# Supplementary Information

# Cerebrospinal fluid microRNAs are potential biomarkers of temporal lobe epilepsy and status epilepticus

Rana Raoof, Eva M. Jimenez-Mateos, Sebastian Bauer, Björn Tackenberg, Felix Rosenow, Johannes Lang, Müjgan Dogan Onugoren, Hajo Hamer, Tessa Huchtemann, Peter Körtvélyessy, Niamh M. C. Connolly, Shona Pfeiffer, Jochen H.M. Prehn, Michael A. Farrell, Donncha F. O'Brien, David C. Henshall and Catherine Mooney

### Supplementary Materials and Methods

#### **RNA** extraction

Total RNA was extracted from 200  $\mu$ l of CSF or plasma using miRCURY<sup>TM</sup> RNA Isolation Kit (Exiqon) according to the manufacturer protocol. Lysis of membranized particles within the sample were performed using lysis solution. After a protein precipitation step the resultant supernatant was collected and mixed with isopropanol then loaded into a spin-column which binds only the RNA. This was followed by two respective wash steps followed by a centrifugation for 2 minutes at 11,000 x g to dry the column membrane completely. The final purified RNA was eluted in 25  $\mu$ l RNAase free water. Small RNA and microRNA concentration and microRNA % in each sample was assessed using a fragment analyzer (Advanced Analytical).

#### MicroRNA expression profiling

MicroRNA profiling was performed using the OpenArray platform from Applied Biosystem, as described (Mooney *et al.*, 2015). The OpenArray reverse transcription reaction was performed according to the manufacturer's protocol using 3  $\mu$ l of total RNA in a mix of 0.75  $\mu$ l Megaplex RT primer pools (human Pools A or B Cat No. 4444750) from Applied Biosystem, 1.5  $\mu$ M dNTPs with dTTPs, 75U Multiscribe Reverse Transcriptase, 1X RT Buffer, 1.5  $\mu$ M MgCl2, 1.8U RNAase inhibitor (RT kit Cat No 4366596, AB). Reverse transcription reaction was performed in Applied Biosystem thermal cycler.

To increase the quantity of desired cDNA before performing PCR and to significantly increase the ability to detect low abundance transcripts, a pre-amplification step was performed according to the manufacturer's recommendation. 2.5  $\mu$ l RT product was mixed with 1X Megaplex PreAmp primers (10X Human Pool A and B Cat. No. 4444748, AB), 1X TaqMan PreAmp master mix (2X, Cat No. 4391128, AB). Pre-amplification reaction was performed in an Applied Biosystem thermal cycler.

PreAmp product was first diluted with 0.1X TE to a ratio of 1:40, 22.5  $\mu$ l of diluted PreAmp product was then added to same volume of 2X TaqMan OpenArray Real time PCR Master Mix (Cat No. 4462164, AB) in the 384-well OpenArray sample loading plate. The manufacturers protocol was followed and the OpenArray panels were automatically loaded by the OpenArray AccuFill System. Each panel enables the quantification of microRNA expression in three samples and up to four panels can be cycled simultaneously, allowing for the analysis of 12 samples on a QuantStudio 12K Flex Real-Time PCR system. 754 human microRNAs were amplified in each sample together with 16 replicates each of four internal controls (ath-miR159a, RNU48, RNU44 and U6 rRNA).

#### **Reverse Transcription and Real-Time PCR validation**

Validation of OpenArray findings was performed using the small-scale RT-qPCR protocol adapted from (Mitchell *et al.*, 2008). RNA was extracted from CSF samples using miRCURY RNA isolation kit-biofluid. For the Reverse Transcription step, a master mix containing, 1x RT buffer (AB), 1.26 units RNAase inhibitor (AB), 16.5 units Multiscribe reverse transcriptase enzyme (AB), 0.025 mM dNTPs (AB), 0.6  $\mu$ l of the specific stem loop RT primer for each microRNA was prepared and added to 1.7  $\mu$ l of total RNA (similar to Mitchell *et al.* (2008)). For real-time PCR amplification, cDNA was diluted in a ratio of 1:6.5 and assayed using 1X TaqMan Fast Universal PCR Master Mix (AB) and microRNAspecific PCR primers. The amplification was done in triplicate and a negative control was included for each primer. The same protocol was followed to quantify the microRNA levels of miR-19b-3p, miR-21-5p and miR-451a in plasma samples from TLE patients.

#### Analysis of microRNA content within exosomes and complexed to Argonaute2

To indicate whether significantly differentially expressed microRNAs are protein bound (Argonaute2) or enclosed within exosomes, we pooled the CSF samples into five TLE samples, five SE samples, three multiple sclerosis samples and three Alzheimer's disease samples. Each pool was then divided into three parts:  $300 \ \mu$ l was allocated for exosome precipitation;  $300 \ \mu$ l for Argonaute2 immunoprecipitation; and  $200 \ \mu$ l for total RNA extraction.

Exosome precipitation was performed using the ExoQuickTM Exosome Precipitation Solution (System Biosciences-SBI) (Lobb *et al.*, 2015). Briefly, 75.6  $\mu$ l of precipitation solution was added to 300  $\mu$ l of CSF. The mix was incubated for 24 hours at 4°C, followed by centrifugation at 1500 x g for 30 minutes. After centrifugation the exosomes appear as a white pellet at the bottom of the tube. To remove any excess precipitation solution a second quick centrifugation step at 1500 x g for 5 minutes was performed. Total RNA was then extracted from exosomes using miRCURY RNA isolation kit-biofluid according to manufacturer protocol.

Argonaute2 pull-down from CSF was adapted from (Jimenez-Mateos *et al.*, 2012) as follows. 300  $\mu$ l of pooled CSF was incubated overnight with 10  $\mu$ g of antibodies against Argonaute-2 (C34C6, Cell Signaling Technology) at 4°*C*. Protein A-agarose beads (Santa Cruz Biotechnology) were added, mixed and incubated for 4 hours at 4°*C*, then centrifuged and the supernatant removed. The pellet was washed three times with immunoprecipitation buffer containing 300 mM NaCL, 5 mM MgCl2, 0.1% NP-40, 50 mM Tris HCl. Total RNA was extracted from Argonaute2 IP pellet using 200  $\mu$ l of Trizol reagent (Invitrogen). Phase separation was performed using 50  $\mu$ l of chloroform, the upper aqueous phase was collected and transformed into a new tube.

Total RNA in the sample was precipitated and washed using Isopropanol and 75% ethanol respectively. The final RNA pellet was dissolved in 12  $\mu$ l RNA ase free water.

#### MicroRNA expression after exosome precipitation and Argonaute2 IP

For the reverse transcription reaction, RT primers for miR-19b-3p, miR-21-5p and miR-451a were pooled and diluted with 1X TE buffer to a final concentration of 0.05X. An RT mix was prepared containing 3  $\mu$ l Multiscribe reverse transcriptase enzyme, 1.5  $\mu$ l 10X RT buffer, 0.19  $\mu$ l RNAase inhibitor, 0.3  $\mu$ l dNTPs, 6  $\mu$ l RT primer pool and 1.01  $\mu$ l dH2O. For a 15  $\mu$ l RT reaction, 3  $\mu$ l RNA was mixed with 12  $\mu$ l RT mix.

To increase the quantity of desired cDNA before performing PCR, a pre-amplification step was performed for each sample. Pre-amplification reaction mix was prepared by pooling the TaqMan microRNA assays of the above microRNAs and diluting it with 1X TE buffer to a final concentration of 0.2X. 3.75  $\mu$ l of preamp primer pool was added to 2.5  $\mu$ l RT product and 12.5  $\mu$ l of 2X TaqMan preamp master mix, dH<sub>2</sub>O was added so the final volume of the reaction is 25  $\mu$ l. RT-qPCR was then performed in 96 well plate following the same protocol described earlier.

## Supplementary Figures S1 - 6

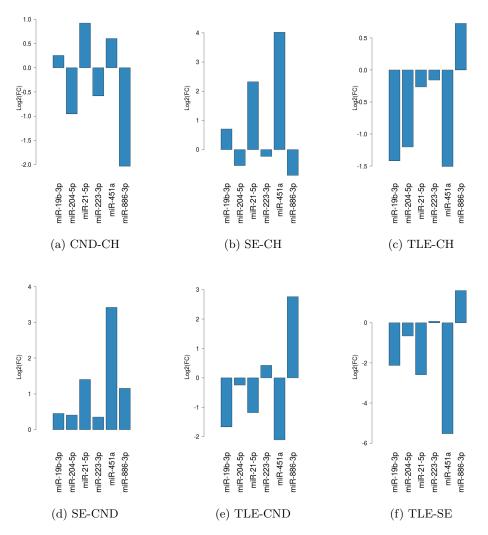
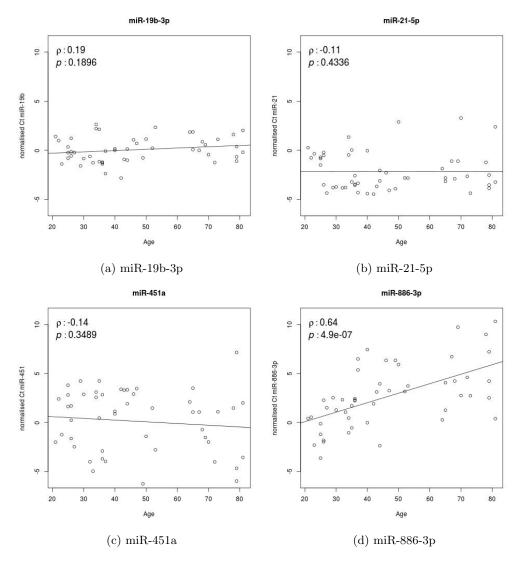


Figure S1: Validation of microRNA. Barplots showing the fold change (FC) in the first indicated group when compared to the second (i.e. TLE-CH is the FC in TLE compared to CH) following Taqman individual microRNA assays of miR-19b-3p, miR-21-5p, miR-204-5p, miR-223-3p, miR-451a and miR-886-3p for each of the four groups: CH (N = 25), CND (N = 25), SE (N = 16) and TLE (N = 14). The fold change is calculated as  $FC = 2^{-\Delta\Delta Ct}$ , where  $\Delta\Delta Ct = Ct_{miRNA} - Ct_{miR-24}$ .



 $\mbox{Figure S2:}$  Correlation between normalised Ct of microRNA in CSF and patient age in controls.

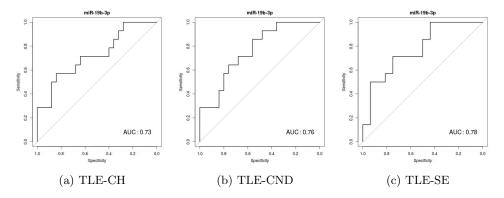


Figure S3: ROC analysis for miR-19b-3p in (a) TLE versus CH (b) TLE versus CND (c) TLE versus SE.

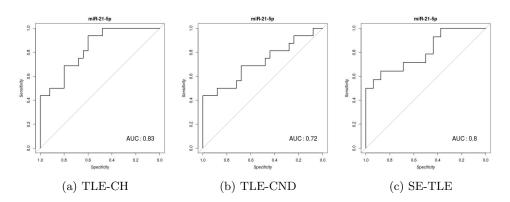


Figure S4: ROC analysis for miR-21-5p in (a) SE versus CH (b) SE versus CND (c) SE versus TLE.

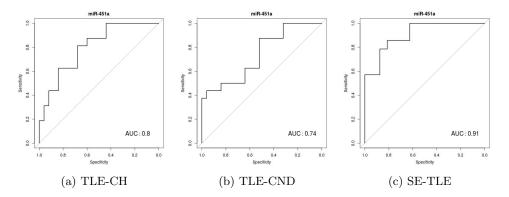


Figure S5: ROC analysis for miR-451a in (a) SE versus CH (b) SE versus CND (c) SE versus TLE.

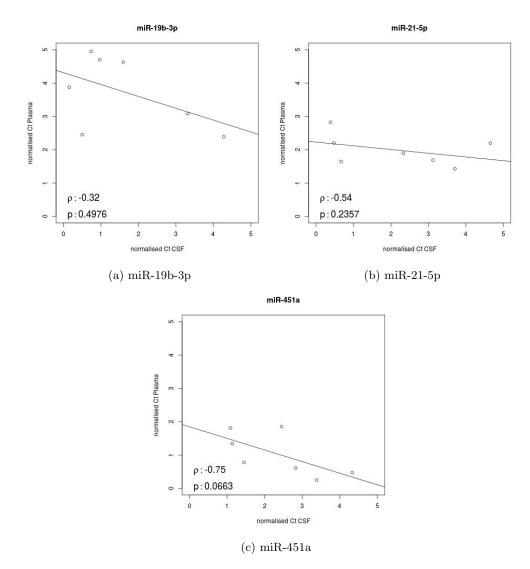


Figure S6: Correlation of normalised Ct between CSF and plasma for (a) miR-19b-3p, (b) miR-21-5p and (c) miR-451a.

## Supplementary Tables S1-3

		Control-	Chronic Headache
$\mathbf{Sex}$	Age	Diagnosis	Experiment
F	25	chronic headache	OA, P, A/E
F	25	chronic headache	OA, P, A/E
F	26	chronic headache	OA, P, A/E
F	32	chronic headache	Р
$\mathbf{F}$	35	chronic headache	Р
$\mathbf{F}$	36	chronic headache	Р
$\mathbf{F}$	37	chronic headache	Р
$\mathbf{F}$	40	chronic headache	OA, P
F	40	chronic headache	P, A/E
$\mathbf{F}$	43	chronic headache	OA, A/E
F	44	chronic headache	OA, P
F	44	chronic headache	P, A/E
F	46	chronic headache	P
F	47	chronic headache	P, A/E
F	48	chronic headache	OA OA
F	49	chronic headache	P
F	50	chronic headache	P
F	$50 \\ 52$	chronic headache	P
М	$\frac{52}{21}$	chronic headache	OA,P, A/E
M	$\frac{21}{22}$	chronic headache	P
M	$\frac{22}{23}$	chronic headache	OA, P, A/E
M	$\frac{23}{25}$	chronic headache	OA, P, A/E
M	$\frac{25}{26}$	chronic headache	OA, P, A/E
M	$\frac{20}{34}$	chronic headache	OA, P, A/E OA, P, A/E
M	$\frac{34}{34}$	chronic headache	OA, P, A/E
M	$34 \\ 35$	chronic headache	
M	$\frac{35}{37}$	chronic headache	OA, P, A/E P
M	37 41	chronic headache	r OA, A/E
			eurological Diseases
Sex	Amo		-
	Age	Diagnosis	Experiment
F	67	Alzheimer's disease	P, A/E
F	70	Alzheimer's disease	P, A/E
F	79	Alzheimer's disease	P, A/E
М	65	Alzheimer's disease	P, A/E
Μ	68	Alzheimer's disease	P, A/E
Μ	69	Alzheimer's disease	P, A/E
Μ	78	Alzheimer's disease	P, A/E
М	79	Alzheimer's disease	P, A/E
Μ	81	Alzheimer's disease	P, A/E
F	26	multiple sclerosis	P
F	27	multiple sclerosis	P, A/E
F	29	multiple sclerosis	P, A/E
$\mathbf{F}$	30	multiple sclerosis	P, A/E
$\mathbf{F}$	33	multiple sclerosis	P, A/E
F	36	multiple sclerosis	P, A/E
	36	multiple sclerosis	P, A/E
F			
F F	42	multiple sclerosis	P, A/E
F	42 43 81	multiple sclerosis multiple sclerosis multiple sclerosis	P, A/E P, A/E P, A/E

Table S1: Demographics and clinical data for TLE, SE, CND and CH samples.

$\mathbf{F}$	53	metastatic brain tumour	Р
		(breast cancer)	
$\mathbf{F}$	64	undefined gait disorder	Ρ
F	65	sinus vein thrombosis	Ρ
Μ	72	choroidal melanoma	Р
		(with possible brain metastasis)	
Μ	73	motor neuron disease	Р
Μ	79	right hypoglossal paresis	Р

п	пт	Б
1	L	Ľ

Sex	Age	Diagnosis	Experiment
F	40	TLE right	OA, P, A/E
$\mathbf{F}$	40	TLE+HS	OA, A/E
$\mathbf{F}$	42	focal	OA, P, A/E
$\mathbf{F}$	45	TLE	OA, P, A/E
$\mathbf{F}$	55	TLE	OA, P, A/E
$\mathbf{F}$	56	multifocal epilepsy	OA, P, A/E
Μ	18	TLE right	OA, P, A/E
Μ	20	TLE	OA, P, A/E
Μ	23	TLE	OA, P, A/E
Μ	27	TLE	OA, P, A/E
Μ	34	multifocal epilepsy	OA, P, A/E
Μ	35	TLE	OA, P, A/E
Μ	48	TLE	OA, P, A/E
Μ	57	TLE	OA, P, A/E
Μ	60	TLE left	OA, P, A/E

	SE				
Sex	Age	Semiology	Actiology	Experiment	
F	58	FSE	encephalopathy of unknown origin	OA, P, A/E	
$\mathbf{F}$	59	FSE	undetermined	OA, P, A/E	
$\mathbf{F}$	76	FSE	post-traumatic subarachnoid haemorrhage	OA, P, A/E	
$\mathbf{F}$	78	FSE	brain tumour resection in 1990	Р	
F	81	FSE	undetermined	Р	
$\mathbf{F}$	85	FSE	left temporal lobe tumour	OA, P, A/E	
$\mathbf{F}$	53	NCSE	undetermined	Р	
$\mathbf{F}$	74	NCSE	undetermined	OA, P, A/E	
Μ	60	FSE	alcohol abuse/hypoglycaemia IDDM	OA, P, A/E	
Μ	61	FSE	aneurysmal bleeding	OA, P, A/E	
Μ	77	FSE	immediate SE after stroke	OA, P, A/E	
Μ	91	FSE	apoplexy	OA, P, A/E	
Μ	67	GTC	HIV-encephalitis/schizophrenia	OA, P, A/E	
Μ	78	GTC	lung tumour with brain metastases	OA, A/E	
Μ	83	GTC	dementia	OA, P, A/E	
Μ	53	NCSE	multiple sclerosis	OA, P, A/E	
Μ	63	NCSE	alcohol withdrawal	OA, P, A/E	
Μ	88	NCSE	post-stroke	OA, P, $A/E$	

Key: M = Male; F = Female; FSE = Focal SE; GTC = generalized tonic clonic; NCSE = non convulsive SE; insulin dependent diabetes mellitus (IDDM); DD= differential diagnosis; OA = samples used for profiling; <math>P = samples used in RT-qPCR validation; A/E = samples used for Ago/Exo analysis.

miR-21-5pmiR-21-5pmiR-19b-3pmiR-451aAKT2NFIBARID4BABCB1ANKD46NTF3ATXN1AKT1ANP32APCBP1BACE1BCL2APAF1PDCD4BCL211CAB39BASP1PEL11BMPR2CPNE3BCL2PIAS3CREB1DCBLD2BCL6PLATCUL5FRZBBMPR2POD3CYP19A1IKBKBBTG2PPARADNMT1IL6RCCL20PPIFESR1MIFCDC5APTX3HIPK1MMP9CDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYL1PRAB5ADERL1RHONC0A3ROR2DOCK5RMND5APRKAA1IME70DOCK6RMND5APRKAA1IME70DOCK7RPS7PTENIME70DUSP10RTN4SMAD4IME70E2F2SATB1TGFB1IME70E2F3SASH1SOCS1IME70FMODSMAD7IMAIMAGAS5SMARCA4IMAIMAGDF5SMN1IME72IMAHPGDSOX5IMAIME72ICAM1SOP3IMAIME72IGF11ISCUTGFB1IMAIARA1TGFB1ISCUIGF13STAT3IMAIMP2TOFA1P3IMAMMP3TOPORS<	-			
ANKRD46NTF3ATXN1AKT1APA32APCBP1BACE1BCL2APAF1PDCD4BCL2111CAB39BASP1PELI1BMPR2CPNE3BCL2PIAS3CREB1DCBLD2BCL6PLATCUL5FRZBBMPR2PLOD3CYP19A1IKBKBBTG2PPARADNMT1IL6RCCL20PPIFESR1MIFCCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIAVL4SERPINB5TLR2FMODSMAD7SAGAS5SMARCA4GDF5SMN1HIPK3SO23HYRM5SOX2HYGM1SP14IL18TCF21IRAK1TGFB1SCUTGFBR3JMYTGIF1LIAK1TGFBR3JMYTGFB1SCUTMFAF10BMMP2TNFRSF10B <trt< td=""><td>miR-21-5p</td><td>miR-21-5p</td><td>miR-19b-3p</td><td>miR-451a</td></trt<>	miR-21-5p	miR-21-5p	miR-19b-3p	miR-451a
ANP32APCBP1BACE1BCL2APAF1PDCD4BCL2L11CAB39BASP1PEL11BMPR2CPNE3BCL2PIAS3CRE10DCBLD2BCC6PLATCUL5FRZBBMPR2PLOD3CYP19A1IKBKBBTG2PPARADNMT1IL6RCCL0PPIFESR1MIFCCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1CXCL10RESTMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1IMEDOCK7RPS7PTENIMEDUSP10RTN4SMAD4IMEE2F1SASH1SOCS1IMEE2F2SATB1TGFB1IMEEGFRSECISBP2LTGFBR2IMEEGFSSMAC44IMEIMEGDF5SMARC44IMEIMEGDF5SMARC44IMEIMEGDF5SMARC4IMEIMEIL18TCF21ITAM1IMEIMACKSTMSF3IMEIMEJAG1TGFBR3IMM2IMAJMYTGIF1IMEIMEIRAK1TGFB18IMEIMESCUTMESF30BIMEIMEMAP2K3TIME3IMEIMEMMP2T	AKT2	NFIB	ARID4B	ABCB1
APAFIPDCD4BCL2111CAB39BASP1PELI1BMPR2CPNE3BCL2PIAS3CREB1DCBLD2BCL6PLATCUL5FRZBBMPR2PLOD3CYP19A1IKBKBBTG2PPARADNMT1IL6RCCL20PPIFESR1MIFCCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC441RECKMXD1PKD1CXC110RESTMYLPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFB2EIAVL4SERPINB5TLR2ELAVL4SERPINB5TLR2EAUSMAC44GDF5SMN1HIPK3SOD3HNRNPKSOX5ICAM1SP1IGF1RSP42IACATGFBR3JMYTGFB1ISCUTGFBR3JMYTGF	ANKRD46	NTF3	ATXN1	AKT1
BASP1PELI1BMPR2CPNE3BCL2PIAS3CREB1DCBLD2BCL6PLATCUL5FRZBBMPR2PLOD3CYP19A1IKBKBBTG2PPARADNMT1IL6RCCL20PPIFESR1MIFCCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK5RMND5APRKAA1DOCK7RPS7PTENUSP10RTN4SMAD4E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2EIF4A2SERPINB5TLR2EASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIFHIPK3SOD3	ANP32A	PCBP1	BACE1	BCL2
BCL2PIAS3CREB1DCBLD2BCL6PLATCUL5FRZBBMPR2PLOD3CYP19A1IKBKBBTG2PPARADNMT1IL6RCCL20PJFESR1MIFCCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK5RMND5APRKAA1DOCK7DOCK7RPS7PTENTMED7DOCK5RMND5APRKAA1DOCK7DOCK7RPS7PTENTGFB1EGFRSECISBP2LTGFB2SETEIF4A2SERPINB5TLR2SEEIF4A2SERPINB5TLR2SEERB2SETD2STAT3SOT3HNRNPKSOX2SMARCA4SOT5ICAM1SP1SITSITIGF1RSPRY2SITSITIAG1TGFB1SITSITISCUTGFBR3SITSITJMYTGIF1SITSITIRAK1TGFBISITSITIGF1RSPRY2SITSITIAG1TGFBR3SITSITJMYTGFBR3SITSITJMYTGFBR3SITSITJMYTGFBR3 </td <td>APAF1</td> <td>PDCD4</td> <td>BCL2L11</td> <td>CAB39</td>	APAF1	PDCD4	BCL2L11	CAB39
BCL6PLATCUL5FRZBBMPR2PLOD3CYP19A1IKBKBBTG2PPARADNMT1IL6RCCL0PPIFESR1MIFCCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP1CDC25APTX3HIPK1MMP1CDC25APTX3HIPK1MMP9CDC4A1REXMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7DOCK6RNND5APRKAA1DOCK7DOCK7RPS7PTENLUSP10DUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIAVL4SERPINB5TLR2ELAVL4SERPINB5TLR2FMODSMAC44GDF5SMN1HIPK3SOZ3HYANSOX5ICAM1SPI2HYATGFBR3JAG1TGFBR3JAG1TGFBR3JMYTGF1IRAK1TGFBR3JMYTGF10ILRFIP1TIAM1MAP2K3TIMP3MMP2TORIAIP2 <t< td=""><td>BASP1</td><td>PELI1</td><td>BMPR2</td><td>CPNE3</td></t<>	BASP1	PELI1	BMPR2	CPNE3
BMPR2PLOD3CYP19A1IKBKBBTG2PPARADNMT1IL6RCCL0PPIFESR1MIFCCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25ARASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFLMYLIPRA5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2EIF4A2SERPINB5TLR2EAVL4SERPINI1TP53ERBB2SETD2FASIGFASIGSIRT2SIM1HIPK3SOD3SOX5ICAM1SP1IGFIRSP42IL12ASTAT3IL18TCF21IRAK1TGFBR3JMYTGFBR3JMYTGFBR3JMYTGFI1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP4TP63MYCTPM1MYD88VEGFA <td>BCL2</td> <td>PIAS3</td> <td>CREB1</td> <td>DCBLD2</td>	BCL2	PIAS3	CREB1	DCBLD2
BMPR2PLOD3CYP19A1IKBKBBTG2PPARADNMT1IL6RCCL0PPIFESR1MIFCCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDC25ARASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFLMYLIPRA5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2EIF4A2SERPINB5TLR2EAVL4SERPINI1TP53ERBB2SETD2FASIGFASIGSIRT2SIM1HIPK3SOD3SOX5ICAM1SP1IGFIRSP42IL12ASTAT3IL18TCF21IRAK1TGFBR3JMYTGFBR3JMYTGFBR3JMYTGFI1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP4TP63MYCTPM1MYD88VEGFA <td>BCL6</td> <td>PLAT</td> <td>CUL5</td> <td>FRZB</td>	BCL6	PLAT	CUL5	FRZB
BTG2PPARADNMT1IL6RCCL20PPIFESR1MIFCCL0PTX3HIPK1MMP2CDC25APTX3HIPK3MYCCDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISD22TGFBR2EIF4A2SERPINB5TLR2EAVL4SERPINB5TLR2EAVL4SERPINB5TLR2FASLGSIRT2SIFMODSMACA4SIGDF5SMN1SIHIPK3SOD3SIHNRNPKSOX2SIIL18TCF21SIIL2ASTAT3SIIL18TGFBR3JMYTGIF1LRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP2TNFRSF10BMMP2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88<			CYP19A1	
CCL20PPIFESR1MIFCCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK6RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPIN11TP53ERBE2SETD2FASLGSIRT2FMODSMACA4GDF5SMN1HIPK3SOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP9TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD8VEGFANCOA3WWP1	BTG2		DNMT1	IL6R
CCR1PTENGCM1MMP2CDC25APTX3HIPK1MMP9CDC25APTX3HIPK1MMP9CDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINB5TLR2EASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3ILBTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9S73MEF2CTNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD8VEGFANCOA3WWP1	CCL20	-		
CDC25APTX3HIPK1MMP9CDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINI1TP53ERB2SETD2FASLGFMODSMAD7SOA5GAS5SMARCA4GDF5SMN1HIPK3SOD3HINRNPKSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGFF1IRAK1TGFBR3JMYTGF11IRARITTMP3MAP2K3TIMP3MMP2TNFRSF10BMMP3TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD8VEGFANCAPGVHLNCOA3WWP1				
CDK2AP1RASA1HIPK3MYCCLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINB5TLR2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP9TOPORSMSH2TOR1AIP2MTAPTP63MYCTPM1MYD8VEGFANCAAGVHLNCOA3WWP1				
CLURASGRP1KAT2BOSR1COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINI1TP53ERB2SETD2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX5ICAM1SP1IGF1RSPRY2L12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9S73MEF2CTNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCOA3WWP1		-		-
COL4A1RECKMXD1PKD1CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7DOCK7RPS7PTENDOCK7DUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFREGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPIN11TP53ERB2SETD2FASLGSIRT2FMODSMAD7GAS5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGIF1LRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP3TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	-		-	-
CXCL10RESTMYCNRAB14DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2EAVL4SERPIN11TP53ERB2SETD2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5IL18TCF21IRAK1TGFBR3JMYTGIF1LRFIP1TIAM1MAP2&3TIMP3MMP2TOPORSMS16TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
DAXXRFFLMYLIPRAB5ADERL1RHONCOA3ROR2DOCK4RHOBPPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINB1TP53ERB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MMP2TNFRSF10BMMP3TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
DERL1RHONCOA3ROR2DOCK4RHOBPPP2R5ETMED7DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPIN11TP53ERB2SETD2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP3TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
DOCK4RHOBPPP2R5ETMED7DOCK5RMND5APRKAA1DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINI1TP53ERB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX5ICAM1SP1IGF1RSPRY2L12ASTAT3L1BTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MMP2TNFRSF10BMMP9TOPORSMSH2TOR1AIP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
DOCK5RMND5APRKAA1DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINI1TP53ERBB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9S73MMP2TOFAIP3MMP3TOPORSMMP4TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	-			
DOCK7RPS7PTENDUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINI1TP53ERBB2SETD2FASLGFMODSMAD7SAS5GAS5SMARCA4SGD3HNRNPKSOZ2SIT2HPGDSOX5SIT2IL12ASTAT3SIT3IL18TCF21SIT4IRAK1TGFBR3JMYJMYTGIF1SIMP3MARCKSTMP3SIMACKSMMP2TNFRSF10BSIMP2MMP3TOPORSSISH3MMP4TOPORSSISH3MMP3TOPORSSISH3MMP4TP63TMSH2MTAPTP63SISH2MTAPVEGFASIGFANCAPGVHLSIWP1				IMED7
DUSP10RTN4SMAD4E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINI1TP53ERB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP2TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
E2F1SASH1SOCS1E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINI1TP53ERBB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MF2CTNFRSF10BMMP3TOPORSMSH2TOR1AIP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
E2F2SATB1TGFB1EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPINI1TP53ERBB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP3TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
EGFRSECISBP2LTGFBR2EIF4A2SERPINB5TLR2ELAVL4SERPIN11TP53ERB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP9TOPORSMSH2TOR1AIP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
EIF4A2SERPINB5TLR2ELAVL4SERPINI1TP53ERBB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MMP2TNFAIP3MMP3TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
ELAVL4SERPINI1TP53ERBB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MMP2TNFRSF10BMMP3TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
ERBB2SETD2FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MMP2TNFRSF10BMMP3TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCA3WWP1			-	
FASLGSIRT2FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBRJAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MMP2TOFORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1			TP53	
FMODSMAD7GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBRJAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MMP2TOFAIP3MMP3TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCA3WWP1				
GAS5SMARCA4GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBRJAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MMP2TNFRSF10BMMP3TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCA3WWP1				
GDF5SMN1HIPK3SOD3HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBIISCUTGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MEF2CTNFAIP3MMP2TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCA3WWP1	-			
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HNRNPKSOX2HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBIISCUTGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MEF2CTNFAIP3MMP2TOFORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
HPGDSOX5ICAM1SP1IGF1RSPRY2IL12ASTAT3IL18TCF21IRAK1TGFBIISCUTGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MEF2CTNFASF10BMMP2TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCA3WWP1		SOD3		
ICAM1SP1IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBIISCUTGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	HNRNPK	SOX2		
IGF1RSPRY2IL12ASTAT3IL1BTCF21IRAK1TGFBIISCUTGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	HPGD	SOX5		
IL12ASTAT3IL1BTCF21IRAK1TGFBIISCUTGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP2TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	ICAM1	SP1		
IL1BTCF21IRAK1TGFBIISCUTGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFRSF10BMMP2TOPORSMSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	IGF1R	SPRY2		
IRAK1TGFBIISCUTGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP3TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	IL12A	STAT3		
ISCUTGFBR2JAG1TGFBR3JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	IL1B	TCF21		
JAG1 TGFBR3   JMY TGIF1   LRRFIP1 TIAM1   MAP2K3 TIMP3   MARCKS TM9SF3   MEF2C TNFAIP3   MMP2 TNFRSF10B   MMP9 TOPORS   MSH6 TP53BP2   MTAP TP63   MYC TPM1   MYD88 VEGFA   NCAPG WWP1	IRAK1	TGFBI		
JMYTGIF1LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	ISCU	TGFBR2		
LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	JAG1	TGFBR3		
LRRFIP1TIAM1MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1	JMY	TGIF1		
MAP2K3TIMP3MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
MARCKSTM9SF3MEF2CTNFAIP3MMP2TNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
MEF2CTNFAIP3MMP2TNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1		-		
MMP2TNFRSF10BMMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
MMP9TOPORSMSH2TOR1AIP2MSH6TP53BP2MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1		-		
MSH2 TOR1AIP2 MSH6 TP53BP2 MTAP TP63 MYC TPM1 MYD88 VEGFA NCAPG VHL NCOA3 WWP1				
MSH6 TP53BP2 MTAP TP63 MYC TPM1 MYD88 VEGFA NCAPG VHL NCOA3 WWP1	-			
MTAPTP63MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
MYCTPM1MYD88VEGFANCAPGVHLNCOA3WWP1				
MYD88 VEGFA NCAPG VHL NCOA3 WWP1				
NCAPG VHL NCOA3 WWP1				
NCOA3 WWP1				
	INFIA	1001		

Table S2: Validated targets for miR-21-5p, miR-19b-3p and miR-451a from miR-TarBase (Chou *et al.*, 2016).

Epilesy gene database	Gene				
miR-19b-	-3p				
egad	ARC				
egad	MTRR				
carpedb	NF1				
egad	NR3C1				
carpedb	SLC6A8				
egad	SLC9A1/NHE1				
carpedb	SLC9A6				
carpedb	TCF4				
miR-21-	miR-21-5p				
carpedb	ADNP				
carpedb	EIF2S1				
carpedb	EPM2A				
carpedb	FMR1				
carpedb, egad	IL1B				
carpedb	PLAT				
carpedb	PLD1				
carpedb	ZNF354A				
miR-451a					
carpedb, egad	ABCB1				

Table S3: Validated targets for miR-19b-3p, miR-21-5p and miR-451a from miR-TarBase with genes in the CARPEDB (http://carpedb.ua.edu/search.cfm) and epiGAD (Tan and Berkovic, 2010) databases.

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