

Materials and Methods

Cell culture

MHCC-LM3, HeLa, MCF-7, SMCC-7721, MGC-803 and HEK-293T cells were cultured in Dulbecco's modified Eagle's medium (DMEM) supplemented with 10% fetal bovine serum (FBS) and 1% penicillin-streptomycin solution. HCT-116 was grown in McCoy's 5A Modified medium with 10% FBS and 1% penicillin-streptomycin solution. NCI-H1299 was cultured in RPMI-1640 supplemented with 10% FBS and antibiotics.

Exosomes isolation

To isolate cell-derived exosomes, cells were cultured in serum-free medium for 24 h. Then the medium was collected to extract exosomes using differential ultracentrifugation methods essentially as described in the literature¹. Briefly, medium was centrifuged at 500xg for 5 min, 2000xg for 5 min, and finally at 4600xg for 20 min at 4°C to remove cells and debris; and eventually ultracentrifuged at 134,000xg for 70 min at 4°C using a Beckman ultracentrifuge. For serum samples, the exosomes were isolated using Total Exosome Isolation (from serum) (Invitrogen, Carlsbad, CA, USA) following the manufacturer's protocol. The isolated exosomes were eluted in PBS and used immediately or stored at -80°C.

Transmission electron microscopy (TEM)

The exosomes were separated by ultracentrifugation and the pellet was resuspended in PBS. One drop of the resuspended exosomes was put on a copper mesh for 1min. The fluid was then absorbed from the edges of the copper mesh with filter paper. The copper mesh was stained with 1% uranyl acetate in ddH₂O for 1min. The sample was dried for 5 min under incandescent light

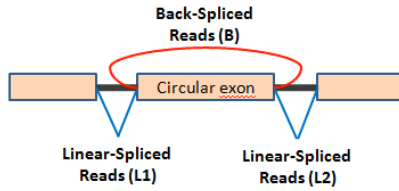
after the staining solution was absorbed by the filter paper. The copper mesh was placed under transmission electron microscope (FEI, Tecnai G2 spirit) and photographed.

RNA-seq analysis

Total RNA was extracted using TRIzol or TRIzol LS Reagent (Invitrogen). Poly(A) RNA was purified with two rounds of hybridization to Dynaloligo(dT) beads (NEB). Total RNA and exosomal RNA samples were treated with RiboMinus™ Eukaryote Kit (Qiagen) to remove ribosomal RNA before constructing RNA-seq libraries. Ribosome depleted RNA was treated with RNase R (Epicentre) for RNA-seq analysis of RNase R treated samples. Strand-specific RNA-seq libraries were prepared using NEBNext Ultra Directional RNA Library Prep Kit for Illumina (NEB) following the manufacturer's instructions. Briefly, RNA samples (about 50 ng) were fragmented and then used for first- and second-strand cDNA synthesis with random hexamer primers. For second-strand cDNA synthesis, dUTP mix (without dTTP) was used which allows for the removal of the second strand. The cDNA fragments were treated with End-It DNA End Repair Kit to repair the ends, then modified with Klenow to add an A at the 3' end of the DNA fragments, and finally ligated to adapters. Ligated cDNA products were purified and treated with uracil DNA glycosylase to remove the second-strand cDNA. Purified first-strand cDNA was subjected to 14 cycles of PCR amplification. Library quality was determined on Bioanalyzer 2100 (Agilent).

The strand-specific RNA-seq libraries were sequenced using IlluminaHiSeq 2500 platform. Reads were mapped to human reference genome GRCh37/hg19 using TopHat v2.0.8b². Similar sequencing depths (45.0M reads for cells, 45.3M for cell-derived exosomes, 31.0M for normal serum exosomes, 40.8M for CRC serum exosomes) were achieved from different Ribo(-) RNA-seqs. RNase R treated samples were sequenced with a small depth (21.0M for cell sample and 3.5M for exosomes sample). Notably, the low sequencing depth of RNase R treated exosomes sample may be due to the more completed digestion of RNase R in exosomes sample as we found

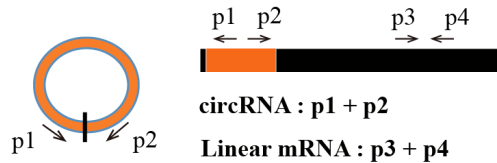
similar number of circular RNAs identified from both RNase R treated samples though their sequencing depths are different. A computational pipeline³ based on anchor alignment of unmapped reads was used to identify circRNAs. Briefly, The unmapped reads were extracted 20mers from both ends and aligned them independently to find unique anchor positions within spliced exons. Anchors that aligned in the reversed orientation (head-to-tail) indicated circRNA splicing. Then the anchor alignments were extended such that the complete read aligns and the breakpoints were flanked by GU/AG splice sites. Ambiguous breakpoints were discarded. Notably, we used TopHat2 but not Bowtie2 for RNA-seq reads mapping because we found some junction reads could not be mapped correctly to genome using Bowtie2 (Unpublished data). Counts of reads mapping across an identified backsplice are normalized by read length and number of reads mapping (spliced reads per billion mapping [SRPBM]). We calculated the number of reads mapping from all gene regions. Gene coordinates were downloaded from the RefGene tables in the UCSC Genome Browser (downloaded on 03/28/2014). The identified circRNAs from cells and cell-derived exosomes were calculated using SRPBM and represented using Circos plots⁴. The representative RNA-seq results for the HIPK3 gene and circ-HIPK3 (exon2) locus in various RNA-seq libraries were obtained using Integrative Genomics Viewer (IGV)⁵. The back-spliced ratio of circRNA and its linear transcript from RNA-seq was calculated as suggested below. For comparison of the exo-circRNA profile of normal serum and that of colon cancer serum, the commonly expressed circRNAs were considered with SRPBM>0.6 (at least one read in both library), while the specific expressed circRNAs were chosen using a stringency of SRPBM cut-off (SRPBM>6). The expression level of protein coding genes for the new circRNAs in CRC cancer patients was analyzed by 27 paired CRC samples from TCGA cohort.



$$\text{Back-Spliced Ratio} = B / (0.5 \times L1 + 0.5 \times L2)$$

Quantitative reverse transcription polymerase chain reaction (qRT-PCR)

cDNA was synthesized with the PrimeScript RT reagent kit (Takara Bio Inc., Dalian, China). Real-time PCR analyses were performed with SYBR Premix Ex Taq (Takara Bio Inc.). Outward facing primers were designed to amplify specific circRNAs (See below). β -actin was used as an internal control. The primers are listed in Supplementary Table S3.



Animal models

To analyze circulating exo-circRNA from cancer-bearing mice, BALB/c-nu/nu mice were subcutaneously implanted with 4×10^6 MHCC-LM3 liver cancer cells. After 8 weeks, mice were sacrificed and peripheral blood was obtained by retro-orbital bleeding. Serum was separated from blood cells by sequential centrifugation at $500 \times g$ for 10 min followed by $3000 \times g$ for 20 min, and subjected to exosomal RNA isolation. Mice were handled and housed according to protocols approved by the Shanghai Medical Experimental Animal Care Commission.

Serum collection and exosomal RNA extraction

Whole blood samples were obtained from tissue bank of Fudan University Shanghai Cancer Center. All people had signed informed consent for donating their samples to tissue bank of

Fudan University Shanghai Cancer Center. Whole blood was separated into serum and cellular fractions within 2 h after blood was derived, and serum were stored at -80°C . Serum exosomes were isolated as indicated above. Exosomal RNA was extracted using TRIzol LS Reagent (Invitrogen) in the presence of glycogen.

Cell transfection and cell proliferation assay

miR-7 mimics were synthesized by Ribobio (Guangzhou, China). CDR1as expression vector was constructed by cloning CDR1as sequences into two complementary repeat elements driven by CMV promoter. The oligonucleotide or plasmid transfection was performed using the Lipofectamine 2000 reagent (Invitrogen). The cell-derived exosomes were collected 48 h after transfection.

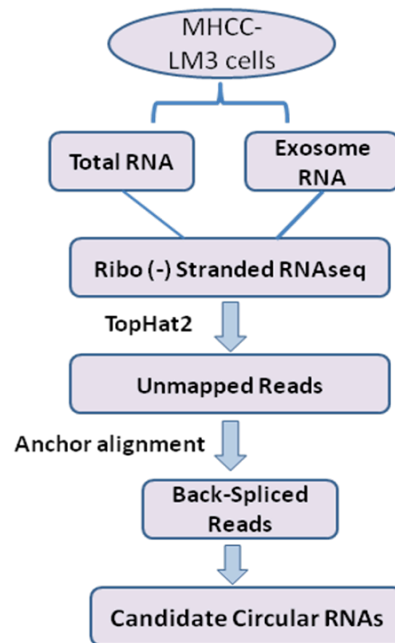
For cell proliferation assay, miR-7 mimics or negative control were transfected into SMCC-7721 liver cancer cells in 96-well plate. After 4 h transfection, CDR1as exosomes or control exosomes were added to the transfected cells. The cells were subsequently incubated for 48 h, and cell proliferation was measured using the Cell Counting Kit-8 (CCK-8) (Dojindo Corp., Japan). CDR1as exosomes and control exosomes were collected from cell culture medium after transfection with CDR1as expression vector or control vector in HEK-293T cells. Notably, we performed the functional assay in SMCC-7721 liver cancer cell because miR-7 was reported to function as a tumor suppressor in liver cancer (Fang et al., *Hepatology*, 2012) and CDR1as circular RNA was found to be dysregulated in liver cancer tissues compared with matched normal tissues (data not shown). We conducted the experiment regarding the regulation of circular RNA sorting to exosomes by associated miRNA in HEK-293T and MCF-7 cells, because CDR1as circular RNA is highly expressed in both cells.

Statistical analysis

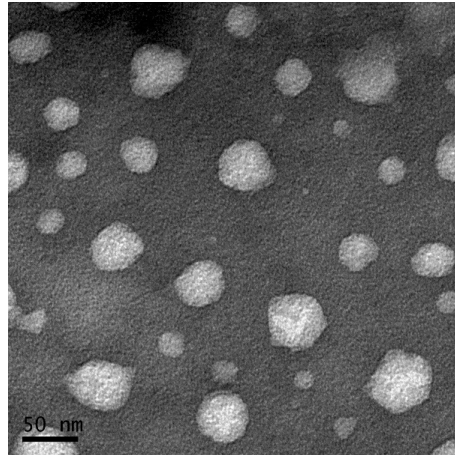
The results are presented as the means \pm S. D. The data were subjected to Student's t-test (two-tailed, with $p < 0.05$ considered significant) or Pearson's correlation analysis.

References

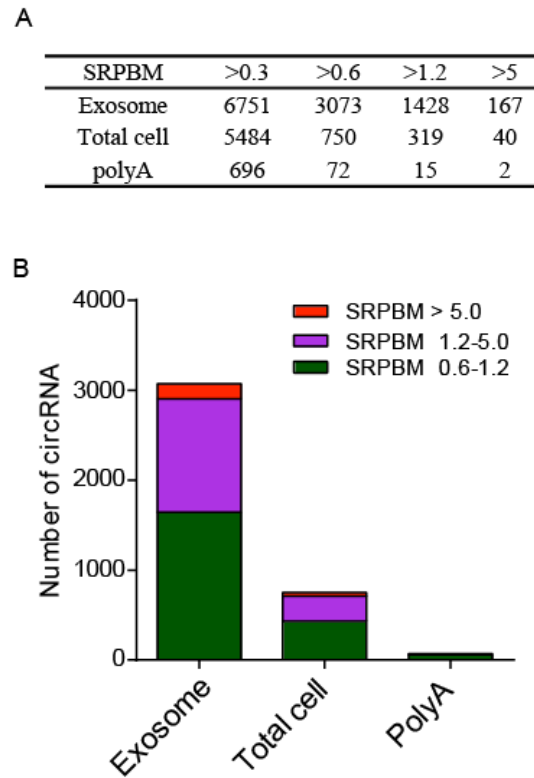
1. They, C., Amigorena, S., Raposo, G. & Clayton, A. Isolation and characterization of exosomes from cell culture supernatants and biological fluids. *Curr Protoc Cell Biol* Chapter 3, Unit 3 22 (2006).
2. Trapnell, C., Pachter, L. & Salzberg, S.L. TopHat: discovering splice junctions with RNA-Seq. *Bioinformatics* 25, 1105-11 (2009).
3. Memczak, S. et al. Circular RNAs are a large class of animal RNAs with regulatory potency. *Nature* 495, 333-8 (2013).
4. Krzywinski, M. et al. Circos: an information aesthetic for comparative genomics. *Genome Res* 19, 1639-45 (2009).
5. Robinson, J.T. et al. Integrative genomics viewer. *Nat Biotechnol* 29, 24-6 (2011).



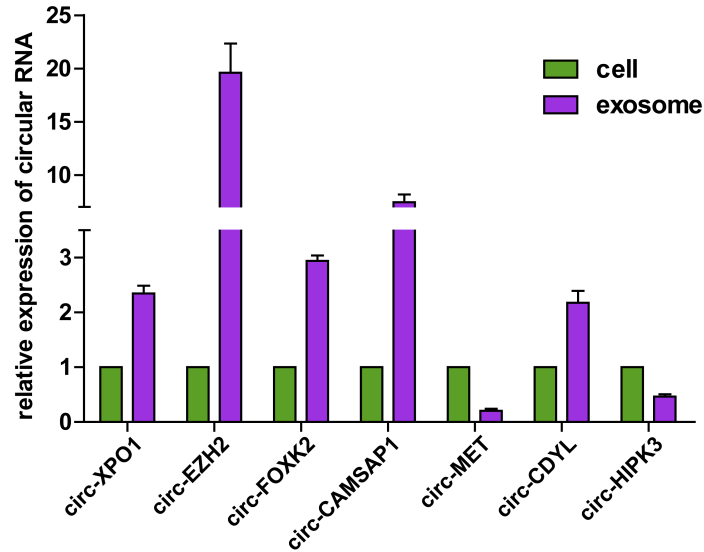
Supplementary information, Figure S1 RNA-seq analysis of circular RNAs in MHCC-LM3 cells and cell-derived exosomes.



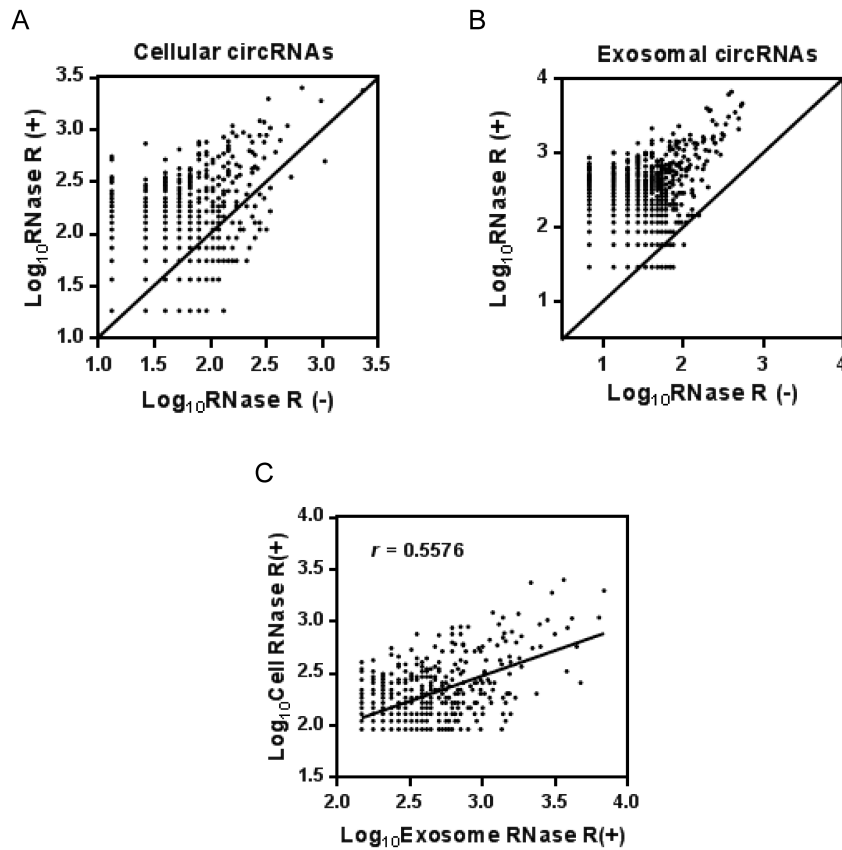
Supplementary information, Figure S2 Transmission electron micrograph of exosomes isolated from MHCC-LM3 cells. The scale bar is 50 nm.



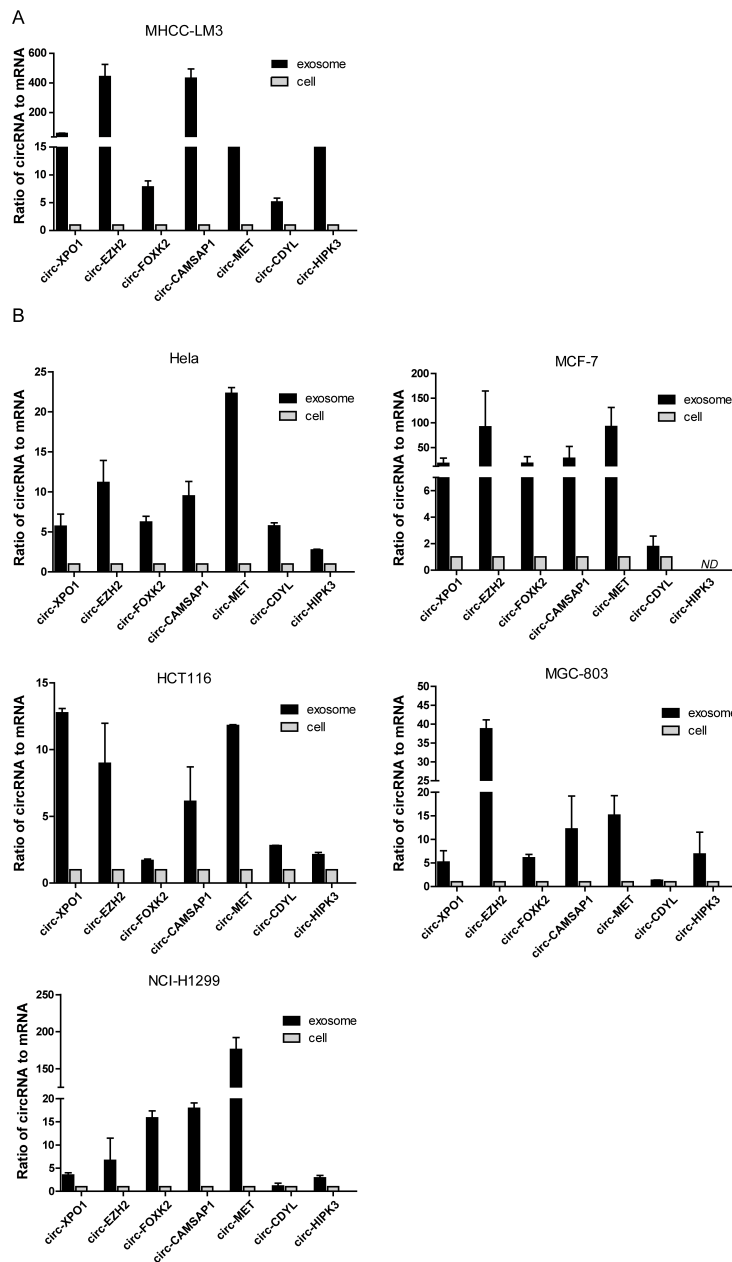
Supplementary information, Figure S3 The number of circular RNAs identified from different RNA-seq libraries. When using a stringency of SRPBM cut-off, the number of exo-circRNA is significant higher than that of cellular circRNA, while circRNA is almost absent in polyA(+) RNAseq library.



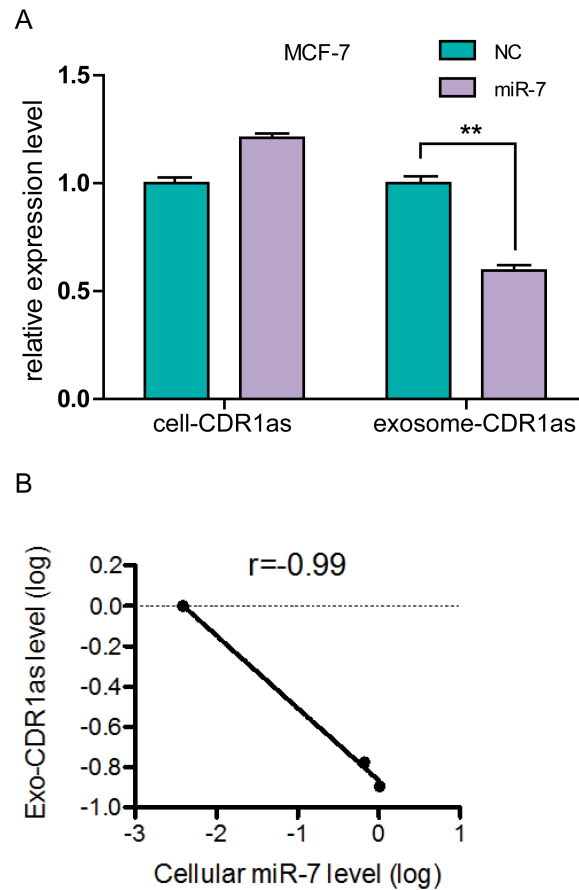
Supplementary information, Figure S4 qRT-PCR analysis of seven circRNAs after reverse transcription (RT) on same amount of cellular RNA and exosomal RNA. The level in cell was set as 1. Data are presented as means \pm standard deviation (S.D). MET and HIPK3 circular RNAs are higher in cells than exosomes, while the other five circular RNAs are lower in cells than exosomes. Notably, the length of MET and HIPK3 circular RNAs is much longer than that of others (circ-MET 1,214nt, circ-HIPK3 1,099nt, circ-CDYL 667nt, circ-CAMSAP1 426nt, circ-EZH2 355nt, circ-FOXK2 346nt, circ-XPO1 307nt), suggesting that the length of circular RNA might be linked to the regulation of circRNA sorting into exosomes.



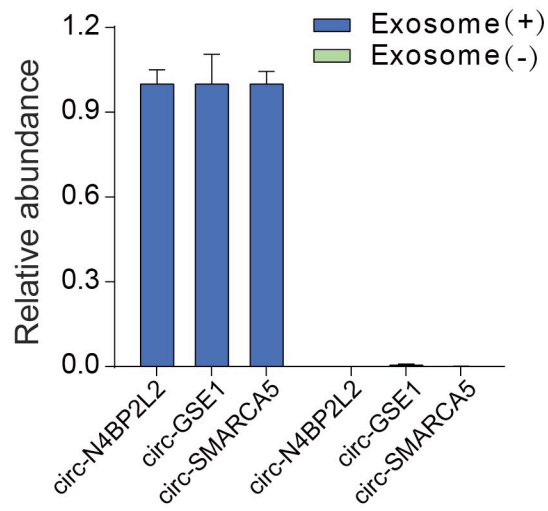
Supplementary information, Figure S5 RNA-seq analysis of circRNAs in MHCC-LM3 cells and cell-derived exosomes with or without RNase R treatment. **(A)** circRNAs are enriched in MHCC-LM3 cells with RNase R treatment compared with cells without RNase R treatment. **(B)** circRNAs are enriched in MHCC-LM3 cell-derived exosomes with RNase R treatment compared with exosomes without RNase R treatment. **(C)** Correlation between cellular circRNAs and exo-circRNAs after RNase R treatment.



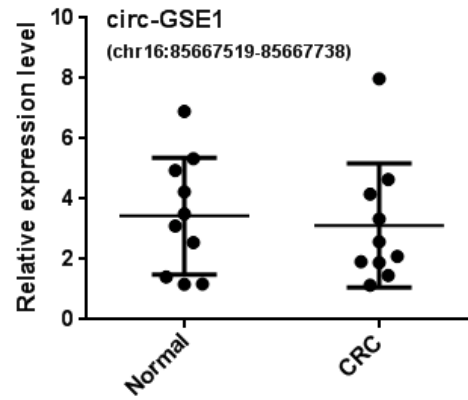
Supplementary information, Figure S6 qRT-PCR analysis the ratio of circRNA to mRNA between cells and cell-derived exosomes. **(A)** qRT-PCR analysis the ratio of circRNA to mRNA between MHCC-LM3 cells and cell-derived exosomes. **(B)** qRT-PCR analysis the ratio of circRNA to mRNA between cells and cell-derived exosomes in various cancer cells. The ratio in cell was set as 1. Data are presented as means \pm standard deviation (S.D). *ND* represents not determined.



Supplementary information, Figure S7 (A) qRT-PCR analysis of CDR1as circular RNA expression level after transfection with control or miR-7 mimics in MCF-7 cells and cell-derived exosomes. Data are presented as means±S.D. **P<0.01, by Student's t-test. **(B)** The relationship between the amount of miR-7 expressed in cells and the levels of CDR1as circular RNA in the exosomes generated by the cells. HEK293T cells were transfected with different amount of miR-7 mimics. The levels of miR-7 in cells and CDR1as circular RNA in the exosomes were determined by qRT-PCR analysis. Data was plotted and Pearson correlation was analyzed. The result showed that there was an inverse relationship between the amount of miRNAs expressed in cells and the levels of circRNAs in the exosomes generated by the cells.



Supplementary information, Figure S8 qRT-PCR analysis of three circRNAs in serum-derived exosomes and exosomes-depleted serum. The level in serum-derived exosomes was set as 1. Data are presented as means \pm S.D. Notably, the exosomes-depleted serum did not contain microvesicles. Thus, herein we could not exclude the possibility of circRNAs being present in microvesicles.



Supplementary information, Figure S9 qRT-PCR analysis of serum circ-GSE1 level in normal serum and colon cancer serum (n=10, respectively). Serum expression level of circ-GSE1 is not significantly different between cancer serum and NS ($P>0.05$ by Student's *t*-test).

Supplementary information, Table S1 Human serum exosomal circular RNAs

Chr	Start	End	Strand	circRNA ID	SRPBM	Genomic length	Spliced length	Gene symbol	Annotation
chr1	1158623	1159348	-	Serum_circ_0001	1.43	725	251	SDF4	CDS,Exon
chr1	1747194	1770677	-	Serum_circ_0002	2.14	23483	298	GNB1	CDS,Exon,5'UTR
chr1	4709430	4709610	-	Serum_circ_0003	4.29	180	NA	NA	Intergenic
chr1	6867042	6948959	+	Serum_circ_0004	4.29	81917	1112	CAMTA1	CDS,Exon,5'UTR
chr1	6880240	6948959	+	Serum_circ_0005	5.00	68719	1112	CAMTA1	CDS,Exon,5'UTR
chr1	6880240	6885270	+	Serum_circ_0006	3.57	5030	189	CAMTA1	CDS,Exon,5'UTR
chr1	6880240	6894050	+	Serum_circ_0007	1.43	13810	189	CAMTA1	CDS,Exon,5'UTR
chr1	7837219	7838229	+	Serum_circ_0008	17.87	1010	211	VAMP3	CDS,Exon
chr1	8601272	8617582	-	Serum_circ_0009	1.43	16310	308	RERE	CDS,Exon
chr1	9991948	9994918	-	Serum_circ_0010	3.57	2970	277	LZIC	CDS,Exon
chr1	12460237	12476880	+	Serum_circ_0011	6.43	16643	699	VPS13D	CDS,Exon
chr1	12638745	12640694	-	Serum_circ_0012	4.29	1949	570	DHRS3	CDS,Exon,3'UTR
chr1	15860731	15863309	+	Serum_circ_0013	5.00	2578	407	DNAJC16	CDS,Exon,5'UTR
chr1	17668437	17668897	+	Serum_circ_0014	2.86	460	283	PADI4	CDS,Exon
chr1	21083658	21100103	-	Serum_circ_0015	2.14	16445	631	HP1BP3	CDS,Exon
chr1	21091869	21100103	-	Serum_circ_0016	2.14	8234	540	HP1BP3	CDS,Exon
chr1	21097422	21100103	-	Serum_circ_0017	3.57	2681	304	HP1BP3	CDS,Exon
chr1	21137230	21139732	-	Serum_circ_0018	4.29	2502	229	EIF4G3	CDS,Exon
chr1	21231375	21268823	-	Serum_circ_0019	1.43	37448	1080	EIF4G3	CDS,Exon,3'UTR
chr1	21306826	21307720	-	Serum_circ_0020	2.14	894	295	EIF4G3	CDS,Exon
chr1	21327691	21329301	-	Serum_circ_0021	2.14	1610	96	EIF4G3	CDS,Exon,5'UTR
chr1	21377358	21386287	-	Serum_circ_0022	1.43	8929	129	EIF4G3	Exon,5'UTR
chr1	21377358	21437876	-	Serum_circ_0023	5.00	60518	266	EIF4G3	Exon,5'UTR
chr1	21548239	21554534	-	Serum_circ_0024	2.86	6295	466	ECE1	CDS,Exon
chr1	22041881	22048257	-	Serum_circ_0025	1.43	6376	315	USP48	CDS,Exon
chr1	24143164	24144073	-	Serum_circ_0026	2.86	909	204	HMGCL	CDS,Exon
chr1	24840803	24841057	+	Serum_circ_0027	4.29	254	254	RCAN3	CDS,Exon,5'UTR
chr1	26772806	26774151	+	Serum_circ_0028	3.57	1345	219	DHDDS	CDS,Exon
chr1	27056141	27059283	+	Serum_circ_0029	6.43	3142	783	ARID1A	CDS,Exon
chr1	29362337	29365938	+	Serum_circ_0030	5.72	3601	271	EPB41	CDS,Exon
chr1	29481207	29481422	-	Serum_circ_0031	2.14	215	215	SRSF4	CDS,Exon
chr1	31478699	31501711	-	Serum_circ_0032	5.00	23012	357	PUM1	CDS,Exon
chr1	31810021	31811895	+	Serum_circ_0033	2.14	1874	193	ZCCHC17	CDS,Exon
chr1	31810021	31821821	+	Serum_circ_0034	3.57	11800	619	ZCCHC17	CDS,Exon
chr1	33413822	33415375	-	Serum_circ_0035	5.72	1553	493	RNF19B	CDS,Exon
chr1	33760537	33760906	+	Serum_circ_0036	7.86	369	238	ZNF362	CDS,Exon
chr1	35484953	35486068	-	Serum_circ_0037	5.00	1115	335	ZMYM6	CDS,Exon
chr1	35824525	35827390	+	Serum_circ_0038	8.58	2865	755	ZMYM4	CDS,Exon
chr1	35854510	35859340	+	Serum_circ_0039	1.43	4830	648	ZMYM4	CDS,Exon
chr1	35879572	35881315	+	Serum_circ_0040	2.14	1743	361	ZMYM4	CDS,Exon
chr1	38355228	38357126	-	Serum_circ_0041	2.14	1898	265	INPP5B	CDS,Exon
chr1	39888045	39888572	+	Serum_circ_0042	1.43	527	333	MACF1	CDS,Exon
chr1	40319641	40323089	-	Serum_circ_0043	9.29	3448	240	TRIT1	CDS,Exon

chr1	40654726	40668286	+	Serum_circ_0044	2.14	13560	573	RLF	CDS,Exon
chr1	40656443	40668286	+	Serum_circ_0045	2.14	11843	418	RLF	CDS,Exon
chr1	42041214	42050989	-	Serum_circ_0046	7.15	9775	5728	HIVEP3	CDS,Exon,5'UTR
chr1	44773981	44785416	-	Serum_circ_0047	8.58	11435	269	ERI3	CDS,Exon
chr1	46105881	46108171	-	Serum_circ_0048	6.43	2290	267	GPBP1L1	CDS,Exon
chr1	52293467	52299842	-	Serum_circ_0049	2.14	6375	228	NRD1	CDS,Exon
chr1	56297936	56313210	+	Serum_circ_0050	5.00	15274	NA	ENST00000424357	LncRNA
chr1	56430582	56430707	-	Serum_circ_0051	12.87	125	NA	TCONS_00000952	LncRNA
chr1	62166605	62189444	-	Serum_circ_0052	1.43	22839	201	TM2D1	CDS,Exon
chr1	65830317	65831879	+	Serum_circ_0053	2.86	1562	350	DNAJC6	CDS,Exon,5'UTR
chr1	67356836	67371058	-	Serum_circ_0054	6.43	14222	473	WDR78	CDS,Exon
chr1	67423741	67428843	+	Serum_circ_0055	5.00	5102	433	MIER1	CDS,Exon,5'UTR
chr1	78105133	78107340	-	Serum_circ_0056	5.00	2207	351	ZZZ3	Exon,5'UTR
chr1	78177431	78178966	-	Serum_circ_0057	18.58	1535	191	USP33	CDS,Exon
chr1	78324622	78329713	+	Serum_circ_0058	1.43	5091	513	FAM73A	CDS,Exon
chr1	89401781	89435150	-	Serum_circ_0059	3.57	33369	1203	CCBL2	CDS,Exon,5'UTR
chr1	92728419	92737209	-	Serum_circ_0060	3.57	8790	738	GLMN	CDS,Exon
chr1	93070863	93170301	-	Serum_circ_0061	2.14	99438	1741	EV15	CDS,Exon
chr1	93770944	93791452	-	Serum_circ_0062	2.14	20508	NA	ENST00000446528	LncRNA
chr1	95609446	95616975	+	Serum_circ_0063	7.86	7529	410	TMEM56	CDS,Exon,5'UTR
chr1	95609446	95639445	+	Serum_circ_0064	1.43	29999	484	TMEM56	CDS,Exon,5'UTR
chr1	97876622	97878800	-	Serum_circ_0065	3.57	2178	NA	DPYD	Intron
chr1	100856287	100908552	+	Serum_circ_0066	1.43	52265	303	CDC14A	CDS,Exon
chr1	101427383	101440458	+	Serum_circ_0067	2.86	13075	334	SLC30A7	CDS,Exon,3'UTR
chr1	114389178	114397671	-	Serum_circ_0068	1.43	8493	375	PTPN22	CDS,Exon
chr1	117944807	117948267	+	Serum_circ_0069	2.86	3460	353	MAN1A2	CDS,Exon
chr1	117944807	117963271	+	Serum_circ_0070	3.57	18464	553	MAN1A2	CDS,Exon
chr1	145439592	145440140	+	Serum_circ_0071	4.29	548	324	TXNIP	CDS,Exon
chr1	150990287	150991145	+	Serum_circ_0072	6.43	858	296	PRUNE	CDS,Exon
chr1	155110036	155110847	+	Serum_circ_0073	2.14	811	426	SLC50A1	CDS,Exon
chr1	155340294	155340774	-	Serum_circ_0074	1.43	480	354	ASH1L	CDS,Exon
chr1	155348071	155385714	-	Serum_circ_0075	5.00	37643	504	ASH1L	CDS,Exon
chr1	155408117	155429689	-	Serum_circ_0076	2.14	21572	844	ASH1L	CDS,Exon
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chr1	155691307	155695810	+	Serum_circ_0078	1.43	4503	304	DAP3	CDS,Exon
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chr1	161071837	161072165	-	Serum_circ_0081	2.86	328	213	PFDN2	CDS,Exon
chr1	169767997	169770112	+	Serum_circ_0082	2.86	2115	191	C1orf112	CDS,Exon,5'UTR
chr1	169947225	170001116	-	Serum_circ_0083	1.43	53891	1056	KIFAP3	CDS,Exon
chr1	171492359	171502100	+	Serum_circ_0084	1.43	9741	1040	PRRC2C	CDS,Exon
chr1	171537385	171540560	+	Serum_circ_0085	4.29	3175	195	PRRC2C	CDS,Exon
chr1	172011148	172100428	+	Serum_circ_0086	4.29	89280	667	DNM3	CDS,Exon
chr1	172037958	172100428	+	Serum_circ_0087	5.72	62470	324	DNM3	CDS,Exon
chr1	172061963	172100428	+	Serum_circ_0088	10.01	38465	166	DNM3	CDS,Exon
chr1	172520651	172526934	+	Serum_circ_0089	2.86	6283	670	SUCO	CDS,Exon,5'UTR
chr1	174241551	174274265	+	Serum_circ_0090	2.14	32714	479	RABGAP1L	CDS,Exon
chr1	176085759	176105683	-	Serum_circ_0091	2.86	19924	195	RFWD2	CDS,Exon
chr1	182523628	182523761	-	Serum_circ_0092	1.43	133	NA	RGSL1	Antisense
chr1	182778977	182781348	+	Serum_circ_0093	2.14	2371	58	NPL	CDS,Exon

chr1	183513487	183513632	+	Serum_circ_0094	3.57	145	145	SMG7	CDS,Exon
chr1	184675776	184681011	-	Serum_circ_0095	3.57	5235	667	EDEM3	CDS,Exon
chr1	185135703	185144245	+	Serum_circ_0096	2.14	8542	882	SWT1	CDS,Exon
chr1	186420310	186439527	+	Serum_circ_0097	1.43	19217	NA	LOC102724919	LncRNA
chr1	197515051	197581106	-	Serum_circ_0098	2.14	66055	1435	DENND1B	CDS,Exon,3'UTR
chr1	197552281	197581153	-	Serum_circ_0099	2.86	28872	376	DENND1B	CDS,Exon
chr1	198201682	198222310	+	Serum_circ_0100	2.14	20628	226	NEK7	CDS,Exon,5'UTR
chr1	198201682	198233365	+	Serum_circ_0101	2.14	31683	400	NEK7	CDS,Exon,5'UTR
chr1	205585605	205593019	-	Serum_circ_0102	6.43	7414	2777	ELK4	CDS,Exon,3'UTR
chr1	206589248	206603572	+	Serum_circ_0103	1.43	14324	199	SRGAP2	CDS,Exon
chr1	207200838	207201024	-	Serum_circ_0104	2.86	186	186	C1orf116	CDS,Exon,5'UTR
chr1	212190227	212194554	-	Serum_circ_0105	3.57	4327	449	INTS7	CDS,Exon,3'UTR
chr1	212502476	212506940	+	Serum_circ_0106	2.14	4464	299	PPP2R5A	CDS,Exon
chr1	213403839	213405598	+	Serum_circ_0107	1.43	1759	181	RPS6KC1	CDS,Exon
chr1	219352488	219385094	+	Serum_circ_0108	2.86	32606	386	LYPLAL1	CDS,Exon
chr1	220355598	220356273	-	Serum_circ_0109	3.57	675	312	RAB3GAP2	CDS,Exon
chr1	224592131	224601037	-	Serum_circ_0110	4.29	8906	280	WDR26	CDS,Exon
chr1	224605961	224612356	-	Serum_circ_0111	2.86	6395	392	WDR26	CDS,Exon
chr1	227085420	227086147	+	Serum_circ_0112	2.14	727	NA	NA	Intergenic
chr1	227192694	227204751	-	Serum_circ_0113	2.86	12057	360	CDC42BPA	CDS,Exon
chr1	227381486	227441856	-	Serum_circ_0114	2.14	60370	421	CDC42BPA	CDS,Exon
chr1	231093969	231097049	-	Serum_circ_0115	4.29	3080	171	TTC13	CDS,Exon
chr1	235600636	235606226	+	Serum_circ_0116	3.57	5590	436	TBCE	CDS,Exon
chr1	235602083	235606226	+	Serum_circ_0117	1.43	4143	283	TBCE	CDS,Exon
chr1	235883960	235896991	-	Serum_circ_0118	1.43	13031	948	LYST	CDS,Exon
chr1	235950499	235955425	-	Serum_circ_0119	3.57	4926	746	LYST	CDS,Exon
chr1	236187369	236201553	-	Serum_circ_0120	1.43	14184	993	NID1	CDS,Exon
chr1	243579003	243589860	+	Serum_circ_0121	4.29	10857	369	SDCCAG8	CDS,Exon
chr1	243776972	243778463	-	Serum_circ_0122	1.43	1491	135	AKT3	CDS,Exon
chr1	246754813	246755243	+	Serum_circ_0123	9.29	430	430	CNST	CDS,Exon,5'UTR
chr1	246781559	246797889	+	Serum_circ_0124	1.43	16330	439	CNST	CDS,Exon
chr1	246794660	246795226	+	Serum_circ_0125	5.00	566	31	CNST	CDS,Exon
chr1	246890193	246903603	+	Serum_circ_0126	2.14	13410	324	SCCPDH	CDS,Exon
chr1	247248379	247248480	-	Serum_circ_0127	5.72	101	NA	NA	Intergenic
chr10	428438	428611	-	Serum_circ_0128	6.43	173	NA	DIP2C	Exon,CDS,Intron
chr10	1125950	1126416	+	Serum_circ_0129	6.43	466	161	WDR37	CDS,Exon
chr10	6520953	6540520	-	Serum_circ_0130	2.86	19567	974	PRKCQ	CDS,Exon
chr10	11308560	11330515	+	Serum_circ_0131	4.29	21955	438	CELF2	CDS,Exon
chr10	12148244	12150014	+	Serum_circ_0132	2.14	1770	258	DHTKD1	CDS,Exon
chr10	15875628	15879317	-	Serum_circ_0133	3.57	3689	269	FAM188A	CDS,Exon
chr10	16794537	16824083	-	Serum_circ_0134	5.00	29546	489	RSU1	CDS,Exon,5'UTR
chr10	17632344	17646046	-	Serum_circ_0135	2.14	13702	527	PTPLA	CDS,Exon
chr10	17645558	17646046	-	Serum_circ_0136	10.01	488	226	PTPLA	CDS,Exon
chr10	18898773	18931484	-	Serum_circ_0137	2.86	32711	426	NSUN6	CDS,Exon
chr10	20432223	20466338	+	Serum_circ_0138	2.14	34115	520	PLXDC2	CDS,Exon
chr10	20465927	20466338	+	Serum_circ_0139	2.86	411	178	PLXDC2	CDS,Exon
chr10	21979836	22016857	+	Serum_circ_0140	5.72	37021	364	MLLT10	CDS,Exon
chr10	22002700	22016857	+	Serum_circ_0141	2.86	14157	364	MLLT10	CDS,Exon
chr10	22896855	22898646	-	Serum_circ_0142	7.15	1791	195	PIP4K2A	CDS,Exon
chr10	24896527	24896669	+	Serum_circ_0143	2.14	142	NA	ARHGAP21	Antisense

chr10	24918924	24924032	-	Serum_circ_0144	9.29	5108	227	ARHGAP21	CDS,Exon
chr10	27815756	27826957	+	Serum_circ_0145	1.43	11201	408	RAB18	CDS,Exon,5'UTR
chr10	28897114	28900851	+	Serum_circ_0146	1.43	3737	518	WAC	CDS,Exon,5'UTR
chr10	30739186	30739448	+	Serum_circ_0147	2.86	262	262	MAP3K8	CDS,Exon
chr10	32740519	32762951	+	Serum_circ_0148	1.43	22432	847	CCDC7	CDS,Exon,5'UTR
chr10	34739244	34806087	-	Serum_circ_0149	4.29	66843	492	PARD3	CDS,Exon
chr10	35321362	35333796	-	Serum_circ_0150	3.57	12434	664	CUL2	CDS,Exon
chr10	35805450	35819171	+	Serum_circ_0151	4.29	13721	315	CCNY	CDS,Exon
chr10	52193235	52279681	-	Serum_circ_0152	4.29	86446	357	SGMS1	Exon,5'UTR
chr10	52268393	52350007	-	Serum_circ_0153	1.43	81614	186	SGMS1	Exon,5'UTR
chr10	52279590	52350007	-	Serum_circ_0154	2.14	70417	186	SGMS1	Exon,5'UTR
chr10	64976966	64979743	-	Serum_circ_0155	1.43	2777	231	JMJD1C	CDS,Exon,5'UTR
chr10	69648639	69651312	+	Serum_circ_0156	5.00	2673	395	SIRT1	CDS,Exon,5'UTR
chr10	69692353	69700862	-	Serum_circ_0157	4.29	8509	501	HERC4	CDS,Exon
chr10	69714351	69726559	-	Serum_circ_0158	5.00	12208	555	HERC4	CDS,Exon
chr10	70218860	70229920	-	Serum_circ_0159	2.14	11060	645	DNA2	CDS,Exon,3'UTR
chr10	70227879	70229920	-	Serum_circ_0160	3.57	2041	367	DNA2	CDS,Exon,3'UTR
chr10	70246900	70266475	-	Serum_circ_0161	3.57	19575	619	SLC25A16	CDS,Exon
chr10	70497601	70502326	+	Serum_circ_0162	5.00	4725	272	CCAR1	CDS,Exon,5'UTR
chr10	70513608	70531202	+	Serum_circ_0163	4.29	17594	1487	CCAR1	CDS,Exon,5'UTR
chr10	70520763	70532856	+	Serum_circ_0164	1.43	12093	730	CCAR1	CDS,Exon,5'UTR
chr10	70545892	70546449	+	Serum_circ_0165	2.14	557	230	CCAR1	CDS,Exon,5'UTR
chr10	70547683	70548085	+	Serum_circ_0166	1.43	402	307	CCAR1	CDS,Exon,5'UTR
chr10	71142242	71146174	+	Serum_circ_0167	2.14	3932	670	HK1	CDS,Exon
chr10	74100546	74100928	-	Serum_circ_0168	1.43	382	266	DNAJB12	CDS,Exon
chr10	74468040	74475660	+	Serum_circ_0169	5.72	7620	165	MCU	Exon,5'UTR
chr10	74474868	74475660	+	Serum_circ_0170	7.86	792	165	MCU	Exon,5'UTR
chr10	75830427	75832610	+	Serum_circ_0171	2.14	2183	383	VCL	CDS,Exon
chr10	75830427	75834661	+	Serum_circ_0172	2.14	4234	544	VCL	CDS,Exon
chr10	76598440	76603236	+	Serum_circ_0173	2.86	4796	949	KAT6B	CDS,Exon,5'UTR
chr10	86177526	86185649	+	Serum_circ_0174	2.86	8123	409	CCSER2	CDS,Exon,5'UTR
chr10	89267885	89272978	+	Serum_circ_0175	1.43	5093	296	MINPP1	CDS,Exon
chr10	94653105	94659401	+	Serum_circ_0176	10.72	6296	357	EXOC6	CDS,Exon
chr10	98667021	98667504	+	Serum_circ_0177	1.43	483	146	LCOR	Exon,5'UTR
chr10	99196173	99197507	-	Serum_circ_0178	2.14	1334	136	EXOSC1	CDS,Exon
chr10	99196947	99198460	-	Serum_circ_0179	4.29	1513	170	EXOSC1	CDS,Exon
chr10	103427642	103436193	-	Serum_circ_0180	6.43	8551	510	FBXW4	CDS,Exon
chr10	103716353	103761829	-	Serum_circ_0181	4.29	45476	657	C10orf76	CDS,Exon
chr10	105767934	105778666	+	Serum_circ_0182	10.01	10732	528	SLK	CDS,Exon
chr10	112188693	112202132	-	Serum_circ_0183	5.00	13439	NA	NA	Intergenic
chr10	112349362	112350890	+	Serum_circ_0184	1.43	1528	507	SMC3	CDS,Exon
chr10	112356155	112358048	+	Serum_circ_0185	8.58	1893	305	SMC3	CDS,Exon
chr10	112635723	112642855	+	Serum_circ_0186	5.00	7132	848	PDCD4	CDS,Exon,5'UTR
chr10	112723882	112745523	+	Serum_circ_0187	3.57	21641	1075	SHOC2	CDS,Exon,5'UTR
chr10	116879948	116925405	+	Serum_circ_0188	5.72	45457	901	ATRNL1	CDS,Exon,5'UTR
chr10	121657755	121658471	+	Serum_circ_0189	4.29	716	533	SEC23IP	CDS,Exon
chr10	121685547	121693299	+	Serum_circ_0190	2.86	7752	902	SEC23IP	CDS,Exon,3'UTR
chr10	123596232	123629553	-	Serum_circ_0191	4.29	33321	315	ATE1	CDS,Exon,3'UTR
chr10	123659380	123662135	-	Serum_circ_0192	2.86	2755	359	ATE1	CDS,Exon,3'UTR
chr10	126097110	126097534	-	Serum_circ_0193	1.43	424	321	OAT	CDS,Exon,5'UTR

chr10	133757598	133769715	+	Serum_circ_0194	1.43	12117	478	PPP2R2D	CDS,Exon,5'UTR
chr10	134503895	134523960	+	Serum_circ_0195	2.86	20065	341	INPP5A	CDS,Exon
chr10	135209216	135216277	+	Serum_circ_0196	3.57	7061	640	MTG1	CDS,Exon
chr11	9304917	9321248	-	Serum_circ_0197	6.43	16331	1104	TMEM41B	CDS,Exon,3'UTR
chr11	17115807	17118811	-	Serum_circ_0198	1.43	3004	333	PIK3C2A	CDS,Exon
chr11	18312988	18313566	-	Serum_circ_0199	2.14	578	578	HPS5	CDS,Exon
chr11	26057123	26057303	-	Serum_circ_0200	2.86	180	NA	NA	Intergenic
chr11	28250417	28252532	+	Serum_circ_0201	2.14	2115	NA	METTL15	Intron
chr11	33127112	33127610	-	Serum_circ_0202	2.14	498	229	CSTF3	CDS,Exon
chr11	33307958	33309057	+	Serum_circ_0203	9.29	1099	1099	HIPK3	CDS,Exon,5'UTR
chr11	34952950	35006275	+	Serum_circ_0204	4.29	53325	1106	PDHX	CDS,Exon,5'UTR
chr11	46829580	46831424	-	Serum_circ_0205	3.57	1844	348	CKAP5	CDS,Exon
chr11	48175347	48177671	+	Serum_circ_0206	5.00	2324	300	PTPRJ	CDS,Exon
chr11	63426509	63426724	-	Serum_circ_0207	2.86	215	215	ATL3	CDS,Exon,5'UTR
chr11	63963116	63963285	+	Serum_circ_0208	1.43	169	169	STIP1	CDS,Exon
chr11	68529002	68529155	-	Serum_circ_0209	2.86	153	153	CPT1A	CDS,Exon
chr11	70271437	70277386	+	Serum_circ_0210	1.43	5949	309	CTTN	CDS,Exon
chr11	72560799	72579071	-	Serum_circ_0211	2.14	18272	297	FCHSD2	CDS,Exon
chr11	73418464	73429935	-	Serum_circ_0212	3.57	11471	418	RAB6A	CDS,Exon
chr11	74528640	74529090	+	Serum_circ_0213	1.43	450	119	RNF169	CDS,Exon
chr11	77394754	77404656	-	Serum_circ_0214	5.00	9902	350	RSF1	CDS,Exon
chr11	77396149	77404656	-	Serum_circ_0215	1.43	8507	240	RSF1	CDS,Exon
chr11	77402203	77404656	-	Serum_circ_0216	1.43	2453	185	RSF1	CDS,Exon
chr11	77820487	77823816	-	Serum_circ_0217	4.29	3329	261	RNU6-83P	CDS,Exon
chr11	85707868	85712201	-	Serum_circ_0218	1.43	4333	365	PICALM	CDS,Exon
chr11	85707868	85714494	-	Serum_circ_0219	4.29	6626	451	PICALM	CDS,Exon
chr11	85718584	85742653	-	Serum_circ_0220	2.14	24069	677	PICALM	CDS,Exon,5'UTR
chr11	85723323	85742653	-	Serum_circ_0221	2.14	19330	528	PICALM	CDS,Exon,5'UTR
chr11	85733409	85742653	-	Serum_circ_0222	5.72	9244	322	PICALM	CDS,Exon,5'UTR
chr11	85961337	85967554	+	Serum_circ_0223	4.29	6217	438	EED	CDS,Exon
chr11	86778735	86802437	+	Serum_circ_0224	1.43	23702	255	TMEM135	CDS,Exon,5'UTR
chr11	95546095	95546753	+	Serum_circ_0225	3.57	658	302	CEP57	CDS,Exon
chr11	101416591	101448221	-	Serum_circ_0226	3.57	31630	NA	TRPC6	Intron
chr11	108046972	108047817	-	Serum_circ_0227	8.58	845	226	NPAT	CDS,Exon
chr11	108172374	108175579	+	Serum_circ_0228	4.29	3205	497	ATM	CDS,Exon
chr11	111625222	111626174	-	Serum_circ_0229	7.86	952	342	PPP2R1B	CDS,Exon
chr11	114038184	114038354	+	Serum_circ_0230	6.43	170	NA	ZBTB16	Intron
chr11	115670224	115670348	+	Serum_circ_0231	4.29	124	NA	NA	Intergenic
chr11	117150623	117150975	+	Serum_circ_0232	2.86	352	186	RNF214	CDS,Exon
chr11	119155678	119156276	+	Serum_circ_0233	1.43	598	510	CBL	CDS,Exon
chr11	124517260	124518071	-	Serum_circ_0234	17.87	811	244	SIAE	CDS,Exon
chr11	128638012	128642880	+	Serum_circ_0235	1.43	4868	359	FLI1	CDS,Exon
chr11	128638012	128651918	+	Serum_circ_0236	2.86	13906	425	FLI1	CDS,Exon
chr11	128993340	129034322	-	Serum_circ_0237	2.14	40982	286	ARHGAP32	CDS,Exon
chr11	129979323	129980556	+	Serum_circ_0238	2.14	1233	375	APLP2	CDS,Exon,5'UTR
chr11	130130750	130131824	-	Serum_circ_0239	2.86	1074	1074	ZBTB44	CDS,Exon,5'UTR
chr12	938227	939110	+	Serum_circ_0240	1.43	883	NA	WNK1	Intron
chr12	1289705	1299218	+	Serum_circ_0241	3.57	9513	614	ERC1	CDS,Exon,5'UTR
chr12	5908672	5939655	-	Serum_circ_0242	3.57	30983	270	ANO2	CDS,Exon
chr12	19615443	19626289	+	Serum_circ_0243	5.72	10846	316	AEBP2	CDS,Exon

chr12	20774229	20783061	+	Serum_circ_0244	6.43	8832	336	PDE3A	CDS,Exon
chr12	25232177	25243131	+	Serum_circ_0245	8.58	10954	582	LRMP	CDS,Exon
chr12	27107077	27110676	+	Serum_circ_0246	6.43	3599	410	FGFR10P2	CDS,Exon,5'UTR
chr12	27156168	27156323	-	Serum_circ_0247	1.43	155	155	TM7SF3	CDS,Exon
chr12	27521194	27529320	+	Serum_circ_0248	1.43	8126	295	ARNTL2	CDS,Exon Exon,CDS,5'UTR
chr12	28378727	28412375	+	Serum_circ_0249	9.29	33648	NA	NA	,Intergenic
chr12	28457558	28460682	+	Serum_circ_0250	2.14	3124	467	CCDC91	CDS,Exon
chr12	28458581	28460682	+	Serum_circ_0251	2.14	2101	467	CCDC91	CDS,Exon
chr12	28458581	28544344	+	Serum_circ_0252	1.43	85763	653	CCDC91	CDS,Exon
chr12	29446232	29450133	+	Serum_circ_0253	2.86	3901	356	FAR2	CDS,Exon,5'UTR Exon,CDS,3'UTR
chr12	29492783	29494749	-	Serum_circ_0254	4.29	1966	NA	NA	,Intergenic
chr12	30873744	30877385	-	Serum_circ_0255	2.86	3641	243	CAPRIN2	CDS,Exon,3'UTR
chr12	31841940	31862359	-	Serum_circ_0256	4.29	20419	665	AMN1	CDS,Exon
chr12	32751430	32764217	+	Serum_circ_0257	7.86	12787	738	FGD4	CDS,Exon
chr12	32760890	32764217	+	Serum_circ_0258	1.43	3327	345	FGD4	CDS,Exon
chr12	32871576	32875567	+	Serum_circ_0259	1.43	3991	460	DNM1L	CDS,Exon
chr12	42604156	42604421	-	Serum_circ_0260	1.43	265	72	YAF2	CDS,Exon
chr12	42768664	42768876	+	Serum_circ_0261	5.72	212	212	PPHLN1	CDS,Exon
chr12	45695796	45744557	+	Serum_circ_0262	2.14	48761	793	ANO6	CDS,Exon
chr12	46339031	46345510	-	Serum_circ_0263	4.29	6479	244	SCAF11	CDS,Exon
chr12	46622935	46648719	-	Serum_circ_0264	2.14	25784	645	SLC38A1	CDS,Exon,5'UTR
chr12	46633461	46637097	-	Serum_circ_0265	1.43	3636	330	SLC38A1	CDS,Exon,5'UTR
chr12	46633461	46648719	-	Serum_circ_0266	2.14	15258	453	SLC38A1	CDS,Exon,5'UTR
chr12	49167251	49168301	-	Serum_circ_0267	3.57	1050	455	ADCY6	CDS,Exon
chr12	50410413	50412372	-	Serum_circ_0268	3.57	1959	163	RACGAP1	CDS,Exon,5'UTR
chr12	54686962	54687104	+	Serum_circ_0269	1.43	142	NA	NFE2	Antisense
chr12	57677606	57677839	-	Serum_circ_0270	3.57	233	233	R3HDM2	CDS,Exon
chr12	66620502	66622150	+	Serum_circ_0271	1.43	1648	234	IRAK3	CDS,Exon
chr12	69983264	69985939	+	Serum_circ_0272	9.29	2675	304	CCT2	CDS,Exon
chr12	69983264	69987393	+	Serum_circ_0273	5.00	4129	536	CCT2	CDS,Exon
chr12	70193988	70195501	+	Serum_circ_0274	4.29	1513	242	RAB3IP	CDS,Exon
chr12	72956632	72969322	+	Serum_circ_0275	1.43	12690	467	TRHDE	CDS,Exon
chr12	96692646	96694138	-	Serum_circ_0276	5.72	1492	172	CDK17	CDS,Exon
chr12	96692646	96704955	-	Serum_circ_0277	3.57	12309	298	CDK17	CDS,Exon
chr12	96717725	96728643	-	Serum_circ_0278	7.86	10918	312	CDK17	CDS,Exon,5'UTR
chr12	105610846	105623001	-	Serum_circ_0279	1.43	12155	231	APPL2	CDS,Exon,5'UTR
chr12	107236366	107237725	+	Serum_circ_0280	10.01	1359	325	RIC8B	CDS,Exon
chr12	109046047	109048186	-	Serum_circ_0281	71.48	2139	251	CORO1C	CDS,Exon
chr12	109660311	109661709	+	Serum_circ_0282	4.29	1398	318	ACACB	CDS,Exon
chr12	110467282	110471762	+	Serum_circ_0283	4.29	4480	433	ANKRD13A	CDS,Exon
chr12	111923068	111924628	-	Serum_circ_0284	2.86	1560	278	ATXN2	CDS,Exon
chr12	116668337	116675510	-	Serum_circ_0285	7.86	7173	238	MED13L	CDS,Exon
chr12	118693252	118693460	-	Serum_circ_0286	2.86	208	208	TAOK3	CDS,Exon,5'UTR
chr12	120213589	120214646	-	Serum_circ_0287	2.86	1057	276	CIT	CDS,Exon
chr12	122218777	122219098	-	Serum_circ_0288	2.14	321	245	RHOF	CDS,Exon
chr12	123052807	123058927	+	Serum_circ_0289	2.14	6120	778	KNTC1	CDS,Exon
chr12	124071293	124074996	+	Serum_circ_0290	5.00	3703	301	TMED2	CDS,Exon
chr12	124856567	124857156	-	Serum_circ_0291	6.43	589	589	NCOR2	CDS,Exon
chr12	132061420	132061825	+	Serum_circ_0292	2.14	405	NA	NA	Intergenic
chr12	133768074	133768589	+	Serum_circ_0293	1.43	515	223	ZNF268	CDS,Exon,5'UTR

chr13	20632714	20633702	+	Serum_circ_0294	2.14	988	246	ZMYM2	CDS,Exon
chr13	21305979	21306260	-	Serum_circ_0295	5.00	281	281	N6AMT2	CDS,Exon
chr13	21735928	21746820	-	Serum_circ_0296	5.72	10892	726	SKA3	CDS,Exon
chr13	21742126	21742538	-	Serum_circ_0297	2.14	412	412	SKA3	CDS,Exon
chr13	22858430	22858561	-	Serum_circ_0298	1.43	131	NA	NA	Intergenic
chr13	23939304	23945304	-	Serum_circ_0299	2.86	6000	286	SACS	CDS,Exon,5'UTR
chr13	25881943	25893488	+	Serum_circ_0300	2.14	11545	603	NUPL1	CDS,Exon
chr13	28748408	28752072	+	Serum_circ_0301	4.29	3664	260	PAN3	CDS,Exon
chr13	29284896	29287687	-	Serum_circ_0302	1.43	2791	955	SLC46A3	CDS,Exon
chr13	30801548	30815223	-	Serum_circ_0303	5.00	13675	655	KATNAL1	CDS,Exon
chr13	32899212	32900750	+	Serum_circ_0304	4.29	1538	315	BRCA2	CDS,Exon
chr13	33091993	33101669	-	Serum_circ_0305	22.87	9676	513	N4BP2L2	CDS,Exon,5'UTR
chr13	40121369	40134440	-	Serum_circ_0306	2.86	13071	NA	LHFP	Intron
chr13	40293372	40301685	+	Serum_circ_0307	2.14	8313	542	COG6	CDS,Exon,5'UTR
chr13	41517087	41518061	-	Serum_circ_0308	1.43	974	277	ELF1	CDS,Exon
chr13	42040958	42042974	+	Serum_circ_0309	6.43	2016	171	RGCC	CDS,Exon
chr13	43528083	43544806	-	Serum_circ_0310	3.57	16723	375	EPST11	CDS,Exon
chr13	43639821	43659974	+	Serum_circ_0311	3.57	20153	274	DNAJC15	CDS,Exon
chr13	45725821	45781640	+	Serum_circ_0312	3.57	55819	2346	GTF2F2	CDS,Exon
chr13	47269027	47275342	+	Serum_circ_0313	1.43	6315	280	LRCH1	CDS,Exon
chr13	47297355	47308133	+	Serum_circ_0314	2.86	10778	326	LRCH1	CDS,Exon
chr13	48827943	48833083	+	Serum_circ_0315	2.14	5140	598	ITM2B	CDS,Exon
chr13	50025688	50026045	+	Serum_circ_0316	1.43	357	357	SETDB2	CDS,Exon,5'UTR
chr13	50054354	50057699	+	Serum_circ_0317	1.43	3345	613	SETDB2	CDS,Exon
chr13	50140753	50141456	-	Serum_circ_0318	1.43	703	318	RCBTB1	CDS,Exon,5'UTR
chr13	61013821	61041513	+	Serum_circ_0319	5.00	27692	516	TDRD3	CDS,Exon,5'UTR
chr13	95686858	95735544	-	Serum_circ_0320	2.86	48686	1335	ABCC4	CDS,Exon
chr13	95768175	95822882	-	Serum_circ_0321	5.72	54707	808	ABCC4	CDS,Exon
chr13	95813442	95840796	-	Serum_circ_0322	1.43	27354	1192	ABCC4	CDS,Exon
chr13	95858785	95863035	-	Serum_circ_0323	1.43	4250	630	ABCC4	CDS,Exon
chr13	96375495	96377506	+	Serum_circ_0324	2.86	2011	200	DNAJC3	CDS,Exon
chr13	96409897	96416207	+	Serum_circ_0325	4.29	6310	682	DNAJC3	CDS,Exon
chr13	99134518	99171727	-	Serum_circ_0326	4.29	37209	288	STK24	CDS,Exon
chr13	99890680	99896878	+	Serum_circ_0327	5.72	6198	358	UBAC2	CDS,Exon,5'UTR
chr13	100982814	100992513	+	Serum_circ_0328	2.86	9699	214	PCCA	CDS,Exon
chr13	100982814	101020828	+	Serum_circ_0329	1.43	38014	317	PCCA	CDS,Exon
chr13	103275226	103280274	+	Serum_circ_0330	1.43	5048	396	TPP2	CDS,Exon
chr13	113460526	113465040	+	Serum_circ_0331	3.57	4514	189	ATP11A	CDS,Exon
chr13	114773008	114795363	-	Serum_circ_0332	5.00	22355	1370	RASA3	CDS,Exon
chr13	114806475	114822949	-	Serum_circ_0333	5.00	16474	199	RASA3	CDS,Exon
chr14	23378691	23380612	-	Serum_circ_0334	11.44	1921	189	RBM23	CDS,Exon,5'UTR
chr14	31103152	31107453	+	Serum_circ_0335	1.43	4301	214	SCFD1	CDS,Exon,5'UTR
chr14	31185129	31204064	+	Serum_circ_0336	1.43	18935	276	SCFD1	CDS,Exon
chr14	31404368	31425448	-	Serum_circ_0337	2.86	21080	706	STRN3	CDS,Exon
chr14	31416295	31425448	-	Serum_circ_0338	5.00	9153	434	STRN3	CDS,Exon
chr14	31602443	31602881	-	Serum_circ_0339	2.86	438	344	HECTD1	CDS,Exon
chr14	35020919	35024118	-	Serum_circ_0340	1.43	3199	NA	NA	Intergenic
chr14	35331249	35331528	-	Serum_circ_0341	20.01	279	279	BAZ1A	CDS,Exon
chr14	35438375	35441270	-	Serum_circ_0342	2.86	2895	NA	ENST0000054945	LncRNA
chr14	35565763	35568590	-	Serum_circ_0343	5.72	2827	NA	LOC101927178	Antisense

chr14	35568457	35579835	-	Serum_circ_0344	5.72	11378	NA	LOC101927178	Antisense
chr14	39620949	39627606	-	Serum_circ_0345	1.43	6657	296	TRAPPC6B	CDS,Exon
chr14	39620949	39628754	-	Serum_circ_0346	2.14	7805	364	TRAPPC6B	CDS,Exon
chr14	39627488	39628754	-	Serum_circ_0347	5.72	1266	186	TRAPPC6B	CDS,Exon
chr14	39648294	39648666	+	Serum_circ_0348	2.14	372	295	PNN	CDS,Exon
chr14	39746137	39748741	+	Serum_circ_0349	5.00	2604	265	CTAGE5	CDS,Exon,5'UTR
chr14	45587230	45599993	-	Serum_circ_0350	4.29	12763	410	FKBP3	CDS,Exon
chr14	45618039	45628483	+	Serum_circ_0351	1.43	10444	822	FANCM	CDS,Exon
chr14	50130032	50141145	-	Serum_circ_0352	2.86	11113	510	POLE2	CDS,Exon
chr14	50612194	50616948	-	Serum_circ_0353	1.43	4754	343	SOS2	CDS,Exon
chr14	53003436	53011089	-	Serum_circ_0354	1.43	7653	573	TXNDC16	CDS,Exon,5'UTR
chr14	57051718	57092237	+	Serum_circ_0355	2.86	40519	1238	TMEM260	CDS,Exon
chr14	59747740	59758024	+	Serum_circ_0356	1.43	10284	90	DAAM1	CDS,Exon
chr14	61952219	61952374	+	Serum_circ_0357	2.86	155	155	PRKCH	CDS,Exon
chr14	65922338	65927869	+	Serum_circ_0358	2.86	5531	98	FUT8	Exon,5'UTR
chr14	66028054	66028484	+	Serum_circ_0359	2.86	430	430	FUT8	CDS,Exon,5'UTR
chr14	66028054	66096324	+	Serum_circ_0360	5.72	68270	824	FUT8	CDS,Exon,5'UTR
chr14	66082695	66096324	+	Serum_circ_0361	3.57	13629	394	FUT8	CDS,Exon,5'UTR
chr14	67736417	67770316	+	Serum_circ_0362	1.43	33899	1565	MPP5	CDS,Exon,5'UTR
chr14	67784124	67790529	+	Serum_circ_0363	1.43	6405	554	MPP5	CDS,Exon
chr14	68151731	68157138	-	Serum_circ_0364	3.57	5407	400	RDH11	CDS,Exon
chr14	69588933	69616220	-	Serum_circ_0365	5.72	27287	144	DCAF5	CDS,Exon,5'UTR
chr14	70633355	70635201	-	Serum_circ_0366	1.43	1846	1846	SLC8A3	CDS,Exon,5'UTR
chr14	73544076	73570186	+	Serum_circ_0367	2.14	26110	998	RBM25	CDS,Exon
chr14	73614502	73614802	+	Serum_circ_0368	1.43	300	210	PSEN1	CDS,Exon,5'UTR
chr14	73614502	73614814	+	Serum_circ_0369	1.43	312	350	PSEN1	CDS,Exon,5'UTR
chr14	76198680	76201632	+	Serum_circ_0370	2.14	2952	239	TTL5	CDS,Exon
chr14	77237532	77239554	+	Serum_circ_0371	2.14	2022	132	VASH1	CDS,Exon
chr14	77930940	77932010	+	Serum_circ_0372	3.57	1070	218	AHSA1	CDS,Exon
chr14	77987788	78018565	-	Serum_circ_0373	3.57	30777	263	SPTLC2	CDS,Exon
chr14	86815930	86816107	-	Serum_circ_0374	1.43	177	NA	ENST0000053679	LncRNA
chr14	89041036	89044484	+	Serum_circ_0375	3.57	3448	418	ZC3H14	CDS,Exon
chr14	89041036	89076147	+	Serum_circ_0376	2.14	35111	2269	ZC3H14	CDS,Exon,5'UTR
chr14	89628044	89629313	-	Serum_circ_0377	1.43	1269	NA	FOXP3	CDS,Exon
chr14	91155883	91196540	-	Serum_circ_0378	1.43	40657	374	TTC7B	CDS,Exon
chr14	95606995	95608085	-	Serum_circ_0379	2.86	1090	137	DICER1	Exon,5'UTR
chr14	97299803	97327072	+	Serum_circ_0380	2.14	27269	1073	VRK1	CDS,Exon,5'UTR
chr14	101015600	101015909	-	Serum_circ_0381	2.86	309	NA	BEGAIN	Intron
chr14	102506572	102507010	+	Serum_circ_0382	2.14	438	251	DYNC1H1	CDS,Exon
chr14	102659799	102661457	+	Serum_circ_0383	5.00	1658	248	WDR20	CDS,Exon,5'UTR
chr14	103918254	103923549	+	Serum_circ_0384	3.57	5295	137	MARK3	CDS,Exon
chr15	22940727	22947086	+	Serum_circ_0385	4.29	6359	367	CYFIP1	CDS,Exon
chr15	31245764	31260213	-	Serum_circ_0386	4.29	14449	662	MTMR10	CDS,Exon
chr15	41347444	41348904	-	Serum_circ_0387	5.00	1460	203	INO80	CDS,Exon,3'UTR
chr15	41361767	41362745	-	Serum_circ_0388	3.57	978	177	INO80	CDS,Exon,3'UTR
chr15	41669393	41672401	+	Serum_circ_0389	3.57	3008	109	NUSAP1	CDS,Exon
chr15	43250210	43262805	-	Serum_circ_0390	3.57	12595	466	UBR1	CDS,Exon
chr15	43692241	43694048	+	Serum_circ_0391	7.86	1807	313	TUBGCP4	CDS,Exon
chr15	44776421	44783197	+	Serum_circ_0392	1.43	6776	505	CTDSPL2	CDS,Exon
chr15	44898222	44903183	-	Serum_circ_0393	4.29	4961	375	SPG11	CDS,Exon

chr15	49528047	49531564	+	Serum_circ_0394	10.01	3517	238	GALK2	CDS,Exon
chr15	49528047	49584734	+	Serum_circ_0395	3.57	56687	701	GALK2	CDS,Exon
chr15	50264778	50288956	-	Serum_circ_0396	1.43	24178	737	ATP8B4	CDS,Exon,3'UTR
chr15	50763829	50769696	+	Serum_circ_0397	2.86	5867	532	USP8	CDS,Exon
chr15	50940883	50955243	-	Serum_circ_0398	2.14	14360	318	TRPM7	CDS,Exon
chr15	52161413	52194233	+	Serum_circ_0399	4.29	32820	898	TMOD3	CDS,Exon
chr15	52718026	52725482	-	Serum_circ_0400	5.00	7456	428	MYO5A	CDS,Exon
chr15	57445110	57445338	-	Serum_circ_0401	5.00	228	NA	TCF12	Antisense
chr15	59143969	59144164	+	Serum_circ_0402	6.43	195	195	FAM63B	CDS,Exon
chr15	59204761	59205895	-	Serum_circ_0403	5.00	1134	246	SLTM	CDS,Exon
chr15	59383257	59384839	+	Serum_circ_0404	3.57	1582	328	RNF111	CDS,Exon
chr15	59399520	59399869	+	Serum_circ_0405	4.29	349	243	CCNB2	CDS,Exon
chr15	62299506	62306191	-	Serum_circ_0406	7.86	6685	606	VPS13C	CDS,Exon
chr15	64410315	64411053	+	Serum_circ_0407	5.72	738	195	SNX1	CDS,Exon
chr15	64543710	64592922	-	Serum_circ_0408	1.43	49212	516	CSNK1G1	CDS,Exon,5'UTR
chr15	64791491	64792365	+	Serum_circ_0409	2.86	874	NA	NA	Exon,CDS,Intron
chr15	65471271	65472542	-	Serum_circ_0410	5.72	1271	279	CLPX	CDS,Exon
chr15	65962116	65962526	-	Serum_circ_0411	2.14	410	323	DENND4A	CDS,Exon
chr15	66828270	66839043	+	Serum_circ_0412	4.29	10773	461	ZWILCH	CDS,Exon,3'UTR
chr15	67524151	67529158	-	Serum_circ_0413	2.14	5007	462	AAGAB	CDS,Exon,5'UTR
chr15	68434283	68439038	+	Serum_circ_0414	2.14	4755	359	PIAS1	CDS,Exon
chr15	72283443	72286926	-	Serum_circ_0415	2.14	3483	252	MYO9A	CDS,Exon
chr15	75146361	75146990	-	Serum_circ_0416	2.14	629	168	SCAMP2	CDS,Exon
chr15	76566752	76588078	-	Serum_circ_0417	1.43	21326	777	ETFA	CDS,Exon
chr15	76580186	76585041	-	Serum_circ_0418	6.43	4855	265	ETFA	CDS,Exon
chr15	76584771	76588078	-	Serum_circ_0419	6.43	3307	312	ETFA	CDS,Exon
chr15	78837210	78839040	+	Serum_circ_0420	3.57	1830	344	PSMA4	CDS,Exon
chr15	80412669	80415142	+	Serum_circ_0421	7.86	2473	583	ZFAND6	CDS,Exon,5'UTR
chr15	83788329	83796229	+	Serum_circ_0422	2.86	7900	627	TM6SF1	CDS,Exon
chr15	83819966	83832827	-	Serum_circ_0423	2.14	12861	522	HDGFRP3	CDS,Exon
chr15	89656955	89659752	+	Serum_circ_0424	4.29	2797	300	ABHD2	CDS,Exon,5'UTR
chr15	90431752	90432372	-	Serum_circ_0425	7.15	620	292	AP3S2	CDS,Exon,3'UTR
chr15	90451542	90451644	-	Serum_circ_0426	2.14	102	102	C15orf38	CDS,Exon
chr15	90760670	90763123	+	Serum_circ_0427	3.57	2453	326	SEMA4B	CDS,Exon
chr15	95025504	95025692	+	Serum_circ_0428	5.00	188	188	MCTP2	Exon,3'UTR
chr15	101104896	101105470	-	Serum_circ_0429	5.72	574	NA	NA	Intergenic
chr15	101906400	101910728	-	Serum_circ_0430	2.86	4328	326	PCSK6	CDS,Exon
chr16	2369581	2369841	-	Serum_circ_0431	7.86	260	260	ABCA3	CDS,Exon
chr16	9009110	9011013	-	Serum_circ_0432	2.14	1903	358	USP7	CDS,Exon
chr16	14738130	14738466	+	Serum_circ_0433	2.86	336	336	BFAR	CDS,Exon,5'UTR
chr16	14758725	14758928	+	Serum_circ_0434	1.43	203	203	BFAR	CDS,Exon
chr16	15705448	15716980	-	Serum_circ_0435	1.43	11532	1347	KIAA0430	CDS,Exon
chr16	16200594	16205439	+	Serum_circ_0436	2.86	4845	344	ABCC1	CDS,Exon
chr16	18852886	18856973	-	Serum_circ_0437	4.29	4087	700	SMG1	CDS,Exon
chr16	21629185	21629395	+	Serum_circ_0438	2.86	210	210	METTL9	CDS,Exon
chr16	23999828	24046868	+	Serum_circ_0439	10.72	47040	324	PRKCB	CDS,Exon
chr16	24043456	24046868	+	Serum_circ_0440	7.86	3412	241	PRKCB	CDS,Exon
chr16	27224905	27226329	+	Serum_circ_0441	3.57	1424	300	KDM8	CDS,Exon
chr16	30490411	30490782	+	Serum_circ_0442	2.14	371	249	ITGAL	CDS,Exon
chr16	30715384	30715636	+	Serum_circ_0443	3.57	252	252	SRCAP	CDS,Exon

chr16	53288349	53308214	+	Serum_circ_0444	1.43	19865	1106	CHD9	CDS,Exon
chr16	53301205	53308214	+	Serum_circ_0445	5.00	7009	647	CHD9	CDS,Exon
chr16	66642211	66643906	+	Serum_circ_0446	6.43	1695	618	CMTM3	CDS,Exon,5'UTR
chr16	67650647	67650781	+	Serum_circ_0447	2.14	134	134	CTCF	CDS,Exon,5'UTR
chr16	68155889	68160513	+	Serum_circ_0448	3.57	4624	1298	NFATC3	CDS,Exon
chr16	68191771	68217269	+	Serum_circ_0449	2.14	25498	697	NFATC3	CDS,Exon
chr16	69404385	69406258	-	Serum_circ_0450	20.73	1873	234	TERF2	CDS,Exon
chr16	70502751	70503226	+	Serum_circ_0451	1.43	475	292	FUK	CDS,Exon
chr16	71779046	71779517	-	Serum_circ_0452	1.43	471	269	AP1G1	CDS,Exon
chr16	72122885	72124685	-	Serum_circ_0453	2.86	1800	321	TXNL4B	CDS,Exon,5'UTR
chr16	74670243	74671868	-	Serum_circ_0454	2.14	1625	347	RFWD3	CDS,Exon
chr16	83940591	83945972	+	Serum_circ_0455	4.29	5381	420	MLYCD	CDS,Exon
chr16	85667519	85667738	+	Serum_circ_0456	125.80	219	219	GSE1	CDS,Exon
chr16	88677675	88677944	+	Serum_circ_0457	1.43	269	269	ZC3H18	CDS,Exon
chr16	88958289	88968064	-	Serum_circ_0458	2.14	9775	560	CBFA2T3	CDS,Exon,5'UTR
chr16	89484691	89497734	-	Serum_circ_0459	7.15	13043	156	ANKRD11	CDS,Exon
chr17	3969740	3976050	-	Serum_circ_0460	10.01	6310	564	ZZEF1	CDS,Exon
chr17	5250084	5253924	+	Serum_circ_0461	1.43	3840	315	RABEP1	CDS,Exon
chr17	5268416	5271763	+	Serum_circ_0462	1.43	3347	216	RABEP1	CDS,Exon
chr17	16004563	16005119	-	Serum_circ_0463	5.00	556	1064	NCOR1	CDS,Exon
chr17	16012099	16029523	-	Serum_circ_0464	6.43	17424	673	NCOR1	CDS,Exon
chr17	26490568	26499644	+	Serum_circ_0465	12.15	9076	398	NLK	CDS,Exon
chr17	26490568	26512291	+	Serum_circ_0466	9.29	21723	485	NLK	CDS,Exon
chr17	26512204	26519239	+	Serum_circ_0467	2.86	7035	380	NLK	CDS,Exon
chr17	27778472	27778698	+	Serum_circ_0468	3.57	226	226	TAOK1	CDS,Exon,5'UTR
chr17	27778472	27794234	+	Serum_circ_0469	4.29	15762	298	TAOK1	CDS,Exon,5'UTR
chr17	27778472	27809306	+	Serum_circ_0470	1.43	30834	749	TAOK1	CDS,Exon,5'UTR
chr17	27844470	27844674	+	Serum_circ_0471	2.86	204	204	TAOK1	CDS,Exon
chr17	28011580	28030080	-	Serum_circ_0472	7.15	18500	291	SSH2	CDS,Exon
chr17	29185178	29192818	+	Serum_circ_0473	2.86	7640	440	ATAD5	CDS,Exon
chr17	29483000	29497015	+	Serum_circ_0474	2.86	14015	526	NF1	CDS,Exon
chr17	35800605	35802753	+	Serum_circ_0475	2.14	2148	247	TADA2A	CDS,Exon
chr17	35936438	35945538	-	Serum_circ_0476	5.00	9100	530	SYNRG	CDS,Exon
chr17	37707290	37723145	+	Serum_circ_0477	2.14	15855	NA	TCONS_00025374	LncRNA
chr17	38551700	38552717	-	Serum_circ_0478	2.86	1017	274	TOP2A	CDS,Exon
chr17	40650941	40653322	+	Serum_circ_0479	3.57	2381	444	ATP6V0A1	CDS,Exon
chr17	40652724	40653322	+	Serum_circ_0480	2.14	598	325	ATP6V0A1	CDS,Exon
chr17	42453200	42453506	-	Serum_circ_0481	4.29	306	153	ITGA2B	CDS,Exon
chr17	44143902	44145033	-	Serum_circ_0482	5.00	1131	315	KANSL1	CDS,Exon
chr17	45412565	45456619	+	Serum_circ_0483	2.14	44054	1391	EFCAB13	CDS,Exon
chr17	45438743	45456619	+	Serum_circ_0484	2.14	17876	921	EFCAB13	CDS,Exon
chr17	47388673	47390207	-	Serum_circ_0485	9.29	1534	409	ZNF652	CDS,Exon
chr17	48814320	48824063	+	Serum_circ_0486	2.14	9743	1039	LUC7L3	CDS,Exon
chr17	49067810	49075978	-	Serum_circ_0487	5.72	8168	953	SPAG9	CDS,Exon
chr17	57165651	57181755	-	Serum_circ_0488	2.86	16104	260	TRIM37	CDS,Exon
chr17	61829299	61831878	-	Serum_circ_0489	1.43	2579	423	CCDC47	CDS,Exon
chr17	61841375	61842207	-	Serum_circ_0490	2.86	832	283	CCDC47	CDS,Exon
chr17	65887959	65890281	+	Serum_circ_0491	5.72	2322	679	BPTF	CDS,Exon
chr17	65941524	65972074	+	Serum_circ_0492	4.29	30550	2514	BPTF	CDS,Exon
chr17	70681458	70681585	-	Serum_circ_0493	5.72	127	NA	SLC39A11	Intron

chr17	74554455	74554682	+	Serum_circ_0494	3.57	227	NA	SNHG16	Intron
chr17	74763467	74765953	+	Serum_circ_0495	8.58	2486	192	MFS11	CDS,Exon
chr17	76396794	76397138	+	Serum_circ_0496	8.58	344	344	PGS1	Exon,5'UTR
chr17	80115623	80151706	-	Serum_circ_0497	1.43	36083	1465	CCDC57	CDS,Exon
chr18	2762102	2772370	+	Serum_circ_0498	4.29	10268	741	SMCHD1	CDS,Exon
chr18	9177333	9211782	+	Serum_circ_0499	1.43	34449	703	ANKRD12	CDS,Exon,5'UTR
chr18	9182379	9221997	+	Serum_circ_0500	6.43	39618	994	ANKRD12	CDS,Exon,5'UTR
chr18	9577061	9595151	-	Serum_circ_0501	1.43	18090	1079	PPP4R1	CDS,Exon,3'UTR
chr18	18600111	18624147	-	Serum_circ_0502	2.14	24036	771	ROCK1	CDS,Exon
chr18	20569183	20602233	+	Serum_circ_0503	3.57	33050	1887	RBBP8	CDS,Exon
chr18	21644103	21649235	+	Serum_circ_0504	5.72	5132	293	TTC39C	CDS,Exon,5'UTR
chr18	26091852	26091991	+	Serum_circ_0505	1.43	139	NA	NA	Intergenic
chr18	39607406	39629569	+	Serum_circ_0506	7.86	22163	779	PIK3C3	CDS,Exon
chr18	39623696	39629569	+	Serum_circ_0507	7.15	5873	160	PIK3C3	CDS,Exon
chr18	39644703	39647477	+	Serum_circ_0508	6.43	2774	217	PIK3C3	CDS,Exon
chr18	42281139	42281797	+	Serum_circ_0509	5.00	658	658	SETBP1	CDS,Exon,5'UTR
chr18	43698146	43700026	+	Serum_circ_0510	2.14	1880	271	HAUS1	CDS,Exon,5'UTR
chr18	44470542	44483598	-	Serum_circ_0511	2.14	13056	475	PIAS2	CDS,Exon
chr18	45391429	45423180	-	Serum_circ_0512	7.15	31751	783	SMAD2	CDS,Exon,5'UTR
chr18	51797729	51800460	+	Serum_circ_0513	2.14	2731	291	POLI	CDS,Exon
chr18	51797729	51804225	+	Serum_circ_0514	3.57	6496	444	POLI	CDS,Exon
chr18	51804072	51813781	+	Serum_circ_0515	4.29	9709	792	POLI	CDS,Exon
chr18	52544797	52555349	+	Serum_circ_0516	5.00	10552	486	RAB27B	CDS,Exon,5'UTR
chr18	53017589	53018234	-	Serum_circ_0517	3.57	645	307	TCF4	CDS,Exon,5'UTR
chr18	55361813	55371900	-	Serum_circ_0518	11.44	10087	750	ATP8B1	CDS,Exon
chr18	56363597	56367823	+	Serum_circ_0519	2.14	4226	273	MALT1	CDS,Exon
chr18	66564455	66564919	+	Serum_circ_0520	3.57	464	210	CCDC102B	CDS,Exon
chr18	67540379	67563281	-	Serum_circ_0521	3.57	22902	448	CD226	CDS,Exon
chr18	67562936	67577838	-	Serum_circ_0522	5.00	14902	345	CD226	CDS,Exon
chr18	67613969	67614669	-	Serum_circ_0523	10.01	700	409	CD226	CDS,Exon,5'UTR
chr18	74561481	74563895	+	Serum_circ_0524	2.14	2414	308	ZNF236	CDS,Exon
chr19	1090906	1091906	-	Serum_circ_0525	4.29	1000	197	POLR2E	CDS,Exon
chr19	3660963	3661999	-	Serum_circ_0526	1.43	1036	249	PIP5K1C	CDS,Exon
chr19	8520288	8528570	+	Serum_circ_0527	1.43	8282	325	HNRNPM	CDS,Exon
chr19	8612919	8613201	-	Serum_circ_0528	7.15	282	168	MYO1F	CDS,Exon
chr19	10736928	10742627	+	Serum_circ_0529	4.29	5699	673	SLC44A2	CDS,Exon
chr19	11548696	11548945	+	Serum_circ_0530	5.00	249	154	PRKCSH	CDS,Exon
chr19	12355395	12361183	-	Serum_circ_0531	1.43	5788	NA	NA	Intergenic
chr19	13039155	13039661	-	Serum_circ_0532	1.43	506	338	FARSA	CDS,Exon
chr19	14153264	14153601	+	Serum_circ_0533	1.43	337	234	IL27RA	CDS,Exon
chr19	18258252	18258434	+	Serum_circ_0534	8.58	182	182	MAST3	CDS,Exon
chr19	18684102	18684558	+	Serum_circ_0535	2.14	456	198	UBA52	CDS,Exon,5'UTR
chr19	27733209	27736950	+	Serum_circ_0536	1.43	3741	NA	NA	Intergenic
chr19	30476129	30477324	+	Serum_circ_0537	9.29	1195	215	URI1	CDS,Exon,5'UTR
chr19	38631823	38633350	+	Serum_circ_0538	2.86	1527	390	SIPA1L3	CDS,Exon
chr19	39001137	39001421	+	Serum_circ_0539	5.72	284	190	RYR1	CDS,Exon
chr19	40743875	40746017	-	Serum_circ_0540	3.57	2142	258	AKT2	CDS,Exon
chr19	41089303	41089623	+	Serum_circ_0541	3.57	320	205	SHKBP1	CDS,Exon
chr19	41847787	41848152	-	Serum_circ_0542	10.72	365	226	TGFB1	CDS,Exon
chr19	45528586	45528995	+	Serum_circ_0543	5.00	409	224	RELB	CDS,Exon

chr19	49473802	49474280	-	Serum_circ_0544	1.43	478	260	GYS1	CDS,Exon,3'UTR
chr19	55530843	55536639	-	Serum_circ_0545	2.86	5796	54	GP6	CDS,Exon
chr19	55921103	55921685	+	Serum_circ_0546	1.43	582	NA	NA	Intergenic
chr19	57967020	57967550	-	Serum_circ_0547	3.57	530	530	VN1R1	CDS,Exon
chr19	58057824	58059361	-	Serum_circ_0548	2.86	1537	1699	ZNF550	CDS,Exon,3'UTR
chr2	605066	605228	-	Serum_circ_0549	2.14	162	NA	NA	Intergenic
chr2	2784707	2784825	-	Serum_circ_0550	1.43	118	NA	NA	Intergenic
chr2	9022640	9098771	-	Serum_circ_0551	1.43	76131	431	MBOAT2	CDS,Exon
chr2	9028147	9098771	-	Serum_circ_0552	3.57	70624	376	MBOAT2	CDS,Exon
chr2	9048750	9098771	-	Serum_circ_0553	17.16	50021	320	MBOAT2	CDS,Exon
chr2	9079949	9098771	-	Serum_circ_0554	1.43	18822	224	MBOAT2	CDS,Exon
chr2	9083315	9098771	-	Serum_circ_0555	38.60	15456	224	MBOAT2	CDS,Exon
chr2	9458652	9463379	+	Serum_circ_0556	1.43	4727	255	ASAP2	CDS,Exon
chr2	9484660	9491024	+	Serum_circ_0557	5.00	6364	262	ASAP2	CDS,Exon
chr2	9490936	9508648	+	Serum_circ_0558	2.14	17712	533	ASAP2	CDS,Exon
chr2	9496175	9499018	+	Serum_circ_0559	2.86	2843	350	ASAP2	CDS,Exon
chr2	10799297	10808849	-	Serum_circ_0560	5.00	9552	292	NOL10	CDS,Exon,3'UTR
chr2	11426664	11427862	-	Serum_circ_0561	5.00	1198	183	ROCK2	CDS,Exon
chr2	15492115	15496540	-	Serum_circ_0562	3.57	4425	362	NBAS	CDS,Exon,3'UTR
chr2	17884423	17927218	-	Serum_circ_0563	2.14	42795	2147	SMC6	CDS,Exon,5'UTR
chr2	20478343	20478580	-	Serum_circ_0564	6.43	237	237	PUM2	CDS,Exon
chr2	24046127	24046439	-	Serum_circ_0565	4.29	312	312	ATAD2B	CDS,Exon
chr2	24181170	24199945	+	Serum_circ_0566	2.14	18775	301	UBXN2A	CDS,Exon,5'UTR
chr2	24357988	24369956	+	Serum_circ_0567	3.57	11968	587	FAM228B	CDS,Exon,5'UTR
chr2	24357988	24384483	+	Serum_circ_0568	2.14	26495	695	FAM228B	CDS,Exon,5'UTR
chr2	24516556	24518673	-	Serum_circ_0569	1.43	2117	229	ITSN2	CDS,Exon
chr2	26321530	26332775	+	Serum_circ_0570	6.43	11245	200	RAB10	CDS,Exon
chr2	32352016	32353548	+	Serum_circ_0571	2.14	1532	147	SPAST	CDS,Exon
chr2	32602655	32614011	+	Serum_circ_0572	1.43	11356	514	BIRC6	CDS,Exon
chr2	32716491	32718734	+	Serum_circ_0573	3.57	2243	262	BIRC6	CDS,Exon
chr2	32858942	32865477	+	Serum_circ_0574	1.43	6535	348	TTC27	CDS,Exon,5'UTR
chr2	33359859	33413918	+	Serum_circ_0575	5.72	54059	668	LTBP1	CDS,Exon
chr2	33359859	33447218	+	Serum_circ_0576	13.58	87359	843	LTBP1	CDS,Exon
chr2	33411922	33447218	+	Serum_circ_0577	2.14	35296	675	LTBP1	CDS,Exon
chr2	33442618	33447218	+	Serum_circ_0578	8.58	4600	175	LTBP1	CDS,Exon
chr2	33488360	33518349	+	Serum_circ_0579	1.43	29989	717	LTBP1	CDS,Exon
chr2	37259771	37268435	-	Serum_circ_0580	2.14	8664	665	HEATR5B	CDS,Exon
chr2	37276795	37284623	-	Serum_circ_0581	2.86	7828	637	HEATR5B	CDS,Exon
chr2	37426846	37428869	+	Serum_circ_0582	2.14	2023	246	CEBPZ-AS1	Exon,5'UTR Exon,CDS,3'UTR
chr2	37543379	37544322	-	Serum_circ_0583	2.86	943	NA	NA	,Intergenic Exon,CDS,3'UTR
chr2	37543379	37545042	-	Serum_circ_0584	1.43	1663	NA	NA	,Intergenic
chr2	38903053	38903208	+	Serum_circ_0585	1.43	155	155	GALM	CDS,Exon
chr2	39233552	39237844	-	Serum_circ_0586	2.86	4292	401	SOS1	CDS,Exon
chr2	39559057	39564722	-	Serum_circ_0587	1.43	5665	220	MAP4K3	CDS,Exon
chr2	40655612	40657444	-	Serum_circ_0588	7.15	1832	1832	SLC8A1	CDS,Exon,5'UTR
chr2	42543101	42544664	+	Serum_circ_0589	7.15	1563	187	EML4	CDS,Exon
chr2	44436348	44445676	+	Serum_circ_0590	2.14	9328	511	PPM1B	CDS,Exon,5'UTR
chr2	44436348	44436466	+	Serum_circ_0591	3.57	118	118	PPM1B	CDS,Exon,5'UTR
chr2	44729827	44732869	+	Serum_circ_0592	4.29	3042	NA	CAMKMT	Intron
chr2	54114395	54120936	-	Serum_circ_0593	1.43	6541	817	PSME4	CDS,Exon

chr2	58285486	58285623	+	Serum_circ_0594	2.14	137	137	VRK2	Exon,5'UTR
chr2	58449076	58459247	-	Serum_circ_0595	2.14	10171	278	FANCL	CDS,Exon
chr2	61118817	61128218	+	Serum_circ_0596	2.86	9401	384	REL	CDS,Exon
chr2	61343113	61345251	+	Serum_circ_0597	7.15	2138	284	KIAA1841	CDS,Exon
chr2	61719169	61724142	-	Serum_circ_0598	5.00	4973	1128	XPO1	CDS,Exon
chr2	61721028	61722748	-	Serum_circ_0599	5.00	1720	357	XPO1	CDS,Exon
chr2	61749745	61753656	-	Serum_circ_0600	17.87	3911	175	XPO1	CDS,Exon
chr2	61749745	61761038	-	Serum_circ_0601	5.00	11293	307	XPO1	CDS,Exon,5'UTR
chr2	64083439	64090062	+	Serum_circ_0602	10.01	6623	236	UGP2	CDS,Exon,5'UTR
chr2	64083439	64085070	+	Serum_circ_0603	2.14	1631	236	UGP2	CDS,Exon,5'UTR
chr2	64800079	64812679	+	Serum_circ_0604	1.43	12600	392	AFTPH	CDS,Exon
chr2	65318116	65331940	-	Serum_circ_0605	5.72	13824	265	RAB1A	CDS,Exon
chr2	66691240	66775151	+	Serum_circ_0606	3.57	83911	335	MEIS1	CDS,Exon
chr2	68717321	68765359	+	Serum_circ_0607	4.29	48038	1064	APLF	CDS,Exon
chr2	68717321	68772444	+	Serum_circ_0608	5.72	55123	1190	APLF	CDS,Exon
chr2	68740211	68742868	+	Serum_circ_0609	2.14	2657	281	APLF	CDS,Exon
chr2	68794472	68805135	+	Serum_circ_0610	2.14	10663	47	APLF	CDS,Exon
chr2	69583627	69590802	-	Serum_circ_0611	1.43	7175	382	GFPT1	CDS,Exon
chr2	72945231	72960247	-	Serum_circ_0612	1.43	15016	390	EXOC6B	CDS,Exon
chr2	85097348	85097909	-	Serum_circ_0613	1.43	561	561	TRABD2A	CDS,Exon
chr2	85864491	85872206	+	Serum_circ_0614	5.72	7715	536	USP39	CDS,Exon,5'UTR
chr2	86386658	86389202	-	Serum_circ_0615	5.00	2544	240	IMMT	CDS,Exon
chr2	98430433	98435184	-	Serum_circ_0616	1.43	4751	543	TMEM131	CDS,Exon
chr2	99720429	99734222	-	Serum_circ_0617	2.86	13793	966	TSGA10	CDS,Exon,5'UTR
chr2	99786012	99787892	-	Serum_circ_0618	4.29	1880	264	MITD1	CDS,Exon
chr2	99802639	99804720	+	Serum_circ_0619	4.29	2081	159	MRPL30	CDS,Exon,5'UTR
chr2	101874252	101879153	+	Serum_circ_0620	2.14	4901	318	CNOT11	CDS,Exon
chr2	102988412	102998142	+	Serum_circ_0621	1.43	9730	443	IL18R1	CDS,Exon,5'UTR
chr2	106739425	106782539	-	Serum_circ_0622	1.43	43114	1421	UXS1	CDS,Exon
chr2	107446521	107450602	-	Serum_circ_0623	2.86	4081	375	ST6GAL2	CDS,Exon
chr2	109405307	109432561	+	Serum_circ_0624	2.14	27254	1055	CCDC138	CDS,Exon
chr2	109945679	109964405	+	Serum_circ_0625	1.43	18726	276	SH3RF3	CDS,Exon
chr2	113057425	113057606	+	Serum_circ_0626	5.72	181	181	ZC3H6	CDS,Exon
chr2	120677644	120692534	+	Serum_circ_0627	1.43	14890	527	PTPN4	CDS,Exon
chr2	122104613	122120876	-	Serum_circ_0628	2.86	16263	453	CLASP1	CDS,Exon
chr2	122215262	122216551	-	Serum_circ_0629	3.57	1289	207	CLASP1	CDS,Exon
chr2	128520635	128528578	-	Serum_circ_0630	2.14	7943	747	WDR33	CDS,Exon,5'UTR
chr2	128757314	128758028	-	Serum_circ_0631	5.00	714	344	SAP130	CDS,Exon
chr2	128855002	128867320	+	Serum_circ_0632	1.43	12318	463	UGGT1	CDS,Exon,5'UTR
chr2	128910357	128922399	+	Serum_circ_0633	3.57	12042	905	UGGT1	CDS,Exon,5'UTR
chr2	133013091	133013258	-	Serum_circ_0634	2.14	167	NA	ANKRD30BL	Intron
chr2	135075099	135076310	+	Serum_circ_0635	2.86	1211	167	MGAT5	CDS,Exon
chr2	136505836	136519481	+	Serum_circ_0636	3.57	13645	520	UBXN4	CDS,Exon
chr2	144966169	144969146	-	Serum_circ_0637	9.29	2977	267	GTDC1	CDS,Exon,5'UTR
chr2	144966169	144993304	-	Serum_circ_0638	5.72	27135	412	GTDC1	CDS,Exon,5'UTR
chr2	148653869	148657467	+	Serum_circ_0639	15.01	3598	618	ACVR2A	CDS,Exon,5'UTR
chr2	148730307	148733544	-	Serum_circ_0640	7.15	3237	242	ORC4	CDS,Exon,5'UTR
chr2	148730307	148739650	-	Serum_circ_0641	8.58	9343	396	ORC4	CDS,Exon,5'UTR
chr2	150325158	150342859	+	Serum_circ_0642	3.57	17701	NA	NA	Exon,CDS,3'UTR,Intergenic
chr2	159488264	159497271	+	Serum_circ_0643	2.86	9007	542	PKP4	CDS,Exon

chr2	159850218	159850347	-	Serum_circ_0644	5.00	129	NA	TANC1	Antisense
chr2	160585519	160609082	+	Serum_circ_0645	5.72	23563	1989	7-Mar	CDS,Exon,5'UTR
chr2	168869143	168873605	-	Serum_circ_0646	1.43	4462	122	STK39	CDS,Exon
chr2	168986050	168997268	-	Serum_circ_0647	6.43	11218	461	STK39	CDS,Exon
chr2	171867882	171906684	-	Serum_circ_0648	1.43	38802	684	TLK1	CDS,Exon
chr2	172305190	172325540	+	Serum_circ_0649	1.43	20350	660	DCAF17	CDS,Exon,5'UTR
chr2	172569276	172573035	+	Serum_circ_0650	2.14	3759	176	DYNC1I2	CDS,Exon
chr2	173426947	173429801	+	Serum_circ_0651	5.00	2854	413	PDK1	CDS,Exon,5'UTR
chr2	180036846	180041265	-	Serum_circ_0652	1.43	4419	205	SESTD1	CDS,Exon
chr2	183831943	183853914	-	Serum_circ_0653	5.72	21971	838	NCKAP1	CDS,Exon
chr2	190656515	190682906	+	Serum_circ_0654	1.43	26391	602	PMS1	CDS,Exon,5'UTR
chr2	198274493	198274731	-	Serum_circ_0655	2.14	238	238	SF3B1	CDS,Exon
chr2	201718625	201719809	-	Serum_circ_0656	1.43	1184	254	CLK1	CDS,Exon,3'UTR
chr2	201721404	201721708	-	Serum_circ_0657	15.73	304	225	CLK1	CDS,Exon,3'UTR
chr2	201750420	201752408	-	Serum_circ_0658	2.14	1988	148	PPIL3	CDS,Exon,5'UTR
chr2	202010100	202014558	+	Serum_circ_0659	17.87	4458	508	CFLAR	CDS,Exon,5'UTR
chr2	202195192	202195556	-	Serum_circ_0660	3.57	364	151	ALS2CR12	CDS,Exon,3'UTR
chr2	202589017	202590177	-	Serum_circ_0661	2.14	1160	264	ALS2	CDS,Exon
chr2	203329531	203332412	+	Serum_circ_0662	12.15	2881	342	BMPR2	CDS,Exon
chr2	203817281	203820481	+	Serum_circ_0663	3.57	3200	336	CARF	CDS,Exon
chr2	204110568	204111644	+	Serum_circ_0664	2.86	1076	217	CYP20A1	CDS,Exon
chr2	209209834	209212747	+	Serum_circ_0665	4.29	2913	347	PIKFYVE	CDS,Exon
chr2	211018218	211019335	-	Serum_circ_0666	1.43	1117	1117	KANSL1L	CDS,Exon,5'UTR
chr2	219114086	219114644	+	Serum_circ_0667	4.29	558	202	ARPC2	CDS,Exon
chr2	219445283	219445463	+	Serum_circ_0668	5.72	180	180	RQCD1	CDS,Exon,5'UTR
chr2	220011401	220012517	-	Serum_circ_0669	2.14	1116	198	NHEJ1	CDS,Exon
chr2	227729319	227732034	+	Serum_circ_0670	7.15	2715	656	RHBDD1	CDS,Exon,5'UTR
chr2	227771508	227779067	+	Serum_circ_0671	1.43	7559	290	RHBDD1	CDS,Exon
chr2	228356262	228389631	+	Serum_circ_0672	2.86	33369	527	AGFG1	CDS,Exon
chr2	230678585	230680024	-	Serum_circ_0673	1.43	1439	387	TRIP12	CDS,Exon
chr2	239090705	239092754	-	Serum_circ_0674	2.14	2049	304	ILKAP	CDS,Exon
chr2	239093650	239093928	-	Serum_circ_0675	2.14	278	107	ILKAP	CDS,Exon
chr2	240929490	240946787	-	Serum_circ_0676	2.86	17297	250	NDUFA10	CDS,Exon
chr2	240929490	240954277	-	Serum_circ_0677	3.57	24787	452	NDUFA10	CDS,Exon
chr20	1764710	1764874	+	Serum_circ_0678	7.15	164	NA	NA	Intergenic
chr20	2866935	2869447	+	Serum_circ_0679	1.43	2512	NA	PTPRA	Intron
chr20	2944917	2945848	+	Serum_circ_0680	14.30	931	421	PTPRA	CDS,Exon,5'UTR
chr20	3542922	3556595	+	Serum_circ_0681	2.14	13673	767	ATRN	CDS,Exon
chr20	5157293	5159602	+	Serum_circ_0682	2.86	2309	238	CDS2	CDS,Exon
chr20	5538590	5539465	-	Serum_circ_0683	2.14	875	297	GPCPD1	CDS,Exon
chr20	5585009	5585976	-	Serum_circ_0684	5.72	967	77	GPCPD1	CDS,Exon,5'UTR
chr20	25666202	25667102	-	Serum_circ_0685	4.29	900	299	ZNF337	CDS,Exon,5'UTR
chr20	30954186	30956926	+	Serum_circ_0686	10.72	2740	195	ASXL1	CDS,Exon
chr20	31954664	31958435	-	Serum_circ_0687	2.14	3771	428	CDK5RAP1	CDS,Exon
chr20	33057852	33069011	+	Serum_circ_0688	5.00	11159	669	ITCH	CDS,Exon
chr20	34389412	34446303	+	Serum_circ_0689	1.43	56891	452	PHF20	CDS,Exon,5'UTR
chr20	34487291	34487570	+	Serum_circ_0690	3.57	279	279	PHF20	CDS,Exon
chr20	35695126	35696589	-	Serum_circ_0691	2.86	1463	556	RBL1	CDS,Exon
chr20	35835675	35838568	+	Serum_circ_0692	4.29	2893	296	RPN2	CDS,Exon
chr20	37159809	37161502	+	Serum_circ_0693	4.29	1693	195	RALGAPB	CDS,Exon

chr20	37620096	37623523	+	Serum_circ_0694	2.86	3427	192	DHX35	CDS,Exon,5'UTR
chr20	40161688	40179999	-	Serum_circ_0695	5.72	18311	577	CHD6	CDS,Exon,5'UTR
chr20	44477088	44477314	-	Serum_circ_0696	3.57	226	226	ACOT8	CDS,Exon
chr20	45121320	45125591	-	Serum_circ_0697	3.57	4271	NA	NA	Intergenic
chr20	45855945	45865260	-	Serum_circ_0698	7.15	9315	351	ZMYND8	CDS,Exon
chr20	45874751	45875261	-	Serum_circ_0699	5.00	510	510	ZMYND8	CDS,Exon
chr20	45874751	45891172	-	Serum_circ_0700	2.86	16421	804	ZMYND8	CDS,Exon
chr20	45891031	45905539	-	Serum_circ_0701	2.14	14508	623	ZMYND8	CDS,Exon
chr20	45920539	45923523	-	Serum_circ_0702	6.43	2984	207	ZMYND8	CDS,Exon,5'UTR
chr20	47722345	47722534	-	Serum_circ_0703	2.86	189	NA	NA	Intergenic
chr20	47752369	47770608	-	Serum_circ_0704	1.43	18239	404	STAU1	CDS,Exon,5'UTR
chr20	49232538	49236669	-	Serum_circ_0705	1.43	4131	226	FAM65C	CDS,Exon,3'UTR
chr20	55091990	55093353	+	Serum_circ_0706	1.43	1363	NA	GCNT7	Antisense
chr20	55551197	55551322	+	Serum_circ_0707	5.72	125	NA	NA	Intergenic
chr20	57014000	57016139	+	Serum_circ_0708	15.73	2139	258	VAPB	CDS,Exon,5'UTR
chr20	58426622	58436553	+	Serum_circ_0709	1.43	9931	NA	NA	Intergenic
chr20	58755107	58755971	+	Serum_circ_0710	1.43	864	NA	MIR646HG	LncRNA
chr20	60265057	60265203	+	Serum_circ_0711	2.86	146	NA	CDH4 TCONS_00029 068	Intron
chr21	9827146	9827287	-	Serum_circ_0712	2.14	141	NA	CDH4 TCONS_00029 068	LncRNA
chr21	9827155	9827307	-	Serum_circ_0713	4.29	152	NA	CDH4 TCONS_00029 068	LncRNA
chr21	16363521	16415895	-	Serum_circ_0714	12.87	52374	203	NRIP1	Exon,5'UTR
chr21	16386664	16387546	-	Serum_circ_0715	1.43	882	123	NRIP1	Exon,5'UTR
chr21	16386664	16415895	-	Serum_circ_0716	65.05	29231	203	NRIP1	Exon,5'UTR
chr21	17135209	17138460	+	Serum_circ_0717	1.43	3251	223	USP25	CDS,Exon
chr21	17196357	17198684	+	Serum_circ_0718	2.14	2327	386	USP25	CDS,Exon
chr21	30358459	30359255	-	Serum_circ_0719	1.43	796	303	LTN1	CDS,Exon
chr21	30701807	30702014	+	Serum_circ_0720	2.86	207	207	BACH1	CDS,Exon,5'UTR
chr21	34066537	34067592	-	Serum_circ_0721	2.14	1055	310	SYNJ1	CDS,Exon
chr21	36206706	36231875	-	Serum_circ_0722	11.44	25169	297	RUNX1	CDS,Exon
chr21	37619814	37623582	+	Serum_circ_0723	1.43	3768	424	DOPEY2	CDS,Exon
chr21	37711076	37717005	+	Serum_circ_0724	10.01	5929	277	MORC3	CDS,Exon
chr21	37711148	37717329	+	Serum_circ_0725	2.14	6181	397	MORC3	CDS,Exon
chr21	37734480	37736557	+	Serum_circ_0726	4.29	2077	213	MORC3	CDS,Exon
chr21	38792600	38794168	+	Serum_circ_0727	12.87	1568	171	DYRK1A	CDS,Exon,5'UTR
chr21	38792600	38798083	+	Serum_circ_0728	2.86	5483	171	DYRK1A	CDS,Exon,5'UTR
chr21	38792600	38845182	+	Serum_circ_0729	3.57	52582	368	DYRK1A	CDS,Exon,5'UTR
chr21	40578033	40584633	-	Serum_circ_0730	2.86	6600	506	BRWD1	CDS,Exon
chr21	40587162	40590586	-	Serum_circ_0731	1.43	3424	403	BRWD1 TCONS_00029 027	CDS,Exon
chr21	43195267	43195400	+	Serum_circ_0732	4.29	133	NA	BRWD1 TCONS_00029 027	LncRNA
chr21	45497573	45500008	+	Serum_circ_0733	2.14	2435	346	TRAPPC10	CDS,Exon
chr21	47768925	47769734	+	Serum_circ_0734	5.00	809	312	PCNT	CDS,Exon
chr22	19712122	19712233	+	Serum_circ_0735	2.14	111	111	GP1BB	Exon,3'UTR
chr22	21288066	21288532	+	Serum_circ_0736	5.00	466	466	CRKL	CDS,Exon
chr22	24133942	24159123	+	Serum_circ_0737	4.29	25181	814	SMARCB1	CDS,Exon
chr22	26057542	26063767	+	Serum_circ_0738	6.43	6225	239	ADRBK2	CDS,Exon
chr22	26059596	26063767	+	Serum_circ_0739	1.43	4171	137	ADRBK2	CDS,Exon
chr22	28943661	28946139	-	Serum_circ_0740	2.86	2478	NA	TTC28	Intron
chr22	35957769	35957878	+	Serum_circ_0741	2.86	109	NA	NA	Intergenic
chr22	41349558	41363888	+	Serum_circ_0742	2.86	14330	236	RBX1	CDS,Exon
chr22	41531816	41536261	+	Serum_circ_0743	1.43	4445	350	EP300	CDS,Exon

chr22	42204878	42206295	+	Serum_circ_0744	1.43	1417	326	CCDC134	CDS,Exon,5'UTR
chr22	42294652	42296502	+	Serum_circ_0745	2.86	1850	722	SREBF2	CDS,Exon,5'UTR
chr22	46125304	46136418	+	Serum_circ_0746	2.86	11114	445	ATXN10	CDS,Exon
chr22	47115982	47116912	-	Serum_circ_0747	4.29	930	237	CERK	CDS,Exon
chr22	47370185	47374830	+	Serum_circ_0748	2.86	4645	110	TBC1D22A	CDS,Exon
chr22	47370185	47393605	+	Serum_circ_0749	1.43	23420	186	TBC1D22A	CDS,Exon,5'UTR
chr22	50810448	50832564	+	Serum_circ_0750	2.14	22116	374	PPP6R2	CDS,Exon,5'UTR
chr3	9495422	9506356	+	Serum_circ_0751	1.43	10934	378	SETD5	CDS,Exon
chr3	15071781	15076316	+	Serum_circ_0752	1.43	4535	440	NR2C2	CDS,Exon
chr3	20178433	20181856	+	Serum_circ_0753	2.86	3423	255	KAT2B	CDS,Exon
chr3	27490141	27493989	-	Serum_circ_0754	1.43	3848	229	SLC4A7	CDS,Exon
chr3	31617887	31621588	+	Serum_circ_0755	1.43	3701	397	STT3B	CDS,Exon
chr3	31617887	31641951	+	Serum_circ_0756	5.72	24064	563	STT3B	CDS,Exon
chr3	32745359	32758729	+	Serum_circ_0757	2.86	13370	722	CNOT10	CDS,Exon,5'UTR
chr3	33944989	33945160	+	Serum_circ_0758	1.43	171	NA	NA	Intergenic
chr3	37170553	37190529	-	Serum_circ_0759	1.43	19976	232	LRRFIP2	CDS,Exon,5'UTR
chr3	37315026	37323763	+	Serum_circ_0760	5.00	8737	381	GOLGA4	CDS,Exon
chr3	41860914	41877463	-	Serum_circ_0761	2.14	16549	192	ULK4	CDS,Exon
chr3	47139444	47147610	-	Serum_circ_0762	4.29	8166	427	SETD2	CDS,Exon
chr3	47466974	47470160	-	Serum_circ_0763	1.43	3186	785	SCAP	CDS,Exon
chr3	49372452	49373029	-	Serum_circ_0764	11.44	577	128	USP4	CDS,Exon
chr3	50142509	50143142	+	Serum_circ_0765	2.86	633	227	RBM5	CDS,Exon,5'UTR
chr3	50145502	50145737	+	Serum_circ_0766	10.72	235	151	RBM5	CDS,Exon,5'UTR
chr3	52446826	52448603	+	Serum_circ_0767	10.72	1777	255	PHF7	CDS,Exon,5'UTR
chr3	52771601	52775515	-	Serum_circ_0768	5.72	3914	429	NEK4	CDS,Exon
chr3	55640807	55733540	-	Serum_circ_0769	1.43	92733	2456	ERC2	CDS,Exon,3'UTR
chr3	56599665	56601081	+	Serum_circ_0770	2.86	1416	417	CCDC66	CDS,Exon,5'UTR
chr3	56600621	56601081	+	Serum_circ_0771	6.43	460	417	CCDC66	CDS,Exon,5'UTR
chr3	56626997	56628056	+	Serum_circ_0772	2.86	1059	468	CCDC66	CDS,Exon,5'UTR
chr3	56703727	56705720	-	Serum_circ_0773	2.14	1993	258	FAM208A	CDS,Exon
chr3	57276883	57282379	+	Serum_circ_0774	2.14	5496	448	APPL1	CDS,Exon
chr3	66293626	66313803	+	Serum_circ_0775	2.86	20177	263	SLC25A26	CDS,Exon,5'UTR
chr3	69265413	69273841	-	Serum_circ_0776	10.01	8428	295	FRMD4B	CDS,Exon
chr3	71026091	71027180	-	Serum_circ_0777	1.43	1089	461	FOXP1	CDS,Exon
chr3	71056966	71057157	-	Serum_circ_0778	3.57	191	NA	FOXP1	Intron
chr3	71090478	71102924	-	Serum_circ_0779	3.57	12446	587	FOXP1	CDS,Exon,5'UTR
chr3	71739160	71759635	-	Serum_circ_0780	1.43	20475	452	EIF4E3	CDS,Exon,5'UTR
chr3	107429298	107435696	+	Serum_circ_0781	1.43	6398	414	BBX	CDS,Exon,5'UTR
chr3	108773574	108780905	-	Serum_circ_0782	2.14	7331	435	MORC1	CDS,Exon
chr3	108773574	108788604	-	Serum_circ_0783	4.29	15030	641	MORC1	CDS,Exon
chr3	119582265	119595355	-	Serum_circ_0784	1.43	13090	322	GSK3B	CDS,Exon
chr3	119582265	119624699	-	Serum_circ_0785	1.43	42434	420	GSK3B	CDS,Exon
chr3	120351993	120357428	-	Serum_circ_0786	3.57	5435	309	HGD	CDS,Exon
chr3	122892840	122892964	+	Serum_circ_0787	2.14	124	NA	NA	Intergenic
chr3	128514202	128516912	+	Serum_circ_0788	8.58	2710	188	RAB7A	CDS,Exon,5'UTR
chr3	128973510	128973920	+	Serum_circ_0789	2.14	410	169	COPG1	CDS,Exon
chr3	130711794	130720158	+	Serum_circ_0790	3.57	8364	885	ATP2C1	CDS,Exon
chr3	132211230	132215507	+	Serum_circ_0791	2.14	4277	533	DNAJC13	CDS,Exon
chr3	136323150	136349823	-	Serum_circ_0792	2.14	26673	380	STAG1	CDS,Exon,5'UTR
chr3	138289159	138291774	-	Serum_circ_0793	2.86	2615	526	CEP70	CDS,Exon,5'UTR

chr3	138400808	138403645	-	Serum_circ_0794	1.43	2837	368	PIK3CB	CDS,Exon
chr3	142074242	142090170	-	Serum_circ_0795	1.43	15928	790	XRN1	CDS,Exon
chr3	143513842	143551063	-	Serum_circ_0796	5.00	37221	358	SLC9A9	CDS,Exon
chr3	150834124	150840761	+	Serum_circ_0797	1.43	6637	297	MED12L	CDS,Exon
chr3	150834124	150845771	+	Serum_circ_0798	2.14	11647	457	MED12L	CDS,Exon
chr3	155493489	155520380	-	Serum_circ_0799	1.43	26891	208	C3orf33	CDS,Exon,5'UTR
chr3	157839891	157841780	+	Serum_circ_0800	12.87	1889	322	RSRC1	CDS,Exon,5'UTR
chr3	157989571	157989993	+	Serum_circ_0801	5.00	422	NA	RSRC1	Intron
chr3	169840378	169843795	-	Serum_circ_0802	2.14	3417	154	PHC3	CDS,Exon
chr3	169840378	169854453	-	Serum_circ_0803	2.86	14075	1270	PHC3	CDS,Exon
chr3	169854206	169863309	-	Serum_circ_0804	1.43	9103	346	PHC3	CDS,Exon
chr3	169854206	169867032	-	Serum_circ_0805	12.15	12826	505	PHC3	CDS,Exon
chr3	169863210	169867032	-	Serum_circ_0806	5.72	3822	258	PHC3	CDS,Exon
chr3	170855979	170858298	-	Serum_circ_0807	5.72	2319	387	TNIK	CDS,Exon
chr3	171965322	171969331	+	Serum_circ_0808	22.16	4009	526	FNDC3B	CDS,Exon
chr3	179131199	179137293	-	Serum_circ_0809	1.43	6094	603	GNB4	CDS,Exon
chr3	182751778	182755222	-	Serum_circ_0810	2.14	3444	304	MCCC1	CDS,Exon
chr3	182788786	182789145	-	Serum_circ_0811	5.00	359	270	MCCC1	CDS,Exon
chr3	183097084	183107567	-	Serum_circ_0812	2.14	10483	199	MCF2L2	CDS,Exon
chr3	185251358	185252920	-	Serum_circ_0813	3.57	1562	477	LIPH	CDS,Exon
chr3	185318552	185331196	+	Serum_circ_0814	1.43	12644	575	SEN2	CDS,Exon
chr3	185638891	185639914	-	Serum_circ_0815	2.14	1023	200	TRA2B	CDS,Exon
chr3	194169185	194175121	-	Serum_circ_0816	1.43	5936	520	ATP13A3	CDS,Exon
chr3	195063199	195066046	-	Serum_circ_0817	2.14	2847	243	ACAP2	CDS,Exon
chr3	195968818	195969511	-	Serum_circ_0818	7.15	693	222	PCYT1A	CDS,Exon
chr3	195968818	195975194	-	Serum_circ_0819	2.14	6376	491	PCYT1A	CDS,Exon
chr3	196118683	196120490	-	Serum_circ_0820	4.29	1807	179	UBXN7	CDS,Exon
chr3	196118683	196129890	-	Serum_circ_0821	20.01	11207	247	UBXN7	CDS,Exon
chr3	196118683	196134264	-	Serum_circ_0822	2.14	15581	395	UBXN7	CDS,Exon
chr3	197541778	197547301	+	Serum_circ_0823	8.58	5523	378	LRCH3	CDS,Exon
chr3	197597030	197602646	+	Serum_circ_0824	9.29	5616	NA	NA	Exon,CDS,Intron
chr4	2338411	2338708	+	Serum_circ_0825	11.44	297	NA	ZFYVE28	Antisense
chr4	3005957	3009555	+	Serum_circ_0826	2.14	3598	197	GRK4	CDS,Exon
chr4	6843793	6860233	+	Serum_circ_0827	1.43	16440	287	KIAA0232	CDS,Exon
chr4	6995910	7002978	+	Serum_circ_0828	3.57	7068	427	TBC1D14	CDS,Exon,5'UTR
chr4	9828043	9836632	-	Serum_circ_0829	3.57	8589	128	SLC2A9	CDS,Exon
chr4	26387974	26407892	+	Serum_circ_0830	2.86	19918	135	RBPJ	CDS,Exon
chr4	37633006	37640126	-	Serum_circ_0831	1.43	7120	434	RELL1	CDS,Exon,3'UTR
chr4	38091552	38104778	+	Serum_circ_0832	2.14	13226	507	TBC1D1	CDS,Exon
chr4	39328182	39329376	-	Serum_circ_0833	10.01	1194	311	RFC1	CDS,Exon
chr4	39739039	39779430	+	Serum_circ_0834	3.57	40391	465	UBE2K	CDS,Exon
chr4	42466706	42467093	-	Serum_circ_0835	4.29	387	295	ATP8A1	CDS,Exon
chr4	42505466	42517127	-	Serum_circ_0836	3.57	11661	204	ATP8A1	CDS,Exon
chr4	42618049	42629126	-	Serum_circ_0837	6.43	11077	360	ATP8A1	CDS,Exon
chr4	48158696	48200275	-	Serum_circ_0838	1.43	41579	654	TEC	CDS,Exon
chr4	48371865	48385801	+	Serum_circ_0839	5.72	13936	971	SLAIN2	CDS,Exon
chr4	52729602	52752804	+	Serum_circ_0840	2.14	23202	389	DCUN1D4	CDS,Exon,5'UTR
chr4	54011499	54011749	-	Serum_circ_0841	1.43	250	250	SCFD2	CDS,Exon
chr4	54265896	54294350	+	Serum_circ_0842	1.43	28454	469	FIP1L1	CDS,Exon
chr4	54280781	54294350	+	Serum_circ_0843	12.87	13569	359	FIP1L1	CDS,Exon

chr4	54292038	54294350	+	Serum_circ_0844	7.86	2312	251	FIP1L1	CDS,Exon
chr4	56265252	56290810	+	Serum_circ_0845	1.43	25558	794	TMEM165	CDS,Exon,5'UTR
chr4	56277780	56284152	+	Serum_circ_0846	10.72	6372	585	TMEM165	CDS,Exon,5'UTR
chr4	57150974	57164515	+	Serum_circ_0847	2.14	13541	136	KIAA1211	CDS,Exon,5'UTR
chr4	73950965	73958017	-	Serum_circ_0848	2.86	7052	1832	ANKRD17	CDS,Exon
chr4	76711302	76711950	+	Serum_circ_0849	3.57	648	244	USO1	CDS,Exon
chr4	79747190	79772210	+	Serum_circ_0850	1.43	25020	705	BMP2K	CDS,Exon
chr4	83799882	83803090	-	Serum_circ_0851	5.00	3208	403	SEC31A	CDS,Exon,5'UTR
chr4	83867410	83900159	-	Serum_circ_0852	1.43	32749	623	LIN54	CDS,Exon,3'UTR
chr4	83966778	83971137	+	Serum_circ_0853	2.14	4359	336	COPS4	CDS,Exon
chr4	87967317	87968746	+	Serum_circ_0854	2.86	1429	1021	AFF1	CDS,Exon
chr4	88116475	88116842	-	Serum_circ_0855	23.59	367	367	KLHL8	CDS,Exon,5'UTR
chr4	90856599	90856956	+	Serum_circ_0856	2.14	357	357	MMRN1	CDS,Exon
chr4	95155104	95162157	+	Serum_circ_0857	2.86	7053	337	SMARCAD1	CDS,Exon,5'UTR
chr4	95405145	95445026	+	Serum_circ_0858	2.14	39881	152	PDLIM5	CDS,Exon,5'UTR
chr4	96113327	96113433	-	Serum_circ_0859	2.14	106	NA	UNC5C	Intron
chr4	103432036	103459113	+	Serum_circ_0860	2.86	27077	303	NFKB1	CDS,Exon,5'UTR
chr4	105439733	105440611	-	Serum_circ_0861	5.00	878	NA	NA	Intergenic
chr4	106317405	106359193	-	Serum_circ_0862	4.29	41788	428	PPA2	CDS,Exon
chr4	107114765	107133992	-	Serum_circ_0863	1.43	19227	285	TBCK	CDS,Exon
chr4	110384056	110384800	+	Serum_circ_0864	1.43	744	744	SEC24B	CDS,Exon
chr4	110862101	110866431	+	Serum_circ_0865	7.15	4330	813	EGF	CDS,Exon
chr4	110866228	110866431	+	Serum_circ_0866	3.57	203	203	EGF	CDS,Exon
chr4	110914402	110921002	+	Serum_circ_0867	2.86	6600	439	EGF	CDS,Exon
chr4	119026172	119064839	+	Serum_circ_0868	8.58	38667	558	NDST3	CDS,Exon
chr4	120440199	120481518	-	Serum_circ_0869	8.58	41319	869	PDE5A	CDS,Exon
chr4	120473704	120488299	-	Serum_circ_0870	1.43	14595	565	PDE5A	CDS,Exon
chr4	123107190	123111234	+	Serum_circ_0871	1.43	4044	543	KIAA1109	CDS,Exon
chr4	125422050	125464865	-	Serum_circ_0872	2.14	42815	NA	TCONS_00007433	LncRNA
chr4	128851837	128863313	-	Serum_circ_0873	2.14	11476	559	MFSD8	CDS,Exon
chr4	129857809	129880932	-	Serum_circ_0874	4.29	23123	960	SCLT1	CDS,Exon
chr4	129913321	129925031	-	Serum_circ_0875	21.44	11710	396	SCLT1	CDS,Exon
chr4	140037802	140060651	-	Serum_circ_0876	2.86	22849	NA	NA	Exon,CDS,5'UTR,Intron
chr4	140058783	140060651	-	Serum_circ_0877	4.29	1868	323	ELF2	CDS,Exon,5'UTR
chr4	140810510	140812121	-	Serum_circ_0878	1.43	1611	1599	MAML3	CDS,Exon
chr4	143181644	143191927	-	Serum_circ_0879	2.86	10283	185	INPP4B	CDS,Exon
chr4	144464661	144465125	+	Serum_circ_0880	94.35	464	269	SMARCA5	CDS,Exon
chr4	148743877	148744108	+	Serum_circ_0881	2.14	231	158	ARHGAP10	CDS,Exon
chr4	148775826	148800489	+	Serum_circ_0882	2.86	24663	555	ARHGAP10	CDS,Exon
chr4	148775826	148803083	+	Serum_circ_0883	4.29	27257	650	ARHGAP10	CDS,Exon
chr4	148778703	148803083	+	Serum_circ_0884	1.43	24380	650	ARHGAP10	CDS,Exon
chr4	148785996	148803083	+	Serum_circ_0885	2.86	17087	548	ARHGAP10	CDS,Exon
chr4	148860975	148887990	+	Serum_circ_0886	2.14	27015	488	ARHGAP10	CDS,Exon
chr4	151023629	151023964	+	Serum_circ_0887	7.86	335	335	DCLK2	CDS,Exon,5'UTR
chr4	151656409	151729550	-	Serum_circ_0888	1.43	73141	449	LRBA	CDS,Exon
chr4	151682934	151729550	-	Serum_circ_0889	4.29	46616	340	LRBA	CDS,Exon
chr4	151727422	151738409	-	Serum_circ_0890	4.29	10987	347	LRBA	CDS,Exon
chr4	153332454	153333681	-	Serum_circ_0891	1.43	1227	620	FBXW7	CDS,Exon,5'UTR
chr4	154547298	154553990	+	Serum_circ_0892	4.29	6692	283	KIAA0922	CDS,Exon
chr4	156696119	156698794	+	Serum_circ_0893	12.87	2675	220	GUCY1B3	CDS,Exon

chr4	160159960	160162520	+	Serum_circ_0894	3.57	2560	NA	NA	Intergenic
chr4	170398274	170400685	-	Serum_circ_0895	7.15	2411	427	NEK1	CDS,Exon
chr4	170458959	170477246	-	Serum_circ_0896	2.14	18287	399	NEK1	CDS,Exon
chr4	170523158	170523829	-	Serum_circ_0897	2.14	671	262	NEK1	CDS,Exon,5'UTR
chr4	177632652	177650900	-	Serum_circ_0898	1.43	18248	557	VEGFC	CDS,Exon
chr4	178274461	178274882	+	Serum_circ_0899	5.00	421	421	NEIL3	CDS,Exon
chr5	6623326	6625782	-	Serum_circ_0900	4.29	2456	178	NSUN2	CDS,Exon,3'UTR
chr5	31175280	31192193	-	Serum_circ_0901	3.57	16913	NA	NA	Intergenic
chr5	32248107	32248984	-	Serum_circ_0902	1.43	877	232	MTMR12	CDS,Exon
chr5	37238958	37239971	-	Serum_circ_0903	3.57	1013	261	C5orf42	CDS,Exon
chr5	38971978	38978752	-	Serum_circ_0904	6.43	6774	285	RICTOR	CDS,Exon,5'UTR
chr5	38991050	39003724	-	Serum_circ_0905	7.15	12674	388	RICTOR	CDS,Exon,5'UTR
chr5	42277838	42277977	-	Serum_circ_0906	2.14	139	NA	NA	Intergenic
chr5	43675612	43677908	+	Serum_circ_0907	9.29	2296	242	NNT	CDS,Exon
chr5	43675612	43704502	+	Serum_circ_0908	6.43	28890	477	NNT	CDS,Exon
chr5	54941616	54960691	-	Serum_circ_0909	2.86	19075	641	SLC38A9	CDS,Exon,3'UTR
chr5	56160560	56161804	+	Serum_circ_0910	6.43	1244	467	MAP3K1	CDS,Exon
chr5	61669513	61677080	+	Serum_circ_0911	1.43	7567	389	KIF2A	CDS,Exon
chr5	61689781	61690434	-	Serum_circ_0912	2.14	653	217	DIMT1	CDS,Exon
chr5	65271814	65290692	+	Serum_circ_0913	2.14	18878	364	ERBB2IP	CDS,Exon,5'UTR
chr5	65284462	65290692	+	Serum_circ_0914	3.57	6230	364	ERBB2IP	CDS,Exon,5'UTR
chr5	65381274	65384991	+	Serum_circ_0915	2.14	3717	NA	NA	Intergenic
chr5	68470703	68471364	+	Serum_circ_0916	4.29	661	378	CCNB1	CDS,Exon
chr5	70757643	70759944	+	Serum_circ_0917	2.14	2301	170	BDP1	CDS,Exon
chr5	72370568	72373320	+	Serum_circ_0918	7.15	2752	268	FCHO2	CDS,Exon
chr5	74842834	74848416	+	Serum_circ_0919	4.29	5582	268	POLK	CDS,Exon,5'UTR
chr5	75757394	75758139	+	Serum_circ_0920	5.72	745	100	IQGAP2	CDS,Exon
chr5	75866404	75871594	+	Serum_circ_0921	1.43	5190	155	IQGAP2	CDS,Exon
chr5	78952780	78964851	+	Serum_circ_0922	1.43	12071	181	PAPD4	CDS,Exon
chr5	86578185	86595665	+	Serum_circ_0923	2.14	17480	NA	RASA1	Intron
chr5	86679529	86682720	+	Serum_circ_0924	2.86	3191	235	RASA1	CDS,Exon
chr5	88100414	88119747	-	Serum_circ_0925	2.86	19333	593	MEF2C	CDS,Exon,5'UTR
chr5	94872520	94886354	-	Serum_circ_0926	7.15	13834	978	TTC37	CDS,Exon,5'UTR
chr5	95091099	95099324	+	Serum_circ_0927	20.73	8225	479	RHOBTB3	CDS,Exon
chr5	109049220	109051965	+	Serum_circ_0928	2.86	2745	400	MAN2A1	CDS,Exon
chr5	109049220	109065214	+	Serum_circ_0929	2.14	15994	572	MAN2A1	CDS,Exon
chr5	109117096	109125228	+	Serum_circ_0930	2.86	8132	569	MAN2A1	CDS,Exon
chr5	112868575	112871495	+	Serum_circ_0931	2.86	2920	427	YTHDC2	CDS,Exon
chr5	122137563	122139308	+	Serum_circ_0932	3.57	1745	253	SNX2	CDS,Exon
chr5	122272428	122281854	+	Serum_circ_0933	2.86	9426	189	SNX24	CDS,Exon
chr5	122881110	122893258	+	Serum_circ_0934	12.87	12148	536	CSNK1G3	CDS,Exon,5'UTR
chr5	131013395	131044965	-	Serum_circ_0935	6.43	31570	813	FNIP1	CDS,Exon
chr5	133871547	133887899	+	Serum_circ_0936	2.86	16352	311	JADE2	CDS,Exon
chr5	137320945	137324004	-	Serum_circ_0937	15.01	3059	331	FAM13B	CDS,Exon
chr5	139819703	139828890	+	Serum_circ_0938	2.86	9187	625	ANKHD1	CDS,Exon
chr5	140960310	140963182	-	Serum_circ_0939	1.43	2872	422	DIAPH1	CDS,Exon
chr5	144817634	144869887	-	Serum_circ_0940	4.29	52253	NA	NA	Intergenic
chr5	144832476	144852878	-	Serum_circ_0941	1.43	20402	NA	TCONS_00009797	LncRNA
chr5	150102468	150110718	-	Serum_circ_0942	1.43	8250	297	DCTN4	CDS,Exon
chr5	153409048	153414527	-	Serum_circ_0943	6.43	5479	509	FAM114A2	CDS,Exon,5'UTR

chr5	153413350	153414527	-	Serum_circ_0944	1.43	1177	417	FAM114A2	CDS,Exon,5'UTR
chr5	156721791	156727904	+	Serum_circ_0945	1.43	6113	362	CYFIP2	CDS,Exon
chr5	174919097	174919270	+	Serum_circ_0946	2.14	173	173	SFXN1	CDS,Exon,5'UTR
chr5	176370335	176385155	-	Serum_circ_0947	20.73	14820	397	UIMC1	CDS,Exon
chr5	176409469	176409624	-	Serum_circ_0948	4.29	155	155	UIMC1	CDS,Exon,5'UTR
chr5	176709465	176710929	+	Serum_circ_0949	4.29	1464	259	NSD1	CDS,Exon
chr5	179007947	179020646	+	Serum_circ_0950	1.43	12699	523	RUFY1	CDS,Exon
chr5	179132679	179133332	+	Serum_circ_0951	2.14	653	248	CANX	CDS,Exon,5'UTR
chr5	179195850	179198244	+	Serum_circ_0952	2.86	2394	337	MAML1	CDS,Exon
chr6	6362415	6438965	-	Serum_circ_0953	7.15	76550	566	LY86-AS1	Exon,3'UTR
chr6	10702601	10702872	+	Serum_circ_0954	2.14	271	196	PAK1IP1	CDS,Exon
chr6	13579682	13584457	+	Serum_circ_0955	6.43	4775	309	SIRT5	CDS,Exon,5'UTR
chr6	13632601	13644961	-	Serum_circ_0956	6.43	12360	1020	RANBP9	CDS,Exon
chr6	13639794	13644961	-	Serum_circ_0957	1.43	5167	598	RANBP9	CDS,Exon
chr6	13685360	13697128	-	Serum_circ_0958	2.14	11768	112	RANBP9	CDS,Exon
chr6	16245177	16254966	+	Serum_circ_0959	2.86	9789	378	GMPR	CDS,Exon
chr6	16586010	16658132	-	Serum_circ_0960	1.43	72122	254	ATXN1	Exon,5'UTR
chr6	17665469	17669777	-	Serum_circ_0961	4.29	4308	363	NUP153	CDS,Exon
chr6	17675135	17676001	-	Serum_circ_0962	7.86	866	518	NUP153	CDS,Exon
chr6	17773708	17777585	-	Serum_circ_0963	3.57	3877	232	KIF13A	CDS,Exon
chr6	20781375	20846409	+	Serum_circ_0964	5.00	65034	225	CDKAL1	CDS,Exon
chr6	29643162	29643836	-	Serum_circ_0965	10.72	674	229	ZFP57	CDS,Exon
chr6	36567597	36568053	+	Serum_circ_0966	2.14	456	456	SRSF3	Exon,5'UTR
chr6	37973713	38029551	+	Serum_circ_0967	1.43	55838	183	ZFAND3	CDS,Exon
chr6	41783820	41859613	-	Serum_circ_0968	2.14	75793	156	USP49	Exon,5'UTR
chr6	42571325	42574389	+	Serum_circ_0969	2.86	3064	333	UBR2	CDS,Exon
chr6	42650792	42652609	+	Serum_circ_0970	1.43	1817	135	UBR2	CDS,Exon
chr6	42902212	42903408	+	Serum_circ_0971	2.86	1196	221	CNPY3	CDS,Exon
chr6	47563596	47574013	+	Serum_circ_0972	1.43	10417	422	CD2AP	CDS,Exon
chr6	57046829	57048709	+	Serum_circ_0973	3.57	1880	110	BAG2	CDS,Exon
chr6	72002995	72006520	+	Serum_circ_0974	3.57	3525	458	OGFRL1	CDS,Exon
chr6	74345104	74346430	-	Serum_circ_0975	2.14	1326	206	SLC17A5	CDS,Exon
chr6	74432973	74446231	+	Serum_circ_0976	10.72	13258	386	CD109	CDS,Exon
chr6	76344422	76373234	+	Serum_circ_0977	11.44	28812	641	SENP6	CDS,Exon
chr6	76412360	76412788	+	Serum_circ_0978	4.29	428	428	SENP6	CDS,Exon
chr6	77969383	77983024	-	Serum_circ_0979	3.57	13641	NA	NA	Intergenic
chr6	79752559	79770535	-	Serum_circ_0980	2.86	17976	411	PHIP	CDS,Exon
chr6	82923943	82924546	-	Serum_circ_0981	2.14	603	603	IBTK	CDS,Exon
chr6	84627723	84634311	+	Serum_circ_0982	1.43	6588	369	CYB5R4	CDS,Exon
chr6	87920168	87928449	+	Serum_circ_0983	5.00	8281	370	ZNF292	CDS,Exon
chr6	87925620	87928449	+	Serum_circ_0984	5.72	2829	370	ZNF292	CDS,Exon
chr6	88255333	88273950	-	Serum_circ_0985	10.01	18617	425	RARS2	CDS,Exon
chr6	90052042	90053475	-	Serum_circ_0986	2.86	1433	206	UBE2J1	CDS,Exon
chr6	90461149	90463341	-	Serum_circ_0987	1.43	2192	263	MDN1	CDS,Exon
chr6	99860426	99864304	-	Serum_circ_0988	5.72	3878	388	PNISR	CDS,Exon,5'UTR
chr6	105280916	105291173	-	Serum_circ_0989	1.43	10257	208	HACE1	CDS,Exon,3'UTR
chr6	108243000	108250718	-	Serum_circ_0990	4.29	7718	328	SEC63	CDS,Exon
chr6	110428279	110448832	-	Serum_circ_0991	2.86	20553	568	WASF1	CDS,Exon,5'UTR
chr6	111208707	111211559	+	Serum_circ_0992	4.29	2852	317	AMD1	CDS,Exon,5'UTR
chr6	112075636	112075880	-	Serum_circ_0993	2.86	244	NA	FYN	Intron

chr6	127635960	127652175	-	Serum_circ_0994	2.86	16215	499	ECHDC1	CDS,Exon,5'UTR
chr6	129843621	129861687	-	Serum_circ_0995	2.86	18066	NA	NA	Intergenic
chr6	129932677	129939997	-	Serum_circ_0996	4.29	7320	336	ARHGAP18	CDS,Exon
chr6	131247744	131277639	-	Serum_circ_0997	2.14	29895	824	EPB41L2	CDS,Exon,5'UTR
chr6	131939546	131941036	-	Serum_circ_0998	2.14	1490	183	MED23	CDS,Exon
chr6	136990420	137019820	-	Serum_circ_0999	2.86	29400	754	MAP3K5	CDS,Exon
chr6	137015277	137019820	-	Serum_circ_1000	15.01	4543	641	MAP3K5	CDS,Exon
chr6	143158071	143228195	-	Serum_circ_1001	1.43	70124	113	HIVEP2	Exon,5'UTR
chr6	144858717	144860579	+	Serum_circ_1002	2.14	1862	286	UTRN	CDS,Exon
chr6	144858717	144864006	+	Serum_circ_1003	3.57	5289	362	UTRN	CDS,Exon
chr6	145148746	145157074	+	Serum_circ_1004	2.14	8328	291	UTRN	CDS,Exon
chr6	147527106	147560406	+	Serum_circ_1005	1.43	33300	281	STXBP5	CDS,Exon
chr6	147527106	147588303	+	Serum_circ_1006	2.86	61197	564	STXBP5	CDS,Exon
chr6	149663820	149668393	+	Serum_circ_1007	3.57	4573	149	TAB2	Exon,5'UTR
chr6	150092297	150094305	+	Serum_circ_1008	1.43	2008	137	PCMT1	CDS,Exon
chr6	155095122	155116273	+	Serum_circ_1009	5.00	21151	576	SCAF8	CDS,Exon
chr6	157150360	157222659	+	Serum_circ_1010	4.29	72299	384	ARID1B	CDS,Exon
chr6	157222509	157256710	+	Serum_circ_1011	2.86	34201	261	ARID1B	CDS,Exon
chr6	163876310	163899928	+	Serum_circ_1012	5.72	23618	260	QKI	CDS,Exon
chr6	170159933	170168267	+	Serum_circ_1013	1.43	8334	454	ERMARD	CDS,Exon
chr6	170626457	170639638	+	Serum_circ_1014	2.86	13181	2038	FAM120B	CDS,Exon,5'UTR
chr7	5680784	5681007	-	Serum_circ_1015	7.86	223	223	RNF216	CDS,Exon
chr7	5680784	5692141	-	Serum_circ_1016	12.15	11357	321	RNF216	CDS,Exon
chr7	5756453	5760803	-	Serum_circ_1017	2.14	4350	140	RNF216	CDS,Exon
chr7	6085701	6089676	-	Serum_circ_1018	2.86	3975	353	EIF2AK1	CDS,Exon
chr7	6624646	6624891	+	Serum_circ_1019	7.86	245	245	ZDHHC4	CDS,Exon
chr7	8093146	8110761	+	Serum_circ_1020	4.29	17615	481	GLCC1	CDS,Exon
chr7	12263851	12269445	+	Serum_circ_1021	2.86	5594	301	TMEM106B	CDS,Exon
chr7	16298014	16317851	-	Serum_circ_1022	2.86	19837	2315	ISPD	CDS,Exon,5'UTR
chr7	16298014	16348252	-	Serum_circ_1023	7.15	50238	2466	ISPD	CDS,Exon,5'UTR
chr7	17908029	17915413	-	Serum_circ_1024	3.57	7384	397	SNX13	CDS,Exon
chr7	23163395	23183644	+	Serum_circ_1025	4.29	20249	963	KLHL7	CDS,Exon,3'UTR
chr7	27668989	27672045	-	Serum_circ_1026	2.14	3056	122	HIBADH	CDS,Exon
chr7	30661008	30662078	+	Serum_circ_1027	3.57	1070	254	GARS	CDS,Exon
chr7	33644476	33646165	+	Serum_circ_1028	2.14	1689	NA	NA	Intergenic
chr7	35707043	35712888	-	Serum_circ_1029	10.01	5845	347	HERPUD2	CDS,Exon
chr7	35709824	35712888	-	Serum_circ_1030	3.57	3064	192	HERPUD2	CDS,Exon
chr7	37136223	37172839	-	Serum_circ_1031	1.43	36616	214	ELMO1	CDS,Exon
chr7	37896875	37916609	+	Serum_circ_1032	7.15	19734	796	NME8	CDS,Exon
chr7	40027197	40041630	+	Serum_circ_1033	4.29	14433	1142	CDK13	CDS,Exon
chr7	50795489	50800065	-	Serum_circ_1034	1.43	4576	82	GRB10	CDS,Exon,5'UTR
chr7	61969420	61971117	-	Serum_circ_1035	6.43	1697	NA	NA	Intergenic
chr7	65751497	65751696	+	Serum_circ_1036	7.15	199	199	TPST1	CDS,Exon
chr7	65897308	65904291	-	Serum_circ_1037	1.43	6983	NA	TCONS_I2_00026649	LncRNA
chr7	66458203	66459328	-	Serum_circ_1038	6.43	1125	331	SBDS	CDS,Exon
chr7	73100965	73101230	+	Serum_circ_1039	2.86	265	179	WBSCR22	CDS,Exon,5'UTR
chr7	73778584	73803589	+	Serum_circ_1040	1.43	25005	1401	CLIP2	CDS,Exon
chr7	76903010	76903969	+	Serum_circ_1041	4.29	959	267	CCDC146	CDS,Exon
chr7	77016676	77035422	-	Serum_circ_1042	2.14	18746	347	GSAP	CDS,Exon
chr7	77200394	77221573	+	Serum_circ_1043	3.57	21179	393	PTPN12	CDS,Exon,5'UTR

chr7	77210743	77212967	+	Serum_circ_1044	7.15	2224	173	PTPN12	CDS,Exon,5'UTR
chr7	77214859	77230123	+	Serum_circ_1045	6.43	15264	314	PTPN12	CDS,Exon,5'UTR
chr7	77265098	77268641	+	Serum_circ_1046	1.43	3543	207	PTPN12	CDS,Exon
chr7	79186836	79186967	+	Serum_circ_1047	3.57	131	NA	NA	Intergenic
chr7	87593948	87607727	+	Serum_circ_1048	1.43	13779	77	ADAM22	CDS,Exon
chr7	90355880	90377090	+	Serum_circ_1049	1.43	21210	341	CDK14	CDS,Exon,5'UTR
chr7	98564663	98565321	+	Serum_circ_1050	3.57	658	336	TRRAP	CDS,Exon
chr7	98985661	98985884	+	Serum_circ_1051	2.14	223	223	ARPC1B	CDS,Exon
chr7	100410368	100410830	-	Serum_circ_1052	5.00	462	362	EPHB4	CDS,Exon
chr7	101870646	101870949	+	Serum_circ_1053	2.86	303	303	CUX1	CDS,Exon
chr7	102039994	102047945	+	Serum_circ_1054	3.57	7951	252	LOC100630923	CDS,Exon,5'UTR
chr7	105108783	105111295	-	Serum_circ_1055	1.43	2512	288	PUS7	CDS,Exon
chr7	105279933	105283568	-	Serum_circ_1056	1.43	3635	367	ATXN7L1	CDS,Exon
chr7	115898098	115898209	+	Serum_circ_1057	5.72	111	111	TES	Exon,3'UTR
chr7	128138089	128140331	+	Serum_circ_1058	1.43	2242	107	METTL2B	CDS,Exon
chr7	128655032	128658211	-	Serum_circ_1059	2.86	3179	432	TNPO3	CDS,Exon,3'UTR
chr7	129756284	129769416	+	Serum_circ_1060	5.00	13132	866	KLHDC10	CDS,Exon
chr7	129810239	129821559	-	Serum_circ_1061	1.43	11320	608	TMEM209	CDS,Exon
chr7	138209985	138213975	+	Serum_circ_1062	5.72	3990	232	TRIM24	CDS,Exon
chr7	138209985	138258387	+	Serum_circ_1063	3.57	48402	1417	TRIM24	CDS,Exon
chr7	138252225	138258387	+	Serum_circ_1064	5.00	6162	484	TRIM24	CDS,Exon
chr7	138738196	138738841	-	Serum_circ_1065	2.86	645	262	ZC3HAV1	CDS,Exon
chr7	139259873	139260722	-	Serum_circ_1066	1.43	849	161	HIPK2	CDS,Exon
chr7	148543561	148544397	-	Serum_circ_1067	2.14	836	355	EZH2	CDS,Exon,5'UTR
chr7	151181822	151195266	-	Serum_circ_1068	10.01	13444	140	RHEB	CDS,Exon
chr7	151946960	151948051	-	Serum_circ_1069	2.14	1091	192	KMT2C	CDS,Exon
chr7	152007050	152012423	-	Serum_circ_1070	9.29	5373	460	KMT2C	CDS,Exon
chr7	155465560	155473602	+	Serum_circ_1071	7.15	8042	445	RBM33	CDS,Exon
chr7	155499553	155511137	+	Serum_circ_1072	2.14	11584	521	RBM33	CDS,Exon
chr7	156549086	156619438	-	Serum_circ_1073	4.29	70352	578	LMBR1	CDS,Exon
chr7	158552176	158557544	-	Serum_circ_1074	10.01	5368	495	ESYT2	CDS,Exon
chr7	158580694	158591763	-	Serum_circ_1075	1.43	11069	417	ESYT2	CDS,Exon
chr7	158662545	158669382	+	Serum_circ_1076	2.86	6837	558	WDR60	CDS,Exon
chr8	9916509	10014402	+	Serum_circ_1077	1.43	97893	563	MSRA	CDS,Exon,5'UTR
chr8	17868745	17869336	+	Serum_circ_1078	1.43	591	291	PCM1	CDS,Exon
chr8	17927300	17928899	-	Serum_circ_1079	2.14	1599	178	ASAH1	CDS,Exon
chr8	18656804	18662408	-	Serum_circ_1080	4.29	5604	448	PSD3	CDS,Exon
chr8	21832180	21837714	+	Serum_circ_1081	3.57	5534	465	XPO7	CDS,Exon
chr8	21929836	21931346	+	Serum_circ_1082	6.43	1510	231	DMTN	CDS,Exon
chr8	29959413	29962002	+	Serum_circ_1083	1.43	2589	263	LEPROTL1	CDS,Exon
chr8	30032600	30038146	+	Serum_circ_1084	2.14	5546	386	DCTN6	CDS,Exon
chr8	30464573	30494791	-	Serum_circ_1085	2.86	30218	477	GTF2E2	CDS,Exon
chr8	30492548	30511119	-	Serum_circ_1086	4.29	18571	1055	GTF2E2	CDS,Exon,5'UTR
chr8	37623043	37623873	+	Serum_circ_1087	16.44	830	220	PROSC	CDS,Exon
chr8	42761315	42785315	+	Serum_circ_1088	5.00	24000	210	HOOK3	CDS,Exon
chr8	42761315	42798588	+	Serum_circ_1089	2.14	37273	343	HOOK3	CDS,Exon
chr8	46929686	46929906	-	Serum_circ_1090	2.86	220	NA	NA	Intergenic
chr8	48203621	48206619	+	Serum_circ_1091	2.86	2998	269	SPIDR	CDS,Exon,5'UTR
chr8	48869730	48869991	-	Serum_circ_1092	2.86	261	170	PRKDC	CDS,Exon
chr8	52773404	52773806	-	Serum_circ_1093	26.45	402	402	PCMTD1	CDS,Exon,5'UTR

chr8	56698277	56708711	+	Serum_circ_1094	2.14	10434	1376	TGS1	CDS,Exon
chr8	56854413	56860282	+	Serum_circ_1095	4.29	5869	363	LYN	CDS,Exon,5'UTR
chr8	61496766	61504528	+	Serum_circ_1096	2.86	7762	288	RAB2A	CDS,Exon
chr8	61653817	61655656	+	Serum_circ_1097	2.14	1839	1839	CHD7	CDS,Exon,5'UTR
chr8	62489330	62531578	-	Serum_circ_1098	2.14	42248	215	ASPH	CDS,Exon
chr8	66691954	66701216	-	Serum_circ_1099	2.86	9262	145	PDE7A	CDS,Exon
chr8	68934270	68973014	+	Serum_circ_1100	4.29	38744	1003	PREX2	CDS,Exon
chr8	69676649	69676773	-	Serum_circ_1101	2.86	124	NA	C8orf34	Antisense
chr8	71071739	71075089	-	Serum_circ_1102	2.14	3350	292	NCOA2	CDS,Exon
chr8	71126137	71128999	-	Serum_circ_1103	20.73	2862	278	NCOA2	CDS,Exon,5'UTR
chr8	74585341	74601048	-	Serum_circ_1104	15.01	15707	296	STAU2	CDS,Exon,5'UTR
chr8	81937454	81942324	-	Serum_circ_1105	2.14	4870	94	PAG1	Exon,5'UTR
chr8	87392954	87414432	+	Serum_circ_1106	2.14	21478	654	WWP1	CDS,Exon
chr8	90617594	90660841	-	Serum_circ_1107	2.86	43247	NA	NA	Intergenic
chr8	95541297	95550574	-	Serum_circ_1108	5.00	9277	701	KIAA1429	CDS,Exon
chr8	98698895	98703416	+	Serum_circ_1109	2.14	4521	565	MTDH	CDS,Exon
chr8	101299728	101300495	-	Serum_circ_1110	6.43	767	767	RNF19A	CDS,Exon,5'UTR
chr8	103372298	103373854	-	Serum_circ_1111	2.86	1556	324	UBR5	CDS,Exon
chr8	104417003	104420012	-	Serum_circ_1112	1.43	3009	237	SLC25A32	CDS,Exon,3'UTR
chr8	106431371	106456609	+	Serum_circ_1113	4.29	25238	261	ZFPM2	CDS,Exon
chr8	110424493	110439385	+	Serum_circ_1114	5.00	14892	915	PKHD1L1	CDS,Exon
chr8	117723559	117738411	-	Serum_circ_1115	2.86	14852	157	EIF3H	CDS,Exon
chr8	131092147	131104389	-	Serum_circ_1116	1.43	12242	2272	ASAP1	CDS,Exon,3'UTR
chr8	131164981	131181313	-	Serum_circ_1117	13.58	16332	334	ASAP1	CDS,Exon
chr8	131164981	131193126	-	Serum_circ_1118	5.72	28145	550	ASAP1	CDS,Exon
chr8	131164981	131200429	-	Serum_circ_1119	5.00	35448	675	ASAP1	CDS,Exon
chr8	131226801	131302384	-	Serum_circ_1120	2.86	75583	219	ASAP1	CDS,Exon
chr8	141595217	141616013	-	Serum_circ_1121	1.43	20796	193	AGO2	CDS,Exon
chr8	141745349	141762415	-	Serum_circ_1122	5.72	17066	698	PTK2	CDS,Exon
chr8	141799572	141829119	-	Serum_circ_1123	2.86	29547	529	PTK2	CDS,Exon
chr8	141799572	141840625	-	Serum_circ_1124	2.14	41053	584	PTK2	CDS,Exon
chr8	141810557	141900868	-	Serum_circ_1125	5.00	90311	1125	PTK2	CDS,Exon,5'UTR
chr8	141828375	141874498	-	Serum_circ_1126	4.29	46123	505	PTK2	CDS,Exon
chr8	141840570	141874498	-	Serum_circ_1127	6.43	33928	286	PTK2	CDS,Exon
chr8	141856358	141874498	-	Serum_circ_1128	3.57	18140	231	PTK2	CDS,Exon
chr8	141856358	141931231	-	Serum_circ_1129	2.86	74873	625	PTK2	CDS,Exon,5'UTR
chr8	142154246	142161052	+	Serum_circ_1130	1.43	6806	232	DENND3	CDS,Exon
chr8	142154246	142176488	+	Serum_circ_1131	3.57	22242	1130	DENND3	CDS,Exon
chr8	142170730	142173528	+	Serum_circ_1132	4.29	2798	253	DENND3	CDS,Exon
chr8	142264087	142264728	-	Serum_circ_1133	1.43	641	641	SLC45A4	CDS,Exon,5'UTR
chr9	2191265	2192802	+	Serum_circ_1134	10.72	1537	143	SMARCA2	CDS,Exon
chr9	6420911	6434173	+	Serum_circ_1135	2.86	13262	491	UHRF2	CDS,Exon,5'UTR
chr9	6475390	6482099	+	Serum_circ_1136	4.29	6709	529	UHRF2	CDS,Exon,5'UTR
chr9	6880011	6893232	+	Serum_circ_1137	7.86	13221	292	KDM4C	CDS,Exon
chr9	16727794	16738483	-	Serum_circ_1138	3.57	10689	327	BNC2	CDS,Exon
chr9	17226200	17236586	+	Serum_circ_1139	1.43	10386	400	CNTLN	CDS,Exon
chr9	17330629	17342442	+	Serum_circ_1140	5.00	11813	545	CNTLN	CDS,Exon
chr9	18942054	18942173	-	Serum_circ_1141	4.29	119	NA	FAM154A	Intron
chr9	19286766	19305525	+	Serum_circ_1142	2.14	18759	1182	DENND4C	CDS,Exon,5'UTR
chr9	19288593	19290874	+	Serum_circ_1143	1.43	2281	243	DENND4C	CDS,Exon,5'UTR

chr9	19305349	19316837	+	Serum_circ_1144	2.86	11488	496	DENND4C	CDS,Exon,5'UTR
chr9	19360241	19361961	+	Serum_circ_1145	2.86	1720	364	DENND4C	CDS,Exon,5'UTR
chr9	20819794	20823114	+	Serum_circ_1146	5.00	3320	465	FOCAD	CDS,Exon
chr9	20907148	20929595	+	Serum_circ_1147	5.72	22447	692	FOCAD	CDS,Exon
chr9	27183456	27192621	+	Serum_circ_1148	4.29	9165	594	TEK	CDS,Exon
chr9	33948371	33956144	-	Serum_circ_1149	2.86	7773	563	UBAP2	CDS,Exon,3'UTR
chr9	33953282	33963789	-	Serum_circ_1150	2.14	10507	377	UBAP2	CDS,Exon,5'UTR
chr9	33986757	34017187	-	Serum_circ_1151	4.29	30430	561	UBAP2	CDS,Exon,5'UTR
chr9	34241182	34242106	+	Serum_circ_1152	3.57	924	924	UBAP1	CDS,Exon,5'UTR
chr9	34286614	34290387	-	Serum_circ_1153	2.86	3773	304	KIF24	CDS,Exon
chr9	37144631	37147442	+	Serum_circ_1154	1.43	2811	NA	ZCCHC7	Intron
chr9	37424841	37426651	+	Serum_circ_1155	3.57	1810	321	GRHPR	CDS,Exon
chr9	79244107	79251473	-	Serum_circ_1156	1.43	7366	186	PRUNE2	CDS,Exon
chr9	79852917	79853302	+	Serum_circ_1157	1.43	385	305	VPS13A	CDS,Exon
chr9	79968891	80022523	+	Serum_circ_1158	7.86	25632	1730	VPS13A	CDS,Exon,3'UTR
chr9	80409378	80412564	-	Serum_circ_1159	11.44	3186	259	GNAQ	CDS,Exon
chr9	80869751	80879232	+	Serum_circ_1160	1.43	9481	374	CEP78	CDS,Exon
chr9	86292641	86293514	-	Serum_circ_1161	4.29	873	394	UBQLN1	CDS,Exon
chr9	86292641	86301070	-	Serum_circ_1162	3.57	8429	925	UBQLN1	CDS,Exon
chr9	86293355	86301070	-	Serum_circ_1163	5.72	7715	690	UBQLN1	CDS,Exon
chr9	88284399	88327481	-	Serum_circ_1164	2.14	43082	695	AGTPBP1	CDS,Exon,5'UTR
chr9	88307603	88327481	-	Serum_circ_1165	3.57	19878	190	AGTPBP1	CDS,Exon,5'UTR
chr9	88918000	88919862	-	Serum_circ_1166	2.14	1862	208	ZCCHC6	CDS,Exon
chr9	88920106	88924932	-	Serum_circ_1167	2.14	4826	508	ZCCHC6	CDS,Exon
chr9	92070802	92074349	-	Serum_circ_1168	2.14	3547	66	SEMA4D	Exon,5'UTR
chr9	96233422	96238620	+	Serum_circ_1169	1.43	5198	330	FAM120A	CDS,Exon
chr9	96233422	96278551	+	Serum_circ_1170	3.57	45129	1042	FAM120A	CDS,Exon
chr9	96238537	96261168	+	Serum_circ_1171	5.00	22631	309	FAM120A	CDS,Exon
chr9	98740342	98766983	+	Serum_circ_1172	3.57	26641	337	ERCC6L2	CDS,Exon
chr9	111868787	111870850	-	Serum_circ_1173	6.43	2063	220	TMEM245	CDS,Exon
chr9	114148656	114154104	-	Serum_circ_1174	2.86	5448	435	KIAA0368	CDS,Exon
chr9	114825216	114841004	-	Serum_circ_1175	1.43	15788	284	SUSD1	CDS,Exon
chr9	114840817	114842445	-	Serum_circ_1176	13.58	1628	279	SUSD1	CDS,Exon
chr9	114840817	114864565	-	Serum_circ_1177	1.43	23748	582	SUSD1	CDS,Exon
chr9	114905750	114919893	-	Serum_circ_1178	1.43	14143	423	SUSD1	CDS,Exon
chr9	115013208	115060196	-	Serum_circ_1179	1.43	46988	929	PTBP3	CDS,Exon,5'UTR
chr9	124110292	124115580	-	Serum_circ_1180	3.57	5288	650	STOM	CDS,Exon,3'UTR
chr9	126319848	126414402	-	Serum_circ_1181	4.29	94554	486	DENND1A	CDS,Exon
chr9	130504066	130507378	-	Serum_circ_1182	2.86	3312	824	SH2D3C	CDS,Exon
chr9	131235191	131236020	+	Serum_circ_1183	2.14	829	262	ODF2	CDS,Exon
chr9	131271154	131277918	+	Serum_circ_1184	1.43	6764	333	GLE1	CDS,Exon
chr9	131860291	131860929	-	Serum_circ_1185	8.58	638	379	CRAT	CDS,Exon
chr9	132740743	132741653	-	Serum_circ_1186	1.43	910	205	FNBP1	CDS,Exon
chr9	132841908	132848755	+	Serum_circ_1187	5.00	6847	235	GPR107	CDS,Exon,5'UTR
chrX	3735585	3736541	-	Serum_circ_1188	7.15	956	59	LOC389906	Exon,3'UTR
chrX	10031484	10066619	+	Serum_circ_1189	2.86	35135	825	WWC3	CDS,Exon,5'UTR
chrX	11187624	11207104	-	Serum_circ_1190	5.00	19480	989	ARHGAP6	CDS,Exon,3'UTR
chrX	12817325	12828265	+	Serum_circ_1191	5.00	10940	601	PRPS2	CDS,Exon
chrX	16846216	16847893	+	Serum_circ_1192	5.72	1677	366	TXLNG	CDS,Exon
chrX	24905024	24906239	+	Serum_circ_1193	4.29	1215	117	POLA1	CDS,Exon

chrX	53430497	53430825	-	Serum_circ_1194	2.86	328	224	SMC1A	CDS,Exon
chrX	53641494	53641706	-	Serum_circ_1195	2.14	212	212	HUWE1 TCONS_I2_00 030220	CDS,Exon LncRNA
chrX	56029257	56041394	+	Serum_circ_1196	3.57	12137	NA		
chrX	67494579	67518938	-	Serum_circ_1197	2.14	24359	230	OPHN1	CDS,Exon
chrX	67731690	67742759	+	Serum_circ_1198	2.14	11069	535	YIPF6	CDS,Exon
chrX	76812921	76814317	-	Serum_circ_1199	6.43	1396	373	ATRX	CDS,Exon
chrX	76812921	76829823	-	Serum_circ_1200	5.00	16902	482	ATRX	CDS,Exon
chrX	76907603	76912143	-	Serum_circ_1201	5.72	4540	437	ATRX	CDS,Exon
chrX	108861225	108861378	+	Serum_circ_1202	2.86	153	NA	NA	Intergenic
chrX	117575330	117577650	+	Serum_circ_1203	1.43	2320	642	WDR44	CDS,Exon
chrX	118544152	118551603	+	Serum_circ_1204	2.14	7451	173	SLC25A43	CDS,Exon
chrX	118774654	118787003	-	Serum_circ_1205	3.57	12349	557	6-Sep	CDS,Exon,3'UTR
chrX	119063974	119066175	-	Serum_circ_1206	3.57	2201	226	NKAP	CDS,Exon
chrX	119670781	119675575	-	Serum_circ_1207	2.14	4794	722	CUL4B	CDS,Exon
chrX	122163895	122164046	-	Serum_circ_1208	2.86	151	NA	NA	Intergenic
chrX	128692816	128692978	+	Serum_circ_1209	4.29	162	162	OCRL	CDS,Exon
chrX	130454063	130454192	+	Serum_circ_1210	3.57	129	NA	NA	Intergenic
chrX	132978460	132978605	-	Serum_circ_1211	2.14	145	NA	GPC3	Intron
chrX	138897036	138908982	-	Serum_circ_1212	4.29	11946	399	ATP11C	CDS,Exon
chrX	154182166	154189443	-	Serum_circ_1213	2.14	7277	460	F8	CDS,Exon
chrY	13464445	13472457	-	Serum_circ_1214	4.29	8012	NA	NA	Intergenic
chrY	21901413	21903743	-	Serum_circ_1215	2.14	2330	429	KDM5D	CDS,Exon

Supplementary information, Table S2 CRC specific exo-circRNAs with host genes upregulated in CRC tissues

Chr	Start	End	Strand	circRNA ID	SRPBM	Genomic length	Spliced length	gene_symbol
chr7	156619298	156629579	-	Serum_CRC_circ_001	18.04	10281	371	LMBR1
chr7	156526870	156589186	-	Serum_CRC_circ_002	5.41	62316	642	LMBR1
chr7	77210743	77230123	+	Serum_CRC_circ_003	7.22	19380	487	PTPN12
chr7	24663284	24708279	+	Serum_CRC_circ_004	13.53	44995	1116	MPP6
chr10	13214375	13214765	+	Serum_CRC_circ_005	5.41	390	246	MCM10
chr16	16218645	16219768	+	Serum_CRC_circ_006	5.41	1123	229	ABCC1
chr16	16108347	16110478	+	Serum_CRC_circ_007	5.41	2131	264	ABCC1
chr10	17746429	17747740	+	Serum_CRC_circ_008	5.41	1311	297	STAM
chr16	22360599	22361170	-	Serum_CRC_circ_009	5.41	571	314	CDR2
chr5	64747301	64769779	-	Serum_CRC_circ_010	9.02	22478	1357	ADAMTS6
chr1	23397717	23398690	+	Serum_CRC_circ_011	6.31	973	209	KDM1A
chr2	54127017	54128696	-	Serum_CRC_circ_012	5.41	1679	347	PSME4
chr16	66850483	66855462	-	Serum_CRC_circ_013	9.02	4979	439	NAE1
chr1	212218001	212220759	+	Serum_CRC_circ_014	8.12	2758	282	DTL
chr11	77336007	77336863	-	Serum_CRC_circ_015	6.31	856	210	CLNS1A
chr17	5364258	5365866	-	Serum_CRC_circ_016	5.41	1608	399	DHX33
chr20	35812582	35812776	+	Serum_CRC_circ_017	5.41	194	194	RPN2

chr9	33948371	33953472	-	Serum_CRC_circ_018	5.41	5101	404	UBAP2
chr9	33986757	33998862	-	Serum_CRC_circ_019	5.41	12105	421	UBAP2
chr19	10254441	10254663	-	Serum_CRC_circ_020	5.41	222	222	DNMT1
chr22	26853824	26854543	-	Serum_CRC_circ_021	5.41	719	242	HPS4
chr5	145539936	145552337	-	Serum_CRC_circ_022	6.31	12401	582	LARS
chr4	2933551	2933663	-	Serum_CRC_circ_023	5.41	112	112	MFS10
chr17	30315338	30315516	+	Serum_CRC_circ_024	7.22	178	178	SUZ12
chr9	77631183	77632364	-	Serum_CRC_circ_025	7.22	1181	360	C9orf41
chr2	122514815	122519100	+	Serum_CRC_circ_026	8.12	4285	408	TSN
chr4	54249939	54256040	+	Serum_CRC_circ_027	11.73	6101	169	FIP1L1
chr15	42851536	42856055	+	Serum_CRC_circ_028	5.41	4519	401	HAUS2
chr4	56883813	56885721	+	Serum_CRC_circ_029	10.82	1908	413	CEP135
chr3	3182193	3186394	+	Serum_CRC_circ_030	8.12	4201	266	TRNT1
chr7	91924202	91936970	+	Serum_CRC_circ_031	9.02	12768	576	ANKIB1
chr7	91974291	91981956	+	Serum_CRC_circ_032	10.82	7665	401	ANKIB1
chr6	17665469	17669259	-	Serum_CRC_circ_033	6.31	3790	201	NUP153
chr2	191759877	191769893	+	Serum_CRC_circ_034	5.41	10016	593	GLS
chr8	141771263	141774389	-	Serum_CRC_circ_035	5.41	3126	176	PTK2
chr8	141889569	141900868	-	Serum_CRC_circ_036	6.31	11299	394	PTK2
chr6	129932677	129937448	-	Serum_CRC_circ_037	9.92	4771	170	ARHGAP18
chr2	32312560	32314674	+	Serum_CRC_circ_038	7.22	2114	171	SPAST
chr20	18523662	18535034	+	Serum_CRC_circ_039	8.12	11372	637	SEC23B
chr1	62907158	62907970	+	Serum_CRC_circ_040	13.53	812	226	USP1
chr2	172782046	172809519	+	Serum_CRC_circ_041	9.02	27473	302	HAT1
chr13	50279756	50280508	-	Serum_CRC_circ_042	5.41	752	340	KPNA3
chr1	150198939	150201570	-	Serum_CRC_circ_043	8.12	2631	354	ANP32E
chr14	100728640	100728803	+	Serum_CRC_circ_044	6.31	163	163	YY1
chr3	155551256	155560408	-	Serum_CRC_circ_045	6.31	9152	491	SLC33A1
chr5	140961878	140963182	-	Serum_CRC_circ_046	9.92	1304	282	DIAPH1
chr2	179981394	179982340	-	Serum_CRC_circ_047	5.41	946	205	SESTD1
chr7	129760588	129762042	+	Serum_CRC_circ_048	9.92	1454	304	KLHDC10
chr10	32309949	32310215	-	Serum_CRC_circ_049	13.53	266	172	KIF5B
chr12	14609494	14610229	+	Serum_CRC_circ_050	8.12	735	163	ATF7IP
chr3	32574477	32578596	-	Serum_CRC_circ_051	6.31	4119	342	DYNC1L1
chr8	42725146	42729149	-	Serum_CRC_circ_052	5.41	4003	185	RNF170
chr12	111947352	111948386	-	Serum_CRC_circ_053	6.31	1034	377	ATXN2

Supplementary information, Table S3 Primers sequences for real time PCR

	Circular/Linear	Forward primer(5'-3')	Reverse primer(5'-3')
XPO1	Circular (chr2:61,749,745-61,761,038)	CCAAGGAACCAAGTGCAG	GAAATCAAGCAGCTGACGA
EZH2	Circular (chr7:148,543,561-148,544,397)	TGGAAACAGCGAAGGATAC	TCGTCTGAACCTCTTGAGC
FOXK2	Circular (chr17:80,521,229-80,526,077)	TAATGGCTGACAACCTCACA	GCTTCTCTCTCTCTCGCT
CAMSAP1	Circular (chr9:138,773,478-138,774,924)	AGTGCCTCGAAAGAAGCTTC	TCCTGCTCATACTGGTCAA
RTN4	Circular (chr2:55,209,650-55,214,834)	AGTAATTCTGCTCTTGTC	GTCTTCTTAATGTCTCTCC
MET	Circular (chr7:116,339,124-116,340,338)	AATGTGAGATGTCTCCAGCAT	TAAACAGGAGCACGAGGAT
CDYL	Circular (chr6:4,891,946-4,892,613)	CTTAGCTGTTAACGGGAAA	CTGTTGAAGTCGTGGATGT
HIPK3	Circular (chr11:33,307,958-33,309,057)	CAACATATCTACAATCTCGGTAC	ACAACTGCTTGGCTCTACT
GSE1	Circular (chr16:85,667,519-85,667,738)	GCCAAACAGGCGGAGGAGC	CCTGGTCGCGGTGGAAAGC
N4BP2L2	Circular (chr13:33,091,993-33,101,669)	CAAAGACCTCCTCTCCAC	AACATTATACCTGTACCCATC
SMARCA5	Circular (chr4:144,464,661-144,465,125)	CTCCAAGATGGGCGAAAGT	TTCTGATCCACAAGCCTCC
KLHDC10	Circular (chr7:129,760,588-129,762,042)	CAGACCTGCACAAGTTAGA	CCAAATGGGATGCCCGTAC
XPO1	Linear	TGATCCACAGATGGTCGCTG	GGTTCTTAGCAGCTGGGAC
EZH2	Linear	TGCGACTGAGACAGCTCAAG	TGGTCACCGAACACTCCCTA
FOXK2	Linear	TAACGTTCACTGCCCTGTCC	GTTTGCAGCGCTGATGGTTC
SLC22A3	Linear	TCCCCAACTGGCAAGGAATC	ACTCAGGGACCACCCAGTAA
CAMSAP1	Linear	AAGGCTGTACAGGCACTAC	CGCTGATCAGGATGTCTCTC
RTN4	Linear	GAACTCAGGCGCCTCTTCTT	CTATCTGTGCCTGATGCCGT
MET	Linear	GTCCTGCAGTCAATGCCTCT	GTCAGCCTTGTCCCTCCTTC
CDYL	Linear	CTCGTGCAATCCAGTTGTGC	ACCTCACACTCCCTCTCGTT
HIPK3	Linear	TGGAGACTGGGGGAAGATGA	CACACTAACTGGCTGAGGGG
Actin	Linear	TTGTTACAGGAAGTCCCTTGCC	ATGCTATCACCTCCCTGTGTG