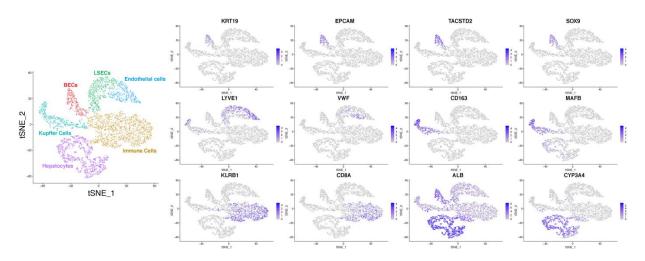
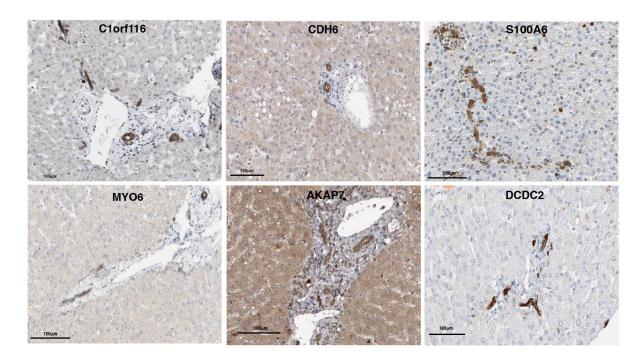


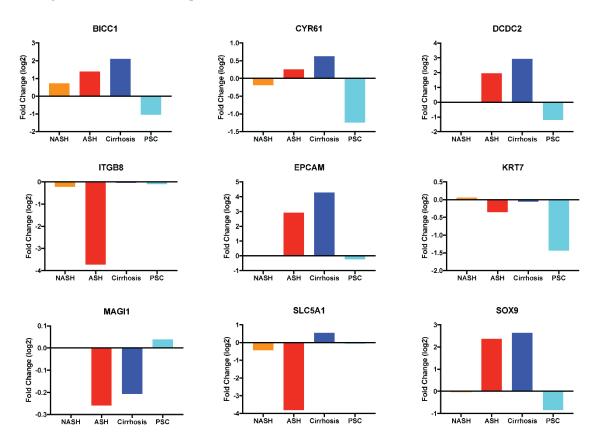
Supplementary Figure S1. (A) TSNE plots of scRNAseq data of hepatocytes and LPCs isolated from healthy and DDC-injured livers, validated hepatocyte (Cyp3a11, Cyp2e1 and Alb) and LPC (Sox9, Epcam, Tacstd2 aka TROP2) markers. The blue scale bar represents normalized counts. TSNE plot by single cell signature explorer with single cell signature analysis of quiescent (B) and activation signature (C) on single cells from Pepe-Mooney et al [28]. Signature scores are presented for each cell using colour gradient and grey colour overlap shows the location of most cells with a high signature score.



Supplementary Figure S2. TSNE plots of scRNAseq data of different cell types isolated from healthy human livers, validated hepatocyte (ALB and CYP3A4), BEC (KRT19, EPCAM, TACSTD2, SOX9), LSECs (LYVE1), Endothelial cell (VWF), Kupffer cell (CD163, MAFB) and other immune cell (CD8A, KLRB1) markers. The blue scale bar represents normalized counts.



Supplemental Figure S3. Immunohistochemistry staining of new potential BEC markers from our BEC signature, obtained from protein atlas.



Supplemental Figure S4. Gene expression of genes in the scBEC signature on transcriptomic data of NASH, ASH, Cirrhosis and PSC. Expression values are compared to their control samples (healthy livers).

Supplementary Table S1. BEC labeling based on injury model.

BEC marker used for isolation	Injury model	Specie	BEC Labeling
MIC1 1C3	Healthy	Mouse	Quiescent
MIC1 1C3	DDC injury	Mouse	Activated
HNF1b	Healthy	Mouse	Quiescent
HNF1b	DDC injury	Mouse	Activated
HNF1b	CDE injury	Mouse	Activated
Folx1	Healthy	Mouse	Initiation
Folx1	DDC injury (3 days)	Mouse	Initiation
Folx1	DDC injury (7 days)	Mouse	Initiation
Folx1	DDC injury (14 days)	Mouse	Activated
EPCAM	Healthy	Mouse	Quiescent
LGR5	CCl4 injury	Mouse	Activated (not used for BEC activation signature)
EPCAM	Cirrhotic liver	Human	Activated
SP	Cirrhotic liver	Human	Activated
TROP2	Cirrhotic liver	Human	Activated

Supplementary Table S2. List of genes expressed by only human or mouse BECs.

Only in human LPCs				Civily in mouse 4LFC	Only in mouse MFC
MTSP DAZZ	SSMS2 EXSEP	TAPRSFILM BROATT	PRIDI CAPAS	PLRT2 CSMR	PHFS6 ANDS
LINCOLES ANCOLE LUZPZ MERGESA	SUCRAG MR17HG	NGFA NGG	SYDEZ PURS WORKS	GAVI GAAI FRENZ	OXMITA. BTC
MR66 IA UDC3001 125 26 LDC600970	TNFAP2 MAPEER	25/F 29/S PPP-08/3L	DOXUGE DOXUGE	ARHGAPS DSEL	MAPELE TAKS
MRIDM MCIAI	LOCHORSE	ADOVE SUMIT	ATPIA TSIFE	ANG CHILI	5MP04 5M0AP2C
NPM-855 16706	NAME AND ADDRESS OF THE PARTY.	ARLEC SICEIAI	000KS 6377	ADMATE IS	2MF276
LOCZROWS	GPRCS B NSURT	AGAPR ARHGEPER	TUBSCP6 FEMIC	WTIP KAZALDI	SETOP POF1
167A7 SNORAG TNF3F9	SARPS CCDC148	GRAMITE TUES	SBF1 HIVEFS TUEZ	DISC. MARY CRES IRRORI ADMATIS ITHE WITH KADALDI ANNICON ANNICON FINALE FERRIL SEFFADA SEFFADA	STEGRANICZ STEGRANICZ SERVE
ORTES EAALETS	POTEM CD53	OHORDCS JMC06	FAMILE FAMILE	M87902 PRSS23	MFIC CDIGJ
6561 HSFE1-MORE RNF222	SYCELL WWTRI-RAI	FORGE TRANS	DADCC DASS	PEDHILS SERTADE PSTLS	SHIAZ SHIAZ SHIACI
UNICODERS DUDIEZ	TNC LOC728668	28792 FAMIFIAI	100F1 GRUNTS		PEE ABHDZ
WASH7P DNASE2	AGRATA	MEET-ASS	RUNKI MARETA		MYCEP PIGEL
SLC14A2 60A37	CISCORE CICORE	CTSF RHSGF1	ARHSAPEZ DDIS1		NEW SORESE
CEUTON	LAMAI COOP1	SC2SA29 RABBS	RANSAPS		HARRY
CRUTS	CMB	STEE	HERCEPE CAMPA		ACTRO ROBTES
PGLO IQCAL	CHOLS	1392 (80Q	YTHOCI		ANDR MERRYS
VIVES VIVES	PLITIZES PLEE	PPP1826 CULT	SPINTS PRECEC		585AP28 67F3C6 65CT
ZCB412A WAKZ	CPT18	FEEPE TURNS	PIGA PIGA		PREASE PASTREE
Cliefs43 ENG	NRSAS PISOFS	TRIMET	ANIA DALKDI		CARRE PRODE
0V0L1 10A4 16SFE	97813 1013 H099083	FLAGEZ LOCE EN 70 EFCE	ATONIA EROCHE		CD151 MARCHO
PPF1835A RNF103-CHMF8	MIXIO PLEDII	CONLI	MISDEL FREPE		2NF430 PRICEA
COUR	NEURLE PCDP1	PLINAS PREPA	AME MARCHS		HOUFER DARKS
PLANERS	TAMES NO.	SLOW? MORIE	PRECIA		WORKS WENTS
HIPAZI. UDC10060605	FRANCE TIMES	ARCR1 WDRS	PRIPLAZ CHER		SEU7
WNT78 HST2HSA	TMPRISIS	ATPEAS DAYKS	2DHC21 8M025		5881 5881
HISTORIC CHSTPASS	SEMMAN KLCI	SACSAS	PENGLI PENGLI		MMX 5733
CTHORDS	MACCIPUS PARTICAL AGAPS	1793A 834437	HOAVE BTGS		78.0427 5305534
FAMILION 1 LOCITATIO	ANXXIII	Clofes	M7106 LOC728377		158657 158657
SICIBAS GPECIA	TICAMS SMIRCAL	HECZ SKGAPI	PPPSRSS CAA/SP		ARHGAP12 CROT
CLD1 LOCISIONNINI GATNIZ	GPRESO	PAMERIA	DOKQ BRTSR		967811 MEDATI
PRSS22 509002	PLEOGS SHEAR VINE TO	MUMBEL CRAMPIL ZYMA	ZETENA TEADS		UBA1 CIBPS
Section Sect	The content of the	WARPA			Section Sect
RHOV END	MEF1 C17urf96 peacetr	DOLN	MAPPE MAPPE INNER		ATPSFIA
57633 57633	CACDEC PORKS	ARHSAP2S MIZAP	PRECIS DINCINS		AVL9 PGERRPS
GOLGANI POS April	VI.1 MSX3	About 19	BCURSS CCDCM		ZMFSSE FEEDOM
HSTIHUBS SERZIS	MA-0 ZETBEE	TPARP PCOX1	299 283 NBPT 13		ROR1 PIMAS
SNORATO CINETOS	TTHG PAS2	FUTE PHE1	VPILI BCOR		KFZA MYSE
Charles	FOOT LENGTOS IS	MAALJ LOCIOOZ71836	DEPSA SVIL		RHBDD2 SRSAP2
TMEMETS	KAADSS6 LOC729603	COBL	RCTD18 MAROSL1		805/LT3
RAPSGAP2	596892 753	THEST SNIPT	C176/63 19151 507563		EDE LYPLA1
DOT31.	RODATZ	1517M.1 OFU27B	BAZZA SECSAR		TMEMING STERM
SICINA SICINA SCANSII	299162 299162	ORMS ZMZ1	CHENNEL		NGEF212 1733.5
GASZ1 SLCTKSP2	SLCESAS ALPKS	CCDC11 PGPDS	MONLIS PHIP		ANHOUSES
OFUDEA ANNECESS	NPCI LOCIOCIBRACT GTPBPS	ENDS CRES	A7F11A NOOR-1		AUBP2 MTSS2
ZYWYMS CNG32	SPEENS SUPPLE	CD04 D9G2	COUTS MCDISS		CDR CRC16
REM2 C336/63	SCHOOL	AMBA3 GPR34	ZNP354 Ph/SA		D6652 D6652
DALM DEAM	SLC26A2 LOCISMODS	NAMES CHAPME	ARHGEPS VPERP RABILITYS		PRCP LYNXII ARHEAPZR
PANESHAL TRANS	110 KS F 100 SCDS	AZG MUTE	MYERPIA		LRPS 19925
05181 051917	OKMT2 CCDC26	CEROPER	CENT		PTPRZ1 TNP00
ECRAIR EGRI	ANKRODOARP PLAUR	2NF182	SICLIM FOP		WWC2
ANOR ANOREGAA	ENCI ENAIROS	ANNECSES LOCKETRIS	7907 608 27907 608		GNAS PLSCKS
68962 885 86663	BAGSE HASES FTFED	281810 11612 EAA1110	H6FDG USF11 FTBF2		TRPCARP RPLIS PRESS
TRPV6 H1FX-651	SPAILS PIPKLS	NUMBER OF THE PERSON NAMED IN	PANEZ PRIEZO		KOMMAS DPF3
SOM LIMBS PROMOS	AGRICA MATAN	UBIZS PPAS	NAMEA NOTE SP28		ARLIER METPLI MERPLE
EAAC285 Clief132	PER2 LAMES	ZKSCANZ	ONTES ANNEASS		THE MOZES
HUNK WORZY	CUCS MO.1	CDR2L TNFRSF30A	MINESPEG MISSELLIS		EP253 FARZ
HSPER TMPRISS	1989/33 5812	PTPNSE	MUFP2 DIOS		15725 50111
USAN EPSIKA	16 VOLUE LOC118280	OTUGE FNBF2L	BOPS BRDCB		UTRN
6010A613 60130131366 FGF9	57C25	UDCTOWER PLEDATE	DDF2L GPR7CHB		THES UND TAPE
CLON9 NORPS	EZK EKZ	PKDGPS SMURP1	ABUMS FBM29		P60 64833
6676 BIK	CUEDCS PROSAPIPS	SUGP2 EAADELS	GPD2 PRICED		SAMESO MESTS
10421 106638 10633	NAMES OF THE PARTY	CSNC353 PANTERS	E14625 100891		TMPO USPSZ
63/6 6912	ANKAR LOCKERON	MAPRIL	REING .		F2RLS MIDES
C20orfs4 MAFF	MYKOM MPTX2	KIMIN	PIOCAP2 5305A11		EP 3E
FAZK FAZK	ARHOLDIS LOCKOLISASES	LCOURF2	MAPS MAPS		PPPEREN
PERIODS USPER	KMADMELS TPLMP1	EARLS EREC	RBM36 VI2F1		STATE O'MER
ARNES BBCS	OCCUMB DEDGS	2FCBrG IMPPSE	PEPEM SPEAKS		DEAY LIEN
EPAA2 HEPE1 EDGATS	MELTS LDOCS	CAD EFIRE SCREET? 27 ANDIA EARSAI ERCO ERCEANAI 27 CING INPES ASAPS TILLE IRF1	ZRTRS USPL1		HEACSS UMPS COL2
HEAR BERAPE	EPE3 EX3	HSPEGALIF Chuf117	CDICIAP		RRAGD PARK1
PCDGTF DUSFE	PPPLEASE LOCALISM	HEPROBER CRUTIST KUTSA BODDS SECREMA BIFECE SECREMA BIFECE SESSAZ MAPCE UPPE	CONSIDER PAN BROS BATHE 2016/00 FORFI HOUSEPAN WYSLYC HIPK CONSIDER CONSIDE		CTF12 ARHGIF22
CLIANS BCLELS	SPAGI	88502 58502	POIPS HOUSEPAS		GATACON DOCKS
PCDHGIF DUSPR C13x79 RC12x35 DUSP2 SECTION*1 LOCACERN WEE3 CDINCER	PAGE SPAGE VILLS APGGZ PLEONG LOCISOTTN Charles	UPF1 M0140	HEFE COALS		ATSCAA TPSSAP2
TPPP	Charles Success	SHOREZ CMTMT TSPRNES	RSRC2 NBPF2E CABINI TOWNER		GFFTS LTBF2 BAKEFTS SAFOR
CARRES	Chories SCCMS PLEOUZ MYSEP PGMSP2 DSSGS GLES	TSPRATS DSC2 KEMBA ZNF6KI LOCKELISH POP1	TOMMIN CHES		SMPOS ATABO
CAMPS CAMPS FAMOR LOCARSON BAPS	0.01	UDCHELIPRE POP1	CHOS BTG1 HMGSBS CARDOS		ATADO SPTICZ CONNESS STREET
SGPF2 DUSPE BENEFIT TO SE	CUINS SHEDIA COLIZAS	TAFED PRES	MAXP		VOME
COLENZ DECE	RAII EPHASS	PYGS LOCIOCISTICS ACMAN	CIGNOI CIGNOI		SLA2
COLMAZ SMAR MANCE MONCE MONCE MONCE MONCE MONCE MONCE MONCE THERE THERE THERE MONCE MO	EPHRS EPHRS EPHRS EPHRS EPHRS EPHRS EPHRS EVICE EPTRS FOLIZ EPTRS	LOCKSTON FOR 1 SELECT SELECT SELECT SELECT SELECT SELECT SELECT SELECT FRES FRES FRES FRES FRES FRES FRES FRES	LOCKERPOL FORDI CODOTIZE FUNDIA RODRO LOCADORI LOCADORI LOCADORI MILE CILATER BYREZ LURAZ SPE ANDI ZILANCE MIRES CODORI BINOT BANDI BINOT BANDI BINOT BANDI		PPF18168
BAGALNTS ATPEAZ ITPEC	RUSC2 IFT140	ACAMB GOLGARA	Charles Charles EPNR2		COMMES LDR1 TMEMESE
TRESSEC	FOSL3 IMSS	25/F-027 25/F	USP42 SP4		MANSCS MANSCS
LOCKHANT ECH2	FOIL2 1853 294711 LADS 6AA1366 OHDB C17W128	CDC428FB PCF11	ZSCANIR MICES		MANICS MANICS BAPPCS SIANG CSGN TOMGLS
	ORSE GTAPEGE MELLERI MELLERI THERESEZ GRANGE MAYE SHANES MAYE MAYE MAYE MAY	SLCSA2 RENDS	END? BAHD1		TOWARD SHORTES
CONSTITUENT CONSTITUENT CONSTITUENT TEREZ	MMLA71 TNFRSF21	CDIONAGE	HCS18		PLES SIMMP
00001 07881 1992	ASPHOG MPP3	MOVES MATERIA METROR	FERS PLAC		ZETERS UNITE
MORE THIPS TAMESON	SHANG MPAT ZHIPPE	SPCRS SACRS	MUS FAMISTA MIDES		CDCAS Chorles APPGPS
TOPAZ MICHOS TOPPOS TOPPOS TOPOS	TRECTOR	INTECNS INFO INCOME INCOME INCOME INFO INFO INFO INFO INFO INFO INFO INFO	URSCP CEP250		59 181 50X
MYSE2 EARLIFIE	287833 KDVQSOTS	50H8F1 F227	NUPSEE CHOTE		RETOR AND 1
PRICES POWER	MOCS EDAM	STIPS EJEKA PORD*	APIL PPMID		DERF PIMOT FREZ
\$1082 PHED82	SECSEAT PARTIES	NFFA EPROD	WHAMM		CMF1 159F11
FAMOUR. CCDOSC*	MODELS MODELS	NUMBER NUMBER	WHAMM THRAPS TRCIDOS WIPP2 PLP2 SAPE2 200 SL2		CHRI
15C2202 H6PROALI	HV5P2	TRIPGO NUMBAL ROS TEL	5AFE2 2NF 117		TAMANGE URPS. SPEKZG
71.13 C35orf12	3131 0422	GCR45L LDC100099177	MYING PMS2PE		FORZ LZTRS
MEPICALI LOCERNISI TLI CISO/BI BRCI COCCAS GREY	CAMSAPS SLMS OHDE STM SPEN REL	MUMAL BMS IPI GCN4L LOCIO0099177 PGD6 WWTRI CBL	200 317 00 9975 MF1MG 9M6198 3MG1 1C2N LMFK2		SPERZIG FORZ LZTRS PPPZCB TRIPS TOPERZ
		PPMGL MPZLII			GACIE
EXTES EXALIZE EXALIZE EXALIZE EXALIZE EXCLANATE EXCLANAT	DOWNER LIAPS SEP	MCAM TIPS	PECI PACS I SANGE SEVERE PACS I SANGE SEVERE PACS I SANGE APPEN SERVE PACS I SANGE		ZMYM2 PHACTRA
ZSCANIZPI TRIMES ZNF20P	287834 287834	M2F1 EDEA CYTHP	SCAP4		TAMMS PRICES LOCAL PRODE PRACE MAPH TURNE SAMM CUPS TELENS MINOP PRESE MINOP PRESE MINOP PRESE MINOP PRESE MINOP
RE2 REDGE	MANGAPII	HEREPU APSSS	588MS 1678A		MUPH TUBASC
LOCHENSO NCOAT	HAMESC HIPSE RIPEZ	TMG18F1 URKC1 TMG1	TRAVEL CTREE		ENTER FRANC CUP1
GAINTS PROME	HSPSGAB2P LOCKINGS	PLEO-GS RABILIFPS	EAA2967 PTEF1		1073.2 TBLXXX1
AMOREZ BCIZ	LAMES. SERTADO	MP21.8 1082 MC21.8 1082 MC21 MC21 MC21 MC21 MC300 MC30	HEFEE WIRPAL		PREAPS SHEAR
BC12 GD4 SCC13A2 HSST2HGBE SLIND MPSD61 DD01		MEPOS MCOLNE SPEAZ	GPAPS ATACIN MINKS WARPTS PASSOCS FORPS		1004 MW2K7 COP21
E1780 MFIDE	LIPH FUNB NPHPE SUCANA ARCHE	MCOUNT SPEAZ CACDS CSP1 CSNCS	SAMPTO PAGEOUS PORTE		COPET
DEGS DEAPS DEF INS	TRATE	USP24	BRIGHTZ POM121C		