

Table S1. Datasets summary.**A.**

Cell Type	Antibody	Replicate	Reads	Pairs
GM12878	H3K4me1	Monoclonal Rep 1	83,100,486	41,550,243
		Monoclonal Rep 2	99,255,196	49,627,598
	H3K4me3	Monoclonal Lot 8 Rep 1	99,255,196	78,227,985
		Monoclonal Lot 8 Rep 2	156,455,970	42,980,622
		Monoclonal Lot 9 Rep 1	85,961,244	33,912,720
		Monoclonal Lot 9 Rep 2	67,825,440	36,033,346
	H3K9me3	Monoclonal Rep 1	143,527,964	71,763,982
		Monoclonal Rep 2	66,206,100	33,103,050
	H3K27ac	Monoclonal Rep 1	146,244,844	73,122,422
		Monoclonal Rep 2	156,042,348	78,021,174
	H3K27me3	Monoclonal Rep 1	157,892,610	78,946,305
		Monoclonal Rep 2	152,454,660	76,227,330
HeLa	H3K27ac	Monoclonal Rep 1	17,340,796	8,670,398
		Monoclonal Rep 2	16,389,304	8,194,652
		Polyclonal Rep 2	13,155,478	6,577,739
K562	H3K4me1	Monoclonal Rep 1	44,707,286	22,353,643
		Monoclonal Rep 2	19,370,594	9,685,297
		Polyclonal Rep 1	46,708,750	23,354,375
		Polyclonal Rep 2	77,858,414	38,929,207
	H3K4me3 – lot comparison	Monoclonal Lot 8 Rep 1	83,285,982	41,642,991
		Monoclonal Lot 8 Rep 2	69,829,160	34,914,580
		Monoclonal Lot 9 Rep 1	73,635,980	36,817,990
		Monoclonal Lot 9 Rep 2	68,671,138	34,335,569
	H3K4me3	Monoclonal Rep 1	10,769,082	5,384,541
		Monoclonal Rep 2	14,706,444	7,353,222
		Monoclonal Rep 2	14,864,810	7,432,405
		Monoclonal Rep 4	11,230,992	5,615,496
		Polyclonal Rep 1	13,184,088	6,592,044
		Polyclonal Rep 2	10,007,054	5,003,527
		Polyclonal Rep 3	11,968,378	5,984,189
		Polyclonal Rep 4	25,205,992	12,602,996
	H3K9me3	Monoclonal Rep 1	75,625,321	37,812,661
		Monoclonal Rep 2	37,480,051	18,740,026
		Monoclonal Rep 2	45,075,156	22,537,578
	H3K27ac	Monoclonal Rep 1	42,775,420	21,387,710
Monoclonal Rep 2		72,589,124	36,294,562	
Polyclonal Rep 1		60,003,204	30,001,602	
Polyclonal Rep 2		28,926,788	14,463,394	

	H3K27me3	Monoclonal Rep 1	19,964,374	9,982,187
		Monoclonal Rep 2	24,909,516	12,454,758
		Monoclonal Rep 2	31,796,524	15,898,262
		Monoclonal Rep 4	25,983,780	12,991,890
		Polyclonal Rep 1	22,909,534	11,454,767
		Polyclonal Rep 2	28,428,020	14,214,010
		Polyclonal Rep 3	19,843,850	9,921,925
		Polyclonal Rep 4	37,134,412	18,567,206
	WCE	Rep 1	15,726,808	7,863,404
mES	H3K4me1	Monoclonal Rep 1	76,330,698	38,165,349
		Monoclonal Rep 2	98,191,020	49,095,510
	H3K4me3	Monoclonal Lot 8 Rep 1	81,525,630	40,762,815
		Monoclonal Lot 8 Rep 2	80,975,708	40,487,854
		Monoclonal Lot 9 Rep 1	72,554,992	36,277,496
		Monoclonal Lot 9 Rep 2	73,758,624	36,879,312
	H3K27ac	Monoclonal Rep 1	161,354,476	80,677,238
		Monoclonal Rep 2	161,371,680	80,685,840
	H3K27me3	Monoclonal Rep 1	75,925,468	37,962,734
		Monoclonal Rep 2	164,450,620	82,225,310

B.

		Average Reads After Downsampling	Average Pairs After Downsampling	Pairs in Merged Dataset
K562	H3K27ac	25,808,498	12,904,249	25,808,498
	H3K27me3	18,616,216	9,308,108	27,924,324
	H3K4me1	35,539,733	17,769,867	35,539,733
	H3K4me3	9,204,667	4,602,334	18,409,335
	H3K9me3	28,479,015	14,239,507	28,479,015