Supplementary Figure 1: Example of predicted chromatin domains. An ideogram of chromosome 2 shows the cytogenetic banding pattern along with the location of this specific example. The distributions of ChIP-seq tag mapping peaks for the active histone modification (red bars), the repressive histone modification (blue bars) are shown in separate tracks. The predicted euchromatic domains (red bands) and heterochromatic domains (blue bands) are shown in the tracks denoted as 'Euchromatin' and 'Heterochromatin'.

chr2 (q14.2-q21.1)			3435	l	
H3K27me2	یں ہے۔ یہ <mark>اور میں اور اور میں اور میں اور میں اور اور اور اور اور اور اور اور اور اور</mark>		Indial data	— مەمەمەمەر لىسلىل <mark>مارزىدا (ئىر بىمال</mark> رايىس ب _{ىل} ىدا _م اردىلى	11	<u></u>
H3K27me3	Marine Marine and Andrew Street and Andrew Street	al line in the second	(فروالي) والماولين	معرجية الألبان والمتعالي ومرد المتعريل	the share	Ļψ
H3K9me2	hall a shi na mana da da ma anda da ma	ويفروفه أستاها أنشينا والتقفين والمروز والروحانة التأسيس	L ⁱ le London Lateration		ر مر عل	الريه
H3K9me3	Later Manual al Maria and a fee	المرابعة والمعارفة والمعاركة والمتعارفة والمعارفة والمعارفة والمعارفة والمعارفة والمعارفة والمعارفة والمعارفة		المتحديد والمار والمراجع	له در عله	
H4K20me3	ي من وي ما من الم العمر معان ال من ما من العالم		ويعرف الترتيس ويرتق			لسيا
H2A.Z	have be described to service and					
H2AK5ac	والمحافظ والمراجع والمحافظ والمح			Athen Langerton at Landsman Land		Ju.
H2AK9ac	اساريناني محيدة ويعريها ويتريه والمراجع	ىرىيا ۋە يېيىلى <u>تە مەركىلىتە بورىسە سىلەتى بىرى كىتى مىزىرىيا تەركى تەركى تەركى</u>	ويللمنه ويفحر	وتحريقه والترجي التمريح والارز واللوا	a	يالي.
H2BK120ac		· · · · · · · · · · · · · · · · · · ·				L b .
H2BK12ac						L b.
H2BK20ac		· · · · · · · · · · · · · · · · · · ·				
H2BK5ac	I.a I.a	·				1 .
H2BK5me1		de same en esta de al construction de la construcción de la construcción de la construcción de la construcción		terret at hilling the discussion of the second	ه	
H3K14ac	والماولية فالشيب أستنقل فمقاقبه فالعامية المتعادية	يليب وروي ويقيع ومعاود وروي وروي وليو مساينات	يغ وغالباً السبي	فرجاني ومرتب كمتال أحج بمتنا بالتعاو		hu
H3K18ac		k		hadad be dealer		
H3K23ac			يع بي بايار ه		nde måler d	lant.
H3K27ac		L	h			I.h
H3K27me1	المرافقات ومستعدين الأواط والمقاد والمستعد	والاسترومة ومرافل ورائر أوره أهوان والمتعاول ورواز أرافا المورار الرواري		and a state of the second second second	الم الجد الم	lin
H3K36ac			يناف المقدين	delate and the second		ılı.
H3K36me1		والمرابع ويرابع والمتلي ومستركب والمتلج والمتعادين والمتعام والمتكاف	and the state of the	والحراب والمربع والمتل أأنه ومروحية ليتوسك		h h
H3K36me3		enderstalel-ex-monoral and enabled a study-advantation of the	ليه والمحص	A della	م المما سعد	, and
H3K4ac	k	• · · · · · · · · · · · · · · · · · · ·	<u> </u>	de l'al ll'art an	<u></u>	ل اهـــ
H3K4me1	Level Assessment and the	L <u>.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>		uhadd ef yr lewin yn de rywer yn de ryw		LL.
H3K4me2	Land Marcellan and a service			<mark></mark>	الم الإنه عنه	<u>ا</u>
H3K4me3	المست أنتبع المتعالية المتصفية والمسترك المسترك			<u> </u>		
H3K79me1		<u></u>		<u>IIII III a balance anno 1999</u>		معاد
H3K79me2				£1	<u></u> _	
H3K79me3				d Lask de la companya	a	
H3K9ac	· · · · ·				<u> </u>	لل
H3K9me1	hand have been been and have a second build and the second s				الله ال	
H3R2me1	ر هم معريطة بالبارية بالتقاليس من يكر مانية بالتقاليس الم	ىلى ئەرىپىلىرىكى بىرىكى بىرىكى بىلىكى بىرىكى <mark>بىرىكى بىرىكى بىرىكى بىرىكى بىرىكى بىرىكى بىرىكى بىلىكى بىرىكى بىلى</mark> 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1931 - 1	ىر <mark>ىمۇ ئامائامائىلىمى</mark> بىلى _{مە} يارىخار بىلىرىم	and a first and a set of the set o	ىر. <mark>بايەر بىلايا</mark>	يطلن
H3R2me2				alaman kalenda di sebadi ang bila sebadi ang 1975 - 1		
	an		باستاطني		ساميت بالعراب بال	l III
H4K16aC			u ana ang ang ang ang ang ang ang ang ang	a tallathally and at many services and an annual services and	<u>dalah i</u> k	<u>لەلە</u>
	<u></u>			ad an a state of the	<u></u>	
	and also also and the second sec	L,,,,,,, _	ينان الأربي	<mark></mark>	$\frac{1}{1}$	lu.
	La set and set the set of a set of the set o	L	بوالارجاباليونين		<u>, , , , , , , , , , , , , , , , , , , </u>	l.hu
HAD2mo2	- <u> </u>			uktatikan a	 	يند. ريار
Euchromatin						ille.
Heterochromatin						

Supplementary Figure 2: Examples of predicted boundary elements with CTCF binding. The predicted boundary elements are shown as green bands. ChIP-seq peaks for active and repressive histone modifications, along with the locations of euchromatic domains and heterochromatic domains are illustrated as separate tracks (as in Supplementary Figure 1)

chr1 (q42.12)			a41 43 44
H3K27me2			
H3K27me3	Annen		
H3K9me2	ում Այսիկ է է է է երավել է ու ինչ երկ է երկանու այս որ երկան վերում է այլիսի ինչակումի հանում է է է է		u
H3K9me3			
H4K20me3			
H2A.Z	La construction and a construction of the cons		
H2AK5ac	and a new property of the second s	المالانية والمحاد والمحاط	
H2AK9ac	la na sama contactua a del ante contacto conditional contesta mana a mana mena contesta contra a contra a contra		a contra adminia
H2BK120ac		.	k_
H2BK12ac			
H2BK20ac			
H2BK5ac			
H2BK5me1		المحمد بدر ويتليهم أهنان	June Marine Marine
H3K14ac	panda ana asa a sa aka salah sana sa da ka kasa sa na kasa sa sa sa sa sa sa sa da kaka sha la sa sa sa sa	qLdu hnr	udd adai, dii addi) uu
H3K18ac			
H3K23ac		ļi li i i	
H3K27ac			
H3K27me1		ىللىم مەرمەرمەرمىلار 1	فالفرين أللك السراقين ومع
H3K36ac			ana ana ganagada da 🏭 g
H3K36me1	0	as na dadhadadha	
H3K36me3	na a da da <mark>da la la la la</mark> constitución de sectores de sectores de la constitución de	a <mark>alal</mark> haa ahaanaa I	a a tha that a sure that
H3K4ac			and a state of the
H3K4me1			ير المربع المراجعة المعالية
H3K4me2		 	and a stand of the
H3K4me3		k	
H3K/9me1	n an	ىلىغالىيا بايە. ھەب ھ	and the design of the second
H3K/9me2			an ana ana ang ang ang ang ang ang ang a
H3K/9me3			- and the second se
H3K9ac		L	
H3K9Me1	, <u>en anderskallet, also skilvan en en</u>	dhaan haanna Talaan	and a state of the second s
H3RZMei	ի մեր 186 իմ հենհանանություններին հետև 184 հետև 184 հետև ու հետև ու հետև ու հետև հետև տես նետև ու հետև հետև հեն 		
H3RZMez	1.1. 1.1. m. m. h. m. h. m. h. m. h. m. h. m. m. h. m. h. h. m.	1_111.1_11_10 1_1011 . 	M
			handras Handdan ()
		dama an	a di Uda ang kang kang kang kang kang kang kang
		<u>initat</u>	
	(<u></u>	unite de la constante en la condition de la constante en la constante en la constante en la constante en la con
	la a distribution of the share and a second and the second s	ha hia	ataabtu a bibboo aa ah t
Boundary Flement	M. W.L	.U.D 0 INELLIEL AN 1.1	L. ALLIN INNINA ILLIIN.
Euchromatin			
Heterochromatin			

Supplementary Figure 3: Example of a predicted boundary element without CTCF binding. The predicted boundary element is shown as green bands. ChIP-seq peaks for active and repressive histone modifications, along with the locations of euchromatic domains and heterochromatic domains are illustrated as separate tracks (as in Supplementary Figure 1)

chr6 (q22.2-q22.31) [a12 13 14.1 15 6q21 a12 a12 a27
H3K27me2	
H3K27me3	laha dalah shaan inda ada da
H3K9me2	1
H3K9me3	an an an han a san an haile da sharan a sharan a sharan an a
H4K20me3	
H2A.Z	halalla and half have been a second of the second
H2AK5ac	իսութերի հայտարարություններին անհատություններին հայտարարություններին հայտարարին հայտարարին հայտարարին հայտարարո
H2AK9ac	
H2BK120ac	
H2BK12ac	
H2BK20ac	and an a second s
H2BK5ac	an a
H2BK5me1	y na na na ana ana ana ana ana ana ana a
H3K14ac	իր հաշտությանը հետություն անդանակությունը, որ կանորդ հետուները, նաևորտության հատկություն, երանանակություն, հետո
H3K18ac	A second to be a second as a second of the second
H3K23ac	hteelemente le company de la del de de la d
H3K27ac	
H3K27me1	
H3K36ac	a selection and a second production of the second
H3K36me1	իսնենն անտեսներ որը ներանները, մինն բարորնները որը, էլ էր էր ներկանինները էր անտեսին արտուն արտունումը, նարոններ նարոնքններուն,
H3K36me3	and a second
H3K4ac	and the second
H3K4me1	a serie and the second se
H3K4me2	
H3K4me3	
H3K/9me1	ا من أحد من
H3K/9me2	مانور <u>و الانتخاب من المحمد المراجع من المؤمم المانة و محمد من </u>
H3K/9me3	
H3K9ac	an tanàna amin'ny faritr'ora dia kaominina dia kaominin
H3K9me1	
H3R2me1	jarathet, mar, a bhuid bù, k, a a anna ba, a sh. anhla ba bhua an a a bhua an da bhua a bhuid a buana dhuile buana bhua bhuana dhuid buana bhua bhuana bhua bhuan
H3R2me2	լերենանություն, ինչության առաջորվել, որվել առաջորվել է որ անհերանին ու մինչությունին հարցենին հարցել է որ առաջո Առաջորդություն է հարցել է հարցե
	իրակերպում, արտեղակեր անհանդություն, որ պատրապերտություն, որ հանդականներին, տեսներություններին, հանդականներին, Դու հանդապես անհանդություններին, որ հանդականներին, որ հանդականներին, որ հանդապեսներին, որ հանդականներին, որ հան
	- Lucina, and an and a second se
Boundary Flement	
Euchromatin	
Heterochromatin	

Supplementary Figure 4: The predicted boundary element overlapping with BEAD-1. The predicted boundary element is shown as the green band. ChIP-seq peaks for active and repressive histone modifications, along with the locations of euchromatic domains and heterochromatic domains are illustrated as separate tracks (as in Supplementary Figure 1)

chr14 (q11.2)	13 p12 p11.2	14a12	21.3	23.1	24.3	31.3	32.2
H3K27me	2		200 <u>'5'700008ba Hai</u>	<= #16992991		220000001	
H3K27me	3						
H3K9me	2	udu dan uru					
H3K9me	3						
H4K20me	3						
H2A	Z			, in a life it specifie of the paint data and a	<u> </u>	a Marahan ang Propinsi Sanahinan	
H2AK5a		inan an an t- The all the estimation of scanadian second data area	eretudtur Motorializati at are	Plankalur	e anno e faire de la contrata de la		and another of a case of the sine database
H2AK9a							
H2BK120a	aC	- Lithlingini ki linih	an en al sel en en en al le sal le sage		· · · · · · · · · · · · · · · · · · ·		
H2BK12a	aC		······································				
H2BK20a	aC						
H2BK5a	AC			FILAREN			
H2BK5me						·····	
H3K14a			1 11				
H3K18a	ac	·····		- TAVE (TRUE			
H3K23a				-fateballes and an original			a sa hada ata da.
H3K27a			1				
H3K27me	•1						
H3K36a	ac		·····	thaveddal ar tor with the			
H3K36me	e1						
H3K36me	3						and take the
H3K4a							
H3K4me	1			. 1			
H3K4me	2 4			.1.,			
H3K4me							. In the state of
H3K79me	ي المحمد السلام المحمد الم						مالاسلام وريد
H3K79me	2	المحرجات فيالسون والتابين الأطوروسي ينا	aloo			ىلىلىرى بىلىرى	A STATE OF STATE
H3K79me	3		ana a calendar a como como como				ماد ب المحصول المقادمين.
H3K9a				and and the Balance and the states			
H3K9me	.1	hand manufil being tim stream and dear	lakteriterine to galaxie				
H3R2me	.1		╙╾┵┶╾┖╝╌┵╼┷╿╁╁╶ _{╍┍} ╝╫ _{╝╛}				
H3R2me				malemaan			
H4K12a	a.C				.		التالية الفاسية عندي
H4K16a	1C		ويريع ويربع فالمناب والمناز المنار المستقل	and the second second			
H4K20me	.1			Parcelae			
H4K5a	1C			Pidelan			
H4K8a	C	1		Hardenar			
H4K91a	ac						
H4R3me	2		L				
Boundary Eleme	nt						•
Euchromat	in						
Heterochromat	in 💶 🔤						

Supplementary Figure 5: Overlaps between conserved TFBSs. A. Heatmap showing the degrees of pairwise overlaps between TFBSs; B. Matrix showing the numbers of pairwise overlaps between TFBSs; C. List of numbers of all observed combinations of TFBSs.

В



Pairwise	EVI1	CEBP	YY1	CREBP1	USF
Comparisons					
EVI1	382	54	28	35	17
CEBP	54	249	33	33	22
YY1	28	33	157	18	23
CREBP1	35	33	18	150	20
USF	17	22	23	20	140

С

Combination	Number
EVI1 only	214
CEBP only	120
CEBP, EVI1	35
YY1 only	80
YY1,EVI1	13
YY1,CEBP	16
YY1,CEBP,EVI1	8
CREBP1 only	57
CREBP1,EVI1	23
CREBP1,CEBP	17
CREBP1,CEBP,EVI1	6
CREBP1,YY1	7
CREBP1,YY1,EVI1	1
CREBP1,YY1,CEBP	3
CREBP1,YY1,CEBP,EVI1	2
USF only	70
USF,EVI1	9
USF,CEBP	13
USF,CEBP,EVI1	1
USF,YY1	12
USF,YY1,EVI1	3
USF,YY1,CEBP	2
USF,YY1,CEBP,EVI1	1
USF,CREBP1	9
USF,CREBP1,EVI1	2
USF,CREBP1,CEBP	3
USF,CREBP1,CEBP,EVI1	1
USF,CREBP1,YY1	4
USF.CREBP1.YY1.CEBP	1

Supplementary Figure 6: Enrichment profiles around boundary elements of histone modifications which show distinct peaks. The average fold enrichments (y-axis) of individual histone modifications are ploted for the predicted boundary elements (8kb), the heterochromatin sides (8kb) and the euchromatin sides (8kb).



Supplementary Figure 7: Enrichment profiles around boundary elements of histone modifications which increase from heterochromatin to euchromatin. The average fold enrichments (y-axis) of individual histone modifications are ploted for the predicted boundary elements (8kb), the heterochromatin sides (8kb) and the euchromatin sides (8kb).



Supplementary Figure 8: Enrichment profiles around boundary elements of histone modifications which decrease from heterochromatin to euchromatin. The average fold enrichments (y-axis) of individual histone modifications are ploted for the predicted boundary elements (8kb), the heterochromatin sides (8kb) and the euchromatin sides (8kb).



|--|

	RIT	Boundary Element
Median Size	68.6 kb	8 kb
GC content	0.421	0.423
CpG O/E ¹	0.229	0.316
Genic Fractions ²	43.0%	40.9%

¹The ratio of observed CpG frequency to expected CpG frequency. ²The length fractions of regions within gene bodies.

Supplementary Table 2: Enriched Gene Ontology and KEGG Terms of Genes in Predicted Euchromatin Domains with High Gene Densities (>1 gene/20kb)

	Term	P-value
	ATP dependent helicase activity	0.039
	Defense Response	0.045
Gene	Glycerophospholipid Biosynthetic Process	0.056
Ontology	Regulation of Response to External Stimulus	0.069
	Inflammatory Response	0.070
KEGG	Systemic Lupus Erythematosus	0
Pathway	Antigen Processing and Presentation	0.017