodymass_adj)	OU	-791.8	1591.7	0	-518.1	1044.1	0.00011	-263.0	534.1	0.3318
	lambda	-777.9	1563.7	1	-508.9	1025.8	0.99989	-262.3	532.7	0.66817
Fled_T	BM	-812.6	1631.1	0	-535.3	1076.6	0	-273.4	552.7	0.00003
(bodymass_adj)	OU	-791.7	1591.4	0	-518.1	1044.2	0.00011	-263.1	534.1	0.3318
	lambda	-777.9	1563.7	1	-509	1026	0.99989	-262.3	532.7	0.66817
Deve_T	BM	-777.5	1561.0	0	-522.6	1051.3	0	-251.3	508.5	0.00002
(eggmass_adj)	OU	-757	1522	0	-506.2	1020.5	0.00015	-240.2	488.4	0.45016
	lambda	-743.8	1495.5	1	-497.4	1002.9	0.99985	-240	488	0.54982
Incu_T	BM	-777.4	1560.9	0	-522.6	1051.2	0	-251.2	508.4	0.00002
(eggmass_adj)	OU	-757.1	1522.2	0	-506.3	1020.5	0.00015	-240.1	488.3	0.46256
	lambda	-743.8	1495.6	1	-497.5	1002.9	0.99985	-240	488	0.53742
Fled_T	BM	-777.5	1560.9	0	-522.6	1051.2	0	-251.3	508.6	0.00002
(eggmass_adj)	OU	-756.9	1521.9	0	-506.2	1020.4	0.00016	-240.2	488.4	0.45016
	lambda	-743.7	1495.5	1	-497.4	1002.9	0.99984	-240	488	0.54982

Table S4. Phylogenetic linear regression model fitting result of genome size and developmental periods.

Predictor	Model	All species			Non-Passeriformes			Passeriformes		
		logLik	AIC	AICw	logLik	AIC	AICw	logLik	AIC	AICw
Deve_T	BM	-787.9	1581.9	0	-491.2	988.5	0	-287.9	581.9	0
	OU	-758.9	1525.8	0.00106	-479.6	967.3	0.00015	-273	554	0.6981
	lambda	-752.1	1512.1	0.99894	-470.9	949.7	0.99985	-273.8	555.7	0.3019
Incu_T	BM	-787	1580	0	-491.2	988.4	0	-287.3	580.7	0
	OU	-755.6	1519.2	0.00067	-476.9	961.8	0.00017	-273.6	555.2	0.82252
	lambda	-748.3	1504.6	0.99933	-468.2	944.4	0.99983	-275.1	558.2	0.17748
Fled_T	BM	-787.1	1580.2	0	-490.5	986.9	0	-287.2	580.4	0
	OU	-761.7	1531.5	0.00017	-480.4	968.9	0.0001	-272.4	552.8	0.67264
	lambda	-753.1	1514.2	0.99983	-471.2	950.4	0.9999	-273.1	554.2	0.32736
Deve_T (bodymass_adj)	BM	-787.9	1581.9	0	-491.5	989.0	0	-287.2	580.5	0
	OU	-761.1	1530.2	0.00007	-479.9	967.8	0.00013	-273	554	0.88471
	lambda	-751.6	1511.2	0.99993	-471	950	0.99987	-275.0	558.1	0.11529
Incu_T (bodymass_adj)	BM	-788.1	1582.2	0	-491.2	988.3	0	-287.6	581.3	0
	OU	-761.3	1530.6	0.0001	-480.1	968.2	0.00013	-273.3	554.6	0.87451
	lambda	-752.1	1512.2	0.9999	-471.1	950.3	0.99987	-275.2	558.5	0.12549
Fled_T (bodymass_adj)	BM	-787.5	1581.0	0	-491.6	989.3	0	-286.7	579.4	0
	OU	-761	1530	0.00005	-479.7	967.4	0.00013	-272.6	553.2	0.88848
	lambda	-751	1510	0.99995	-470.7	949.5	0.99987	-274.7	557.3	0.11152
Deve_T	BM	-752.7	1511.4	0	-479.3	964.5	0	-264.8	535.6	0

(eggmass_adj)	OU	-724.3	1456.6	0.0001	-466.5	941.1	0.00024	-250.3	508.6	0.81813
	lambda	-715.1	1438.2	0.9999	-458.2	924.5	0.99976	-251.8	511.6	0.18187
Incu_T	BM	-753.6	1513.1	0	-479.9	965.8	0	-265.1	536.1	0
(eggmass_adj)	OU	-724.4	1456.9	0.00027	-467.1	942.2	0.00032	-250.8	509.6	0.83061
	lambda	-716.2	1440.4	0.99973	-459.0	926.1	0.99968	-252.4	512.7	0.16939
Fled_T	BM	-751.8	1509.5	0	-478.5	963.0	0	-264.3	534.6	0
(eggmass_adj)	OU	-724.6	1457.2	0.0004	-466.3	940.7	0.00017	-249.7	507.4	0.77891
	lambda	-714.4	1436.7	0.9996	-457.6	923.3	0.99983	-250.9	509.9	0.22109