

**Supplementary Table 3.** Positions of telomeres and centromeres on human, chimp, dog, cattle, mouse, rat, opossum and chicken chromosomes and corresponding chromosomes in horse.

Human Chr.	Size, Mb	p-arm CEN marker	Mb	Horse Chr.	q-arm CEN marker	Mb	Horse chr.	p-arm TEL marker	Mb	Horse chr.	q-arm TEL marker	Mb	Horse chr.
HSA1	247	GDAP2	118.2	ECA5	UMNe481	149.4	ECA5	IGS15	0.9	ECA2	HNRPU	243	ECA30
HSA2	242	RPIA	88.7	ECA15	PROM2	95.3	ECA15	MYT1L	1.7	ECA15	HDLBP	241.8	ECA6
HSA3	199	111J21SP6	74	ECA16	PROS1	95	ECA19	DDX11	0.2	ECA16	TFRC	197.2	ECA19
HSA4	191	OCIAD1	48.5	ECA3	ASB23	53.5	ECA3	TKY434	0.6	ECA3	FRG1	191.1	ECA27
HSA5	180	HCN1	45.3	ECA21	TKY868	50.7	ECA21	SDHA	0.2	ECA21	MGAT1	180.1	ECA14
HSA6	170	CH241-102E20_T7	58.6	ECA20	PTP4A1	64.3	ECA20	EXOC2	0.4	ECA20	THBS2	169.3	ECA31
HSA7	158	CCT6A	56	ECA13	AUTS2	68.7	ECA13	GPR30	1.0	ECA13	DNAJB6	156.8	ECA4
HSA8	146	VDAC3	42.3	ECA27	MCM4	49	ECA9	CLN8	1.7	ECA27	RPL8	145.9	ECA9
HSA9	140	CH241-115F18_T7	41.5	ECA23	UMNe473	69.1	ECA23	DOCK8	0.2	ECA23	DBH	135.4	ECA25
HSA10	135	ZNF248	38.1	ECA1	HNRPF	43.2	ECA1	WDR37	1.0	ECA29	TXNL2	131.8	ECA1
HSA11	134	MADD	47.2	ECA12	CNTF	58.1	ECA12	IFITM3	0.3	ECA12	OPCML	131.7	ECA7
HSA12	132	MGC50559	31.7	ECA6	PRICKLE1	41.1	ECA6	NINJ2	0.5	ECA6	SFRS8	130.7	ECA8
HSA13	114				ZMYM2	19.4	ECA17				CDC16	114	ECA17
HSA14	106				NP	20	ECA1				CDC42BPB	102.4	ECA24
HSA15	100				NDN	21.4	ECA1				TM2D3	100	ECA1
HSA16	89	ERAF	31.4	ECA13	PHKB	46	ECA3	HBA1		ECA13	GAS8	88.6	ECA3
HSA17	79	UMNe443	11.2	ECA11	TNFAIP1	23.6	ECA11	GEMIN4	0.5	ECA11	CSNK1D	77.8	ECA11
HSA18	76	TKY653	18.6	ECA8	NPC1	19.3	ECA8	ROCK1	0.09	ECA8	TKY932		ECA8
HSA19	64	FKBP8	18.5	ECA21	AHT049	33.3	ECA10	C19orf19	0.4	ECA7	RPS5	63.5	ECA10
HSA20	62	CRNKL1	19.9	ECA22	BCL2L1	29.7	ECA22	TCF15	0.5	ECA22	SOX18	62.1	ECA22
HSA21	46				USP25	16	ECA26				S100B	46.8	ECA26
HSA22	49				DGCR14	17.5	ECA8				ARSA	49.4	ECA28
HSAX	154	UMNe446	52.9	ECAX	ASB12	63.3	ECAX	PLCXD1	0.1	ECAX	SYBL1	154.7	ECAX
<b>Chimp Chr.</b>													
PTR1	247	GDAP2	119.6	ECA5	TDRKH	130.8	ECA5	IGS15	0.9	ECA2	HNRPU	225.8	ECA30
PTR2a	114	n/a			MYT1L	1.7	ECA15	n/a			IL1B	113.7	ECA15
PTR2b	248	n/a			ACTR3	1.7	ECA18	n/a			HDLBP	247.6	ECA6
PTR3	199	FOXP1	72.8	ECA16	PROS1	97.6	ECA19	DDX11	0.2	ECA16	TFRC	201.6	ECA19
PTR4	191	inversion		ECA3	inversion		ECA3	FGFR3	1.8	ECA3	F11	190.9	ECA27
PTR5	180	inversion		ECA21	inversion		ECA21	SDHA	0.3	ECA21	MGAT1	183.3	ECA14
PTR6	170	n/a		ECA20	n/a		ECA20	EXOC2	0.4	ECA20	THBS2	172.3	ECA31

PTR7	158	CCT6A	57.0	ECA13	AUTS2	69.3	ECA13	GPR30	0.9	ECA13	DNAJB6	158.2	ECA4
PTR8	146	VDAC3	39.1	ECA27	MCM4	45.9	ECA9	CLN8	1.7	ECA27	RPL8	144.8	ECA9
PTR9	140	n/a		ECA23	TJP2	67.8	ECA23	DOCK8	0.2	ECA23	DBH	133.7	ECA25
PTR10	135	ZNF248	38.6	ECA1	HNRPF	43.5	ECA1	WDR37	1.1	ECA29	TXNL2	131.2	ECA1
PTR11	134	MADD	47.8	ECA12	MS4A2	58.3	ECA12	IFITM3	0.3	ECA12	OPCML	131.5	ECA7
PTR12	132	PRICKLE1	47.2	ECA6	MGC50559	57.2	ECA6	NINJ2	0.5	ECA6	SFRS8	133.7	ECA8
PTR13	114				ZMYM2	19.4	ECA17				LAMP1	114.7	ECA17
PTR14	106				NP	19.4	ECA1				CDC42BPB	103.3	ECA24
PTR15	100				NDN	21.1	ECA1				TM2D3	99.70	ECA1
PTR16	89	ERAF	31.9	ECA13	PHKB	46.6	ECA3	HBA1	0.1	ECA13	GAS8	90.4	ECA3
PTR17	79	inversion		ECA11	TNFAIP1	29.0	ECA11	GEMIN4	0.6	ECA11	CSNK1D	82.4	ECA11
PTR18	76	RBBP8	18.7	ECA8	NPC1	19.3	ECA8	MPPE1	4.6	ECA8	GALR1	74.1	ECA8
PTR19	64	FKBP8	18.9	ECA21	POP4	34.9	ECA10	C19orf19	0.3	ECA7	RPS5	64.2	ECA10
PTR20	62	CRNKL1	20.2	ECA22	BCL2L1	28.5	ECA22	TCF15	0.5	ECA22	SOX18	62.0	ECA22
PTR21	46				USP25	15.8	ECA26				S100B	46.2	ECA26
PTR22	49				DGCR14	17.5	ECA8				ARSA	49.9	ECA28
PTRX	154	JARID1C	53.6	ECAX	ASB12	63.4	ECAX	PLCXD1	0.07	ECAX	SPRY3	155.1	ECAX
<b>Dog Chr.</b>													
CFA1	125				GALR1	5.7	ECA8				POP4	124.7	ECA10
CFA2	88				CREM	4.7	ECA29				MAD2L2	87.4	ECA2
CFA3	94				CAMK4	4.0	ECA14				PPARGC1A	89.0	ECA3
CFA4	91				ZNF248	3.1	ECA1				FBXL7	90.5	ECA21
CFA5	91				OPCML	5.7	ECA7				CBFB	85.3	ECA3
CFA6	80				CCT6A	3.5	ECA13				DEPDC1	79.9	ECA5
CFA7	83				CYB5R1	3.2	ECA30				MPPE1	80.5	ECA8
CFA8	77				CHGA	4.9	ECA24				CDC42BPB	73.8	ECA24
CFA9	64				CSNK1D	3	ECA11				GGTA1	64.3	ECA25
CFA10	72				CD63	3.1	ECA6				ADD2	72.20	ECA15
CFA11	77				MGAT1	3.1	ECA14				STOM	77.	ECA25
CFA12	75				ELA-A	4.0	ECA20				COL10A1	74.8	ECA10
CFA13	66				RNF19	5.1	ECA9				CXCL6	65.4	ECA3
CFA14	63				AKR1B1	5.9	ECA4				CADPS2	63.0	ECA4
CFA15	67				SLC2A1	3.4	ECA2				KLHL2	64.2	ECA2
CFA16	62				CLCN1	9.3	ECA4				SPAG11B	61.9	ECA27
CFA17	67				MYT1L	3.8	ECA15				OVGP1	67.0	ECA5
CFA18	58				COBL	5.1	ECA4				SCGB1A1	57.2	ECA12
CFA19	56				ZNF330	4.7	ECA2				PRPF40A	56.8	ECA18
CFA20	61				GPR175	4.6	ECA16				C19orf19	61.1	ECA7
CFA21	54				PGR	3.4	ECA7				MS4A1	53.9	ECA12
CFA22	64				CCDC70	3.2	ECA17				CDC16	64.1	ECA17

CFA23	55				TMEM16K	5.6	ECA16				MBNL1	49.8	ECA16
CFA24	50				NAPB	3.2	ECA22				SOX18	50.5	ECA22
CFA25	54				VPS36	3.1	ECA17				HDLBP	54.1	ECA6
CFA26	42				SFRS8	4.0	ECA8				ACTA2	41.7	ECA1
CFA27	48				PRR13	4.7	ECA6				ATP6V1E1	48.2	ECA6
CFA28	44				ALOX5	5.1	ECA1				TXNL2	41.7	ECA1
CFA29	44				PRKDC	3.0	ECA9				MTDH	44.6	ECA9
CFA30	43				RYR3	4.1	ECA1				TSPAN3	42.2	ECA1
CFA31	42				CGGBP1	3.2	ECA26				S100B	32.2	ECA26
CFA32	41				THAP6	3.0	ECA3				FABP2	43.5	ECA2
CFA33	34				PROS1	4.6	ECA19				TFRC	32.2	ECA19
CFA34	45				TRIO	3.2	ECA21				TBL1XR1	43.5	ECA19
CFA35	29				EXOC2	3.8	ECA20				TRIM27	28.9	ECA20
CFA36	33				PSCDBP	6.4	ECA18				COL3A1	33.6	ECA18
CFA37	33				GDF8	3.7	ECA18				CLN8	33.8	ECA27
CFA38	26				ZC3H11A	3.4	ECA30				DUSP10	26.3	ECA30
CFAX	126	JARID1C	44.9	ECAX	ASB12	52.3	ECAX	PLCXD1	0.1	ECAX	SYBL1	126.7	ECAX
<b>Cattle Chr.</b>													
BTA1	146				DSCR1	0.3	ECA26				PCAF	160.8	ECA16
BTA2	125				PROC	5.2	ECA18				ATP13A2	140.2	ECA2
BTA3	116				TMCO1	3.8	ECA5				GPR175	127.9	ECA16
BTA4	110				COBL	4.6	ECA4				DNAJB6	122.9	ECA4
BTA5	118				TSPAN8	0.8	ECA6				PPARA	123.3	ECA28
BTA6	111				FABP2	6.8	ECA2				GRPEL1	121.6	ECA3
BTA7	100				SQSTM1	1.4	ECA14				SLC25A46	111.8	ECA14
BTA8	103				CBR4	0.8	ECA2				STOM	116.3	ECA25
BTA9	95				COL19A1	8.2	ECA20				THBS2	107.1	ECA31
BTA10	95				YTHDC2	1.9	ECA14				B2M	106.1	ECA1
BTA11	101				MERTK	0.4	ECA15				DBH	108.4	ECA25
BTA12	77				PCDH17	3.6	ECA17				CDC16	85.2	ECA17
BTA13	83				PLCB1	0.8	ECA22				DOK5	83.1	ECA22
BTA14	82				RPL8	0.1	ECA09				CA3	75.9	ECA9
BTA15	75				CASP1	2.1	ECA07				MS4A2	84.2	ECA12
BTA16	72				ZC3H11A	0.6	ECA30				CYB5R1	77.9	ECA30
BTA17	70				KLHL2	0.3	ECA2				COMT	76.2	ECA8
BTA18	62				VAC14	0.8	ECA3				RPS5	65.9	ECA10
BTA19	63				HLF	4.6	ECA11				SOX9	60.8	ECA11
BTA20	68				LCP2	1.0	ECA14				POLS	70.3	ECA21
BTA21	63				UBE3A	0.3	ECA1				CDC42BPB	67.7	ECA24
BTA22	59				PGAM2	0.1	ECA4				COPG	60.9	ECA16

BTA23	48				GCLC	7.2	ECA20				EXOC2	53	ECA20
BTA24	60				ATP9B	0.6	ECA8				BCL2	64	ECA8
BTA25	42				HBA1	0.6	ECA13				GPR30	43.6	ECA13
BTA26	47				ZWINT	2.4	ECA1				TXNL2	50.1	ECA1
BTA27	43				CLN8	1.1	ECA27				TOP2B	48.3	ECA16
BTA28	40				IRF2BP2	5.8	ECA1				AGT	46	ECA1
BTA29	45				TYR	6.4	ECA7				IGF2	51.3	ECA12
BTAX	99				LAMP2	0.4	ECAX				PRKX	87.8	ECAX
<b>Mouse Chr.</b>													
MMU1	197				COPS5	10.0	ECA9				LAMB3	195.0	ECA5
MMU2	181				FRMD4A	4.3	ECA29				SOX18	181.5	ECA22
MMU3	159				PKIA	7.3	ECA9				DEPDC1	159.4	ECA5
MMU4	155				RPS20	3.7	ECA9				TNFRSF18	154.8	ECA2
MMU5	152				AKAP9	3.9	ECA4				STARD13	151.3	ECA17
MMU6	149				CCDC132	3.4	ECA4				MGC50559	149.1	ECA6
MMU7	152				LILRA5	3.3	ECA10				NADSYN1	143.6	ECA12
MMU8	131				INSR	3.1	ECA7				IRF2BP2	143.6	ECA1
MMU9	124				CASP1	5.2	ECA7				SLC6A20	123.4	ECA16
MMU10	129				VIP	4.6	ECA31				CD63	128.3	ECA6
MMU11	121				LIMK2	3.2	ECA8				CSNK1D	120.7	ECA11
MMU12	121				RAB10	3.2	ECA15				ITGB8	119.6	ECA4
MMU13	120				GDI2	3.5	ECA29				NNT	120.4	ECA21
MMU14	125				PSMD6	12.9	ECA16				FGF14	123.1	ECA17
MMU15	103				GHR	3.2	ECA21				PRR13	102.20	ECA6
MMU16	98				CREBBP	3.9	ECA13				MX1	97.5	ECA26
MMU17	95				SNX9	5.7	ECA31				PJA2	93.0	ECA14
MMU18	90				CREM	3.2	ECA29				CNDP2	84.8	ECA8
MMU19	61				ADRBK1	4.2	ECA12				EIF3S10	60.8	ECA1
MMUX	166				NUDT11	5.2	ECAX				MID1	165.2	ECAX
<b>Rat Chr.</b>													
RNO1	267				PCMT1	2.2	ECA31				EIF3S10	267.3	ECA1
RNO2	258				PCSK1	1.9	ECA14				DEPDC1	257.7	ECA5
RNO3	171				SURF2	5.8	ECA25				SOX18	170.8	ECA22
RNO4	187				IL6	0.4	ECA4				MGC50559	186.5	ECA6
RNO5	173				CRISPLD1	0.3	ECA9				ISG15	173.0	ECA2
RNO6	147				EIF2AK2	0.09	ECA15				ITGB8	146.4	ECA4
RNO7	143				PTGES3	1.3	ECA6				PRR13	141.20	ECA6
RNO8	129				CASP1	2.0	ECA7				SLC6A20	128.4	ECA16
RNO9	113				PCAF	0.8	ECA16				TYMS	112.6	ECA8
RNO10	110				BFAR	0.01	ECA13				CSNK1D	110.1	ECA11

RNO11	87				CGGBP1	2.1	ECA26				MCM4	87.1	ECA9
RNO12	46				INSR	2.9	ECA7				SART3	43.9	ECA8
RNO13	111				n/a		ECA18				LAMB3	109.1	ECA5
RNO14	112				UBE2D2	2.4	ECA14				ACYP2	111.7	ECA15
RNO15	109				DLG5	0.07	ECA1				FGF14	109.0	ECA17
RNO16	90				RPS24	0.04	ECA1				EFNB2	86.10	ECA17
RNO17	97				POLS	3.8	ECA21				MASTL	96.70	ECA29
RNO18	87				ROCK1	1.3	ECA8				CYB5A	81.20	ECA8
RNO19	59				GOT2	9.6	ECA3				GNPAT	55.0	ECA1
RNO20	55				CLIC2	0.07	ECAX				PREP	49.0	ECA10
RNOX	160				WDR40B	0.6	ECAX				RPL10	160.3	ECAX
<b>Opossum Chr.</b>													
MDO1	748							TXNL2	0.2	ECA1	ITSN2	746.3	ECA15
MDO2	541							ACADM	1.4	ECA5	ABCF3	537.8	ECA19
MDO3	527							CHD1	1.3	ECA14	PES1	525.4	ECA8
MDO4	435							SH3BGR	3.1	ECA26	MATN1	426.5	ECA2
MDO5	304							PGRMC2	1.5	ECA2	ACTN3	307.2	ECA12
MDO6	292							PPIC	3.30	ECA14	BBS9	244.6	ECA4
MDO7	260							LONRF3	0.30	ECAX	IL12A	260.6	ECA19
MDO8	312							C1QDC1	7.87	ECA6	SCIN	307.10	ECA4
MDOX	79							JARID1C	3.10	ECAX	RPL10	60.60	ECAX
<b>Chicken Chr.</b>													
GGA1	200							ARSA	0.11	ECA28	UCP3	200.50	ECA7
GGA2	154							ABCF2	0.1	ECA4	SCRIB	154.70	ECA9
GGA3	113							EFEMP1	0.20	ECA15	RUNX2	112.10	ECA20
GGA4	94							KIAA1166	0.03	ECAX	CNO	93.20	ECA3
GGA5	62							IFITM3	1.60	ECA12	FKBP3	61.30	ECA1
GGA6	37							MMRN2	3.00	ECA1	GLUD1	36.40	ECA1
GGA7	38							GDF8	0.10	ECA18	BAZ2B	38.10	ECA18
GGA8	30							ZNF281	1.50	ECA30	ZRANB2	29.90	ECA5
GGA9	25							STAG1	1.70	ECA16	CP	25.40	ECA16
GGA10	22							ALPK3	0.25	ECA1	GRP58	22.20	ECA1
GGAZ	74							NARS	0.2	ECA8	PPIC	73.90	ECA14