

Supplementary Materials

Supplementary Table S1 ATAC-seq metadata and mapping statistics of all 53 samples

Tissue	ID	BioSample ID	Run ID	Lines	Period	Clean Reads	Mapped Reads	Usable Reads	Usable Ratio	NRF	FRiP
Bone	Inferior sternum 1	SAMN08476467	SRR6713575	White Leghorn Charles River Specific Pathogen Free (SPF)	e9 days	88,509,914	85,160,152	46,922,812	53.01%	76.61%	22.24%
	Inferior sternum 2	SAMN08476467	SRR6713576	White Leghorn Charles River Specific Pathogen Free (SPF)	e9 days	79,939,272	77,426,544	40,017,498	50.06%	74.51%	13.10%
	Inferior sternum 3	SAMN08476467	SRR6713578	White Leghorn Charles River Specific Pathogen Free (SPF)	e9 days	93,484,214	90,608,099	49,456,032	52.90%	76.44%	28.38%
	Superior sternum 1	SAMN08476466	SRR6713589	White Leghorn Charles River Specific Pathogen Free (SPF)	e9 days	76,693,416	74,603,948	37,080,666	48.35%	79.55%	21.99%
	Superior sternum 2	SAMN08476466	SRR6713590	White Leghorn Charles River Specific Pathogen Free (SPF)	e9 days	87,964,262	85,684,883	46,734,446	53.13%	80.65%	25.68%
	Superior sternum 3	SAMN08476466	SRR6713591	White Leghorn Charles River Specific Pathogen Free (SPF)	e9 days	79,305,140	76,986,636	42,133,676	53.13%	77.90%	21.61%
	Sternum 1	SAMN08476468	SRR6713573	White Leghorn Charles River Specific Pathogen Free (SPF)	e10 days	107,210,270	104,270,375	53,484,968	49.89%	76.81%	25.42%
	Sternum 2	SAMN08476468	SRR6713574	White Leghorn Charles River Specific Pathogen Free (SPF)	e10 days	87,621,176	83,976,891	50,126,766	57.21%	74.88%	13.18%
	Sternum 3	SAMN08476468	SRR6713580	White Leghorn Charles River Specific Pathogen Free (SPF)	e10 days	112,867,314	109,875,166	54,360,104	48.16%	76.72%	23.56%
	Keel 1	SAMN08476469	SRR6713569	White Leghorn Charles River Specific Pathogen Free (SPF)	e10 days	102,080,382	98,990,403	51,216,172	50.17%	76.04%	14.84%
	Keel 2	SAMN08476469	SRR6713570	White Leghorn Charles River Specific Pathogen Free (SPF)	e10 days	100,004,340	96,560,999	56,499,032	56.50%	77.56%	13.13%
	Keel 3	SAMN08476469	SRR6713592	White Leghorn Charles River Specific Pathogen Free (SPF)	e10 days	100,088,748	95,978,915	59,117,698	59.07%	73.89%	10.66%
Bud	Forelimb bud 1	SAMN08476462	SRR6713579	White Leghorn Charles River Specific Pathogen Free (SPF)	e4.5 days	88,951,730	86,969,910	46,644,494	52.44%	73.05%	22.75%
	Forelimb bud 2	SAMN08476462	SRR6713585	White Leghorn Charles River Specific Pathogen Free (SPF)	e4.5 days	88,096,594	85,265,293	44,893,816	50.96%	73.75%	24.63%
	Forelimb bud 3	SAMN08476462	SRR6713586	White Leghorn Charles River Specific Pathogen Free (SPF)	e4.5 days	86,477,852	84,309,182	48,213,434	55.75%	77.73%	23.41%
	Hindlimb bud 1	SAMN08476463	SRR6713571	White Leghorn Charles River Specific Pathogen Free (SPF)	e4.5 days	92,777,104	90,728,161	51,918,108	55.96%	77.19%	20.75%
	Hindlimb bud 2	SAMN08476463	SRR6713572	White Leghorn Charles River Specific Pathogen Free (SPF)	e4.5 days	76,116,966	74,324,045	43,324,676	56.92%	79.25%	20.70%
	Hindlimb bud 3	SAMN08476463	SRR6713577	White Leghorn Charles River Specific Pathogen Free (SPF)	e4.5 days	85,219,754	83,328,158	40,732,876	47.80%	77.26%	25.03%
Duodenum	Duodenum 1	This study	This study	Advanced intercross line	49 day	115,087,612	111,901,723	78,491,136	68.20%	71.78%	23.16%
	Duodenum 2	This study	This study	Advanced intercross line	49 day	203,809,316	198,090,563	125,055,84	61.36%	64.79%	25.01%

	Duodenum 3	This study	This study	Advanced intercross line	49 day	135,628,230	131,812,547	88,280,828	65.09%	68.47%	23.84%
	Duodenum 4	This study	This study	Advanced intercross line	49 day	144,963,144	140,767,128	93,423,954	64.45%	68.24%	23.98%
	Duodenum 5	This study	This study	Advanced intercross line	49 day	133,200,100	129,192,490	87,167,556	65.44%	69.11%	23.00%
	Duodenum 6	This study	This study	Advanced intercross line	49 day	138,173,518	134,508,282	86,978,776	62.95%	66.76%	24.81%
Liver	Liver 1	SAMEA103992	ERR261181	White Leghorn	387 (day)	107,704,166	104,109,783	29,384,084	27.28%	40.64%	3.78%
		467	9								
	Liver 2	SAMEA103992	ERR261182	White Leghorn	387 (day)	122,906,008	119,481,970	35,985,368	29.28%	49.10%	4.33%
		351	5								
Lung	Lung 1	SAMN14080452	SRR1105913 3	UCD003 University of California, Davis Chicken-Lung-D	/	111,274,316	106,945,091	43,041,472	38.68%	41.79%	18.89%
Muscle	Flight muscle 1	SAMN08476465	SRR6713581	White Leghorn Charles River Specific Pathogen Free (SPF)	c10 days	96,073,916	92,985,575	56,616,064	58.93%	78.88%	11.05%
	Flight muscle 2	SAMN08476464	SRR6713582	White Leghorn Charles River Specific Pathogen Free (SPF)	e9 days	105,736,718	102,564,248	62,094,008	58.73%	77.52%	12.54%
	Flight muscle 3	SAMN08476465	SRR6713583	White Leghorn Charles River Specific Pathogen Free (SPF)	c10 days	102,335,652	98,798,992	61,179,088	59.78%	78.66%	9.61%
	Flight muscle 4	SAMN08476465	SRR6713584	White Leghorn Charles River Specific Pathogen Free (SPF)	c10 days	97,900,816	93,925,678	57,331,194	58.56%	70.66%	7.40%
	Flight muscle 5	SAMN08476464	SRR6713587	White Leghorn Charles River Specific Pathogen Free (SPF)	e9 days	95,288,260	91,981,505	59,277,454	62.21%	78.40%	8.14%
	Flight muscle 6	SAMN08476464	SRR6713588	White Leghorn Charles River Specific Pathogen Free (SPF)	e9 days	93,664,622	89,998,075	61,106,868	65.24%	78.04%	5.45%
Neural Crest	Neural crest 1	SAMN13031765	SRR1027963 8	N.A.	HH6	20,865,586	16,503,806	7,650,780	36.67%	80.75%	39.12%
	Neural crest 2	SAMN13031764	SRR1027963 9	N.A.	HH6	43,445,008	40,456,337	24,867,378	57.24%	82.03%	30.96%
	Neural crest 3	SAMN13031763	SRR1027964 0	N.A.	HH9	29,657,656	27,899,322	16,479,748	55.57%	86.40%	30.53%
	Neural crest 4	SAMN13031762	SRR1027964 1	N.A.	HH9	49,119,042	44,642,305	12,897,958	26.26%	83.06%	10.18%
Retina	Retina 1	SAMN13388001	SRR1053348 2	Charles River	E5-E6 days	61,695,966	54,901,249	41,867,874	67.86%	87.52%	15.02%
	Retina 2	SAMN13388000	SRR1053348 3	Charles River	E5-E6 days	62,361,646	52,690,145	38,053,120	61.02%	88.81%	30.36%
Skin	Metatarsal skin 1	SAMN08606468	SRR6782018	N.A.	E12 days H&H stage 38	38,952,808	38,247,117	32,386,682	83.14%	90.06%	34.08%
	Metatarsal skin 2	SAMN08606467	SRR6782019	N.A.	E12 days H&H stage 38	37,913,942	37,217,183	30,876,008	81.44%	89.94%	34.66%
Somatopleu	Flank	SAMN12684312	SRR1005973	N.A.	HH18	69,303,336	67,882,905	27,057,132	39.04%	81.92%	20.72%

re	somatopteur 1		4								
	Flank		SRR1005973								
	SAMN12684341			N.A.	HH18	73,285,178	71,484,345	24,521,170	33.46%	77.40%	18.12%
	somatopteur 2		5								
	Flank		SRR1005973								
	SAMN12684340			N.A.	HH18	80,310,472	78,608,215	27,775,286	34.58%	78.56%	20.92%
	somatopteur 3		6								
	Forelimb		SRR1005973								
	SAMN12684339			N.A.	HH18	74,062,902	72,512,369	17,420,366	23.52%	78.79%	21.39%
	somatopteur 1		7								
	Forelimb		SRR1005973								
	SAMN12684338			N.A.	HH18	75,514,026	74,002,398	21,585,260	28.58%	80.38%	20.43%
	somatopteur 2		8								
	Forelimb		SRR1005973								
	SAMN12684311			N.A.	HH18	62,729,190	61,452,419	24,718,154	39.40%	82.82%	25.63%
	somatopteur 3		9								
	Hindlimb		SRR1005974								
	SAMN12684310			N.A.	HH18	71,839,386	69,871,408	24,752,034	34.45%	78.48%	15.71%
	somatopteur 1		0								
	Hindlimb		SRR1005974								
	SAMN12684337			N.A.	HH18	74,520,754	71,101,529	24,729,854	33.19%	79.69%	18.23%
	somatopteur 2		1								
	Hindlimb		SRR1005974								
	SAMN12684336			N.A.	HH18	109,911,854	107,249,723	42,221,356	38.41%	76.31%	21.79%
	somatopteur 3		2								
	CD4+T cell 1	SAMEA108831	ERR261183								
		0	8	White Leghorn	387 (day)	100,850,532	93,887,840	27,720,536	27.49%	55.80%	10.98%
	CD4+T cell 2	SAMEA108834	ERR261184								
		9	2	White Leghorn	387 (day)	104,197,164	98,933,389	31,339,164	30.08%	53.54%	10.35%
	CD8+T cell 1	SAMEA108831	ERR261184								
		1	9	White Leghorn	387 (day)	186,502,078	175,165,691	75,342,896	40.40%	56.02%	7.19%

Supplementary Table S2 Annotation of open chromatin regions for all samples

Tissue	ID	Exon	Intron	TSS	TTS	Intergenic	Total
Bone	Superior sternum 1	2,506	28,544	8,170	1,671	21,710	62,601
	Superior sternum 2	1,885	17,718	7,363	1,127	14,324	42,417
	Superior sternum 3	2,913	34,621	8,500	2,043	25,981	74,058
	Inferior sternum 1	2,378	28,125	8,016	1,627	21,880	62,026
	Inferior sternum 2	2,823	35,367	8,423	1,908	27,936	76,457
	Inferior sternum 3	2,449	28,360	8,073	1,697	22,006	62,585
	Sternum 1	2,488	29,951	8,145	1,717	22,801	65,102
	Sternum 2	2,079	18,528	7,376	1,125	14,688	43,796
	Sternum 3	2,437	28,115	8,036	1,643	21,607	61,838
	Keel 1	2,146	21,488	7,665	1,248	17,133	49,680
	Keel 2	2,231	22,894	7,597	1,321	18,304	52,347
	Keel 3	1,999	16,399	7,182	1,074	13,141	39,795
Bud	Forelimb bud 1	2,323	31,199	8,345	1,781	26,925	70,573
	Forelimb bud 2	2,312	31,517	8,277	1,715	27,948	71,769
	Forelimb bud 3	2,364	32,062	8,543	1,850	27,286	72,105
	Hindlimb bud 1	2,361	28,785	8,056	1,733	24,852	65,787
	Hindlimb bud 2	2,156	25,932	7,783	1,457	22,647	59,975

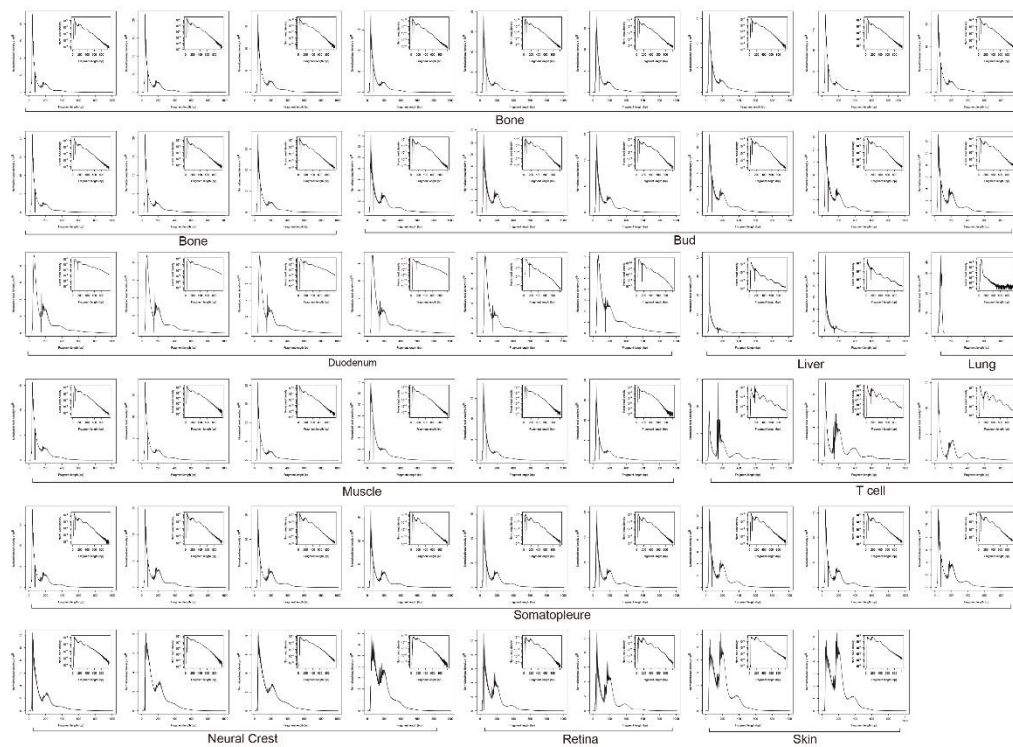
	Hindlimb bud 3	2,422	31,627	7,981	1,752	28,005	71,787
Duodenum	Duodenum 1	2,351	26,171	7,933	1,638	14,764	52,857
	Duodenum 2	2,540	30,932	8,046	1,947	17,046	60,511
	Duodenum 3	2,496	28,730	8,082	1,793	15,891	56,992
	Duodenum 4	2,430	26,290	7,775	1,800	15,083	53,378
	Duodenum 5	2,472	25,930	8,098	1,813	15,115	53,428
	Duodenum 6	2,245	24,395	7,545	1,680	14,018	49,883
Liver	Liver 1	481	2,741	3,867	235	2,865	10,189
	Liver 2	609	4,596	4,240	271	4,993	14,709
Lung	Lung	5,399	41,778	12,821	2,821	36,309	99,128
Muscle	Flight muscle 1	1,909	16,821	7,388	1,125	14,066	41,309
	Flight muscle 2	2,210	22,221	7,503	1,337	18,229	51,500
	Flight muscle 3	1,977	15,013	7,321	1,023	12,581	37,915
	Flight muscle 4	1,588	11,733	6,633	853	9,754	30,561
	Flight muscle 5	1,764	14,187	7,187	963	12,325	36,426
	Flight muscle 6	1,384	10,240	6,184	676	9,268	27,752
Neural Crest	Neural crest 1	2,276	17,844	8,208	1,701	14,906	44,935
	Neural crest 2	2,873	26,777	8,992	2,248	21,819	62,709
	Neural crest 3	2,308	23,074	8,345	1,992	17,991	53,710
	Neural crest 4	1,043	10,774	5,299	664	9,491	27,271
Retina	Retina 1	1,687	19,230	6,608	978	17,627	46,130
	Retina 2	2,128	25,631	7,701	1,453	22,975	59,888
Skin	Metatarsal skin 1	2,710	35,343	8,175	2,004	28,073	76,305
	Metatarsal skin 2	2,606	33,523	8,141	1,944	26,664	72,878
Somatopleure	Flank somatopleure 1	1,719	16,216	7,048	1,023	14,227	40,233
	Flank somatopleure 2	1,798	18,971	6,810	1,085	16,375	45,039
	Flank somatopleure 3	2,134	22,076	7,334	1,278	18,516	51,338
	Forelimb somatopleure 1	1,997	22,173	7,288	1,242	19,496	52,196
	Forelimb somatopleure 2	1,739	17,514	6,792	1,055	15,567	42,667
	Forelimb somatopleure 3	1,898	21,031	7,211	1,187	18,780	50,107
	Hindlimb somatopleure 1	1,773	16,786	7,021	1,065	15,361	42,006
	Hindlimb somatopleure 2	1,782	16,991	6,831	1,053	15,172	41,829
	Hindlimb somatopleure 3	2,071	23,192	7,484	1,395	20,076	54,218
T cell	CD4+T cell 1	887	3,607	5,289	532	2,783	13,098
	CD4+T cell 2	749	3,184	4,943	497	2,328	11,701
	CD8+T cell 1	1,115	7,591	5,628	699	7,675	22,708

Supplementary Table S3 Statistics on number of tissue-specific peaks

Tissue	All peaks number	Tissue-specific peaks number	Proportion of specific peaks
Bone	136,234	3,541	2.60%
Bud	120,040	3,723	3.10%
Duodenum	77,633	3,107	4.00%
Liver	18,340	8,962	48.87%
Lung	90,805	6,858	7.55%
muscle	76,147	4,905	6.44%
Neural crest	81,448	3,629	4.46%
Retina	74,179	5,810	7.83%
Skin	84,480	8,844	10.47%
Somatopleure	102,714	2,965	2.89%
T cell	26,490	6,060	22.88%

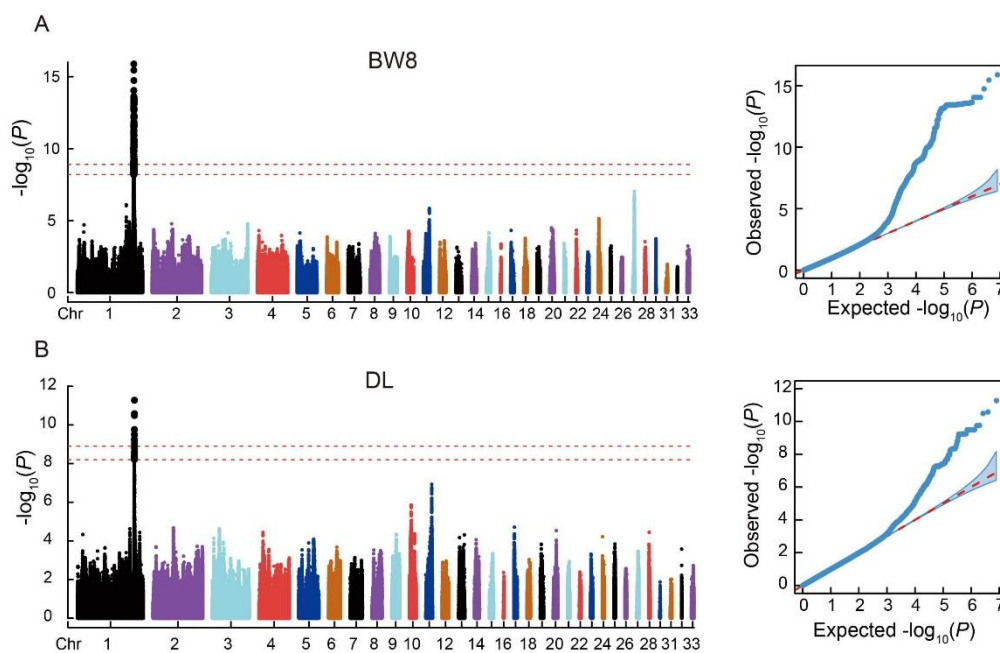
Supplementary Table S4 Distribution of SNPs discovered from low-coverage sequencing across chromosomes

Chr.	Length	Number of SNPs	Density (bp/SNP)
1	197,608,386	1,575,270	125
2	149,682,049	1,217,412	123
3	110,838,418	953,613	116
4	91,315,245	792,257	115
5	59,809,098	523,852	114
6	36,374,701	364,452	100
7	36,742,308	306,795	120
8	30,219,446	254,106	119
9	24,153,086	223,943	108
10	21,119,840	176,043	120
11	20,200,042	212,738	95
12	20,387,278	175,758	116
13	19,166,714	157,956	121
14	16,219,308	138,247	117
15	13,062,184	105,488	124
16	2,844,601	2,973	957
17	10,762,512	98,773	109
18	11,373,140	104,595	109
19	10,323,212	94,516	109
20	13,897,287	133,156	104
21	6,844,979	61,814	111
22	5,459,462	19,841	275
23	6,149,580	54,769	112
24	6,491,222	59,645	109
25	3,980,610	14,800	269
26	6,055,710	50,879	119
27	8,080,432	41,720	194
28	5,116,882	33,201	154
30	1,818,525	2,655	685
31	6,153,034	3,093	1,989
32	725,831	846	858
33	7,821,666	13,868	564
Total	960,796,788	7,969,074	121



Suppl

plementary Figure S1 ATAC-seq data quality metrics of all 53 samples



Sup

plementary Figure S2 GWAS results of body weight at 8 weeks (BW8) and duodenum length (DL)