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Original research

PARP-1 selectively impairs *KRAS*-driven phenotypic and molecular features in intrahepatic cholangiocarcinoma

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► Additional supplemental material is published online only. To view, please visit the journal online (https://doi.org/10.1136/gutjnl-2023-331237).

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Received 19 October 2023
Accepted 24 May 2024

To cite: Keggenhoff FL, Castven D, Becker D, *et al*. *Gut* Epub ahead of print: [*please include* Day Month Year]. doi:10.1136/gutjnl-2023-331237

ABSTRACT

Objective Intrahepatic cholangiocarcinoma (iCCA) is the second most common primary liver cancer with limited therapeutic options. *KRAS* mutations are among the most abundant genetic alterations in iCCA associated with poor clinical outcome and treatment response. Recent findings indicate that Poly(ADP-ribose) polymerase1 (PARP-1) is implicated in *KRAS*-driven cancers, but its exact role in cholangiocarcinogenesis remains undefined.

Design *PARP-1* inhibition was performed in patient-derived and established iCCA cells using RNAi, CRISPR/Cas9 and pharmacological inhibition in *KRAS*-mutant, non-mutant cells. In addition, *Parp-1* knockout mice were combined with iCCA induction by hydrodynamic tail vein injection to evaluate an impact on phenotypic and molecular features of *Kras*-driven and *Kras*-wildtype iCCA. Clinical implications were confirmed in authentic human iCCA.

Results PARP-1 was significantly enhanced in *KRAS*-mutant human iCCA. PARP-1-based interventions preferentially impaired cell viability and tumourigenicity in human *KRAS*-mutant cell lines. Consistently, loss of *Parp-1* provoked distinct phenotype in *Kras/Tp53*-induced versus *Akt/Nicd*-induced iCCA and abolished *Kras*-dependent cholangiocarcinogenesis. Transcriptome analyses confirmed preferential impairment of DNA damage response pathways and replicative stress response mediated by CHK1. Consistently, inhibition of CHK1 effectively reversed PARP-1 mediated effects. Finally, *Parp-1* depletion induced molecular switch of *KRAS*-mutant iCCA recapitulating good prognostic human iCCA patients.

Conclusion Our findings identify the novel prognostic and therapeutic role of *PARP-1* in iCCA patients with activation of oncogenic *KRAS* signalling.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ PARP-1 is involved in multiple oncogenic pathways and processes, including DNA repair, genomic stability, chromatin modification, energy metabolism and apoptosis. Evidence suggests an association between *PARP-1* overexpression and *KRAS* mutations in various cancers, such as acute myeloid leukaemia and colorectal cancer. However, there is limited information available on the impact of *PARP-1* expression on therapeutic response in *KRAS*-mutant intrahepatic cholangiocarcinoma (iCCA).

WHAT THIS STUDY ADDS

⇒ Our results demonstrate that *KRAS*-mutant iCCA cells become highly sensitive to PARP-1 depletion and inhibition in vitro while Parp-1 deficient mice show reduced cholangiocarcinogenesis in vivo. Mechanistically, PARP-1 effects in *KRAS*-mutant iCCA are mediated through CHK1 activation, and this process can be reversed by chemical inhibition. Inhibiting PARP-1 in *KRAS*-mutant tumours leads to a favourable change in prognostic outcome for human iCCA.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ These findings reveal a novel prognostic and therapeutic role of PARP-1 in iCCA patients with activated oncogenic KRAS signaling and poor prognosis. This knowledge may open new avenues for targeted therapies in this particular subset of iCCA patients.

INTRODUCTION

Intrahepatic cholangiocarcinoma (iCCA) is the second most common primary liver cancer (PLC) with increasing incidence and rising mortality rates.[1–3] A profound genetic heterogeneity and diverse spectra of prognostically distinct molecular subgroups render iCCA a prototype for precision oncological approaches.[4 5] Several druggable alterations in oncogenic signalling pathways (eg, *fibroblast growth factor receptor 2 gene* fusions,

isocitrate dehydrogenase 1 and 2 mutations) have been identified in iCCA. The application of specific inhibitors became a new mainstay of therapy and significantly improved the overall survival of patients. However, despite great progress in molecularly guided therapy, only 30%–40% of the iCCA patients present with the above-mentioned druggable alterations.[6] Thus, therapeutic options remain severely limited for the majority of patients. Among the most prominent alterations identified in iCCA, *KRAS* mutations historically posed significant challenges for specific targeting.[2 7] Activating *KRAS* mutations have been observed in around 10%–15% of iCCA patients. Importantly, *KRAS* alterations are characterised by poor response to commonly used chemotherapy and display a reduced overall survival.[8 9] Besides direct protumourigenic properties and increased proliferative characteristics, activated RAS-signalling results in increased intracellular stress which renders RAS-driven tumours particularly dependent on non-oncogenic mechanisms that promote oxidative stress response, apoptosis, and, particularly, DNA damage response (DDR).[10 11]

Several lines of evidence suggest that inhibition of the DDR protein PARP-1 might selectively affect the survival of *KRAS*-mutant tumour cells of different entities, including colorectal cancer (CRC) as well as acute myeloid leukaemia (AML).[12–14] PARP-1 is the most prominent member of the PARP family, involved in several cellular processes such as DDR, genomic stability, chromatin modification, transcription regulation, energy metabolism and programmed cell death. It catalyses poly(ADP-ribosyl)ation (PARylation) on metabolic, oxidative or genotoxic stress and influences the cellular metabolic status by enhancing NAD+ and ATP consumption.[15 16] Inhibition of PARP-1 is closely linked to the concept of synthetic lethality, as pharmacologically inactivated PARP-1 is trapped onto the DNA, causing stalling of the replication fork and thereby sensitising DDR-deficient cells.[17] Consequently, PARP-1 inhibitors have emerged as a therapeutic option in BRCA1/2-mutant ovarian and breast cancers, as well as in prostate and pancreatic cancer that depend on functional DNA repair mechanisms.[18 19] Several clinical trials evaluate PARP-1 inhibition in CCA, however, the mechanistic and therapeutic relevance of *PARP-1* and its inhibition in the context of *KRAS*-mutant iCCA is unknown.[20] In the presented study, we aimed to dissect phenotypic and molecular characteristics of *PARP-1* in iCCA with a particular focus on *KRAS*-mutant subgroups known to have a high cellular turnover (thus, constitutively activated DNA repair mechanisms).[10 11]

RESULTS

PARP-1 expression is abundant in *KRAS*-mutant iCCA

Given the relevance of deregulated DNA repair mechanisms in cholangiocarcinogenesis (particularly homologous recombination (HR) and non-homologous end-joining (NHEJ)), we sought to investigate the relationship between *KRAS* mutations and *PARP-1* expression (figure 1A).[12 13] First, we aimed to investigate a putative association between both molecules in iCCA tissue and analysed the correlation between *PARP-1* and *KRAS* expression in the TCGA patient cohort.[21 22] The median expression of *PARP-1* and *KRAS* was significantly upregulated in cholangiocarcinoma (CHOL) ($p<0.01$) (online supplemental figure S1A-C). Further, pairwise correlation analysis showed a positive correlation ($r=0.6$, $p<0.0001$) (online supplemental figure S1D,E) between both genes. Interestingly, while *PARP-1* expression was significantly upregulated in both iCCA and HCC, association with *KRAS* could only be confirmed in iCCA. To confirm these observations, we performed PARP-1 staining using a tissue microarray (TMA) comprising 194 iCCA as well as 54 specimens from normal bile ducts. We confirmed that PARP-1 levels were significantly increased in iCCA versus normal bile duct (online supplemental figure S1F, $p<0.0001$). In addition, we evaluated the expression of *PARP-1* in an independent iCCA cohort including 151 iCCA, 143 surrounding liver and nine normal bile ducts. Consistently, a significant upregulation of the *PARP-1* on a transcriptome level was observed in iCCA in comparison with the surrounding liver and normal bile ducts (online supplemental figure S1G). In addition, expression of *PARP-1* was positively correlated with genes known to be associated with proliferative capacity (online supplemental figure S1H). Interestingly, expression of *PARP-1* also showed a significant association with overall survival and recurrence-free survival based on *KRAS* status in iCCA (online supplemental figure S1I).

Next, we examined *PARP-1* expression in a variety of different *KRAS*-mutant and *KRAS*-wildtype iCCA cell lines. Consistently, we found a significant overexpression of *PARP-1* in *KRAS*-mutant iCCA cell lines versus non-mutant cell lines (CCC33 vs CCC16 $p=0.0240$; WITT vs HuCCT1 $p=0.0142$; WITT vs RBE $p=0.0034$; HuH28 vs HuCCT1 $p=0.0113$; HuH28 vs RBE $p=0.0023$) (figure 1B). Significant increase of PARP-1 could further be confirmed on protein level (CCC33 vs CCC16 $p=0.0286$; WITT vs HuCCT1 $p=0.0105$; WITT vs RBE $p=0.0122$; HuH28 vs HuCCT1 $p=0.0162$; HuH28 vs RBE $p=0.0234$) (figure 1C,D). Together, these investigations support the hypothesis that *PARP-1* is preferentially upregulated on RNA and protein level in *KRAS*-mutant, but not *KRAS*-wildtype iCCA.

KRAS-mutant iCCAs show preferential sensitivity towards *PARP-1* inhibition in vitro

Given the potential association of *KRAS* mutations and *PARP-1* overexpression in iCCA, we next employed selective RNAi knockdown of *PARP-1* in the *KRAS*-mutant and non-mutant iCCA cell lines to further characterise the potential of *PARP-1* as a putative therapeutic target in this subgroup of patients. Successful knockdown of PARP-1 protein expression was confirmed by Western blotting overall achieving a 66.6%–83.8% reduction compared with control cells (CCC33 78.5%, $p=0.0091$; CCC16 71.0%, $p=0.0040$; WITT 66.6%, $p=0.0358$; HuCCT1 82.4%, $p<0.0001$; RBE 83.8%, $p=0.0006$) (figure 1E). Importantly, PARP-2 protein levels were not affected by the PARP-1 knockdown. Notably, transfection of the *KRAS*-wildtype iCCA cell line HuH28 was not successful due to the low proliferation rate of this cell line. The impact of *PARP-1* knock-down on proliferation was subsequently demonstrated using CFU and SFU. A significant reduction of colony (CCC16 40.5%, $p=0.0043$; HuCCT1 38.8%, $p=0.0243$; RBE 40.4%, $p=0.0002$) and spheroid (CCC16 40.8%, $p=0.0041$; HuCCT1 41.5%, $p<0.0001$; RBE 46.7%, $p<0.0001$) formation capacity ranging from 35.6% to 45.8% was observed in *KRAS*-mutant versus control cells. In contrast, neither colony nor spheroid formation capacity was affected in *KRAS*-wildtype iCCA cell lines (figure 1F).

Next, we used the FDA-approved PARP-1 inhibitor olaparib to confirm the association of PARP-1 and KRAS in the context of chemical inhibition. In concordance with the finding from RNAi experiments, *KRAS*-mutant iCCA cell lines showed a significantly reduced viability in response to PARP-1 inhibition compared with *KRAS*-wildtype cell lines (CCC33 vs CCC16 $p=0.0068$; WITT vs HuCCT1 $p=0.0078$; WITT vs RBE $p=0.0026$; HuH28 vs HuCCT1 $p=0.0725$; HuH28 vs RBE $p=0.0114$) (online supplemental figure S2A). Moreover, olaparib caused

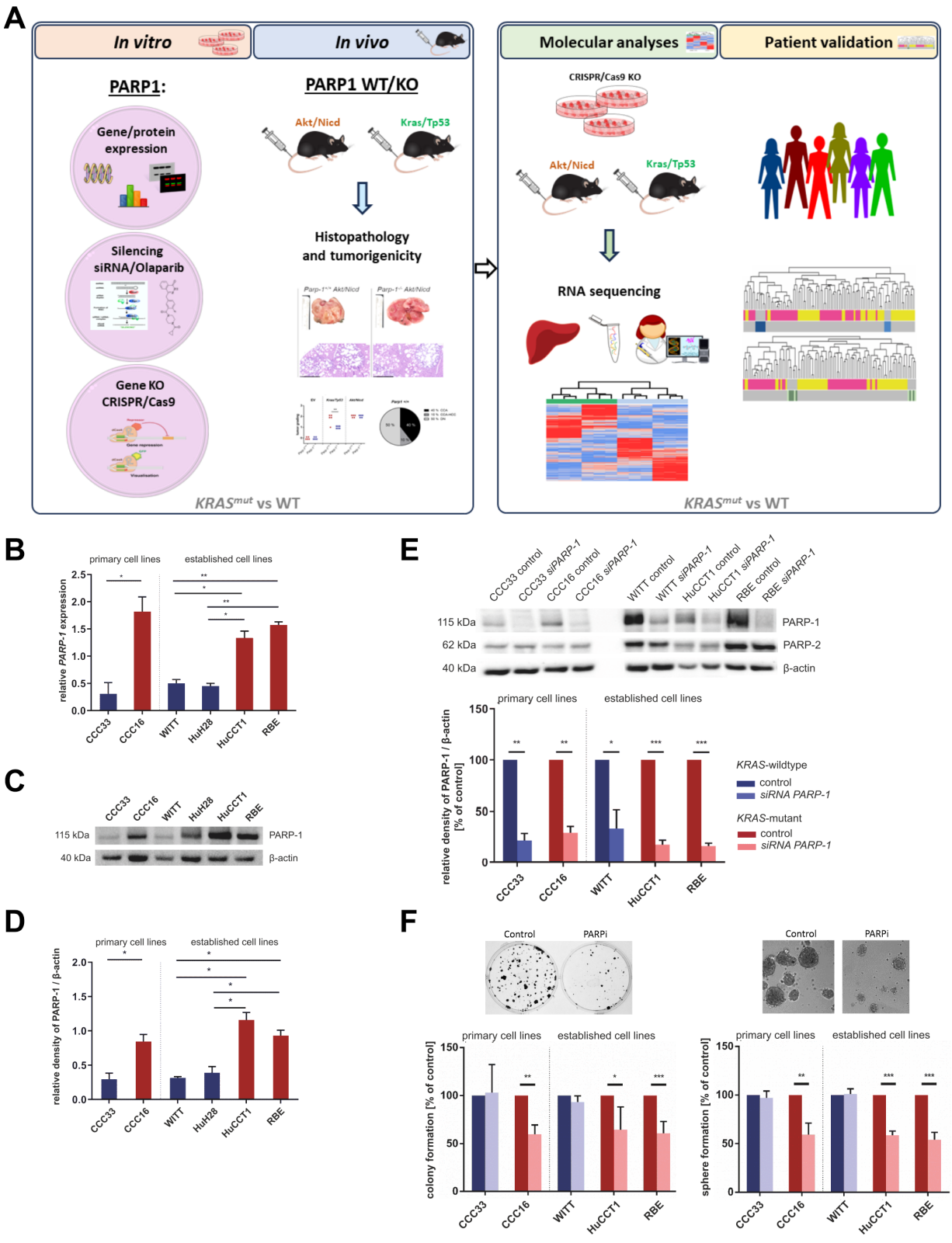

Figure 1 PARP-1 expression in *KRAS*-mutant and *KRAS*-wildtype iCCA and effect of siRNA-mediated knockdown of *PARP-1* on cell viability, colony and sphere formation capacity. (A) Graphical representation of the experimental design. (B) Relative *PARP-1* expression normalised to normal liver tissue in *KRAS*-mutant (CCC16, HuCCT1, RBE; red) and *KRAS*-wildtype iCCA cell lines (CCC33, WITT, HuH28; blue). Mean±SD, n=3, *p<0.05, **p<0.01. (C) Representative Western blot and (D) densitometry analysis of basal PARP-1 protein expression in *KRAS*-mutant and *KRAS*-wildtype iCCA cell lines. Relative density of PARP-1 expression normalised to β-actin is shown. Mean±SD, n=3, *p<0.05. (E) Representative Western blot and densitometric analysis of siRNA-mediated knockdown of PARP-1 protein expression in *KRAS*-mutant (CCC16, HuCCT1, RBE; red) and *KRAS*-wildtype iCCA cell lines (CCC33, WITT; blue). Relative density of PARP-1 expression normalised to β-actin is shown. Mean±SD, n=3, *p<0.05, **p<0.01, ***p<0.001. (F) Representative images of colony and sphere formation assay as well as % of control after siRNA-mediated *PARP-1* knockdown in *KRAS*-mutant and *KRAS*-wildtype iCCA cell lines. Mean±SD, n=3, *p<0.05, **p<0.01, ***p<0.001. iCCA, intrahepatic cholangiocarcinoma.

a selective G1 cell cycle arrest in *KRAS*-mutated primary cells (online supplemental figure S2B).

In addition, PARP-1 inhibition also led to a decrease in the number of CFU and SFU in *KRAS*-mutant iCCA cell lines (CFU: CCC16 50.3%, p=0.0003; HuCCT1 51.6%, p<0.0001; RBE 49.6%, p<0.0001; SFU: CCC16 36.6%, p<0.0001; HuCCT1 38.5%, p=0.0002; RBE 42.1%, p<0.0001). Although olaparib exerted slight effects on colony formation in *KRAS*-wildtype iCCA cell lines CCC33 (27.6%, p=0.0003) and WITT (8.4%, p=0.0171), the spheroid forming capacity of *KRAS*-wildtype iCCA cell lines remained unaffected in all cell lines on olaparib treatment (online supplemental figure S2C). Notably, reduction in CFU was considerably less pronounced in *KRAS*-wildtype versus *KRAS*-mutant cells, which is presumably due to unspecific toxic effects of olaparib unrelated to PARP-1 inhibition.

To unveil potential synergistic effects between olaparib and cytotoxic compounds used for iCCA therapy, we treated KRAS-wildtype and mutated primary cell lines (CCC16 and CCC33) with olaparib in combination with cisplatin and gemcitabine. Combination therapy showed a significantly higher level of synergism for both tested drugs, gemcitabine and cisplatin, in the *KRAS*-mutated cell line (online supplemental figure S2D). To further address whether inhibition of other components of the DDR would induce a similar selective response in *KRAS*-mutated cancers, we tested the efficacy of an additional drug involved in DDR, namely the DNA-PKcs inhibitor KU57788, leading to inhibition of NHEJ. Consistent with a selective effect of PARP-1 inhibition in *KRAS*-mutated iCCA, effect of KU57788 was independent of the mutational status and no significant differences between *KRAS* WT and KO cell lines were observed (online supplemental figure S2E). Taken together, these investigations confirm the preferential antitumourigenic effects of PARP-1-based interventions in *KRAS*-mutant iCCA cell lines and validate the potential utility of combination therapy for the treatment of this subtype of iCCA.

Impact of *PARP-1* depletion on transcriptomic profile, DDR and ROS in *KRAS*-mutant iCCA cell lines

Our functional analyses showed pronounced *KRAS*-dependent differences in iCCA cell lines on PARP-1-based interventions. To further define molecular alterations influenced by PARP-1 inhibition, we generated stable *PARP-1* knockout (*PARP-1* KO) clones of the different iCCA cell lines HuCCT1, RBE, WITT and CCC33 using CRISPR/Cas9 followed by RNA sequencing (online supplemental figure S3A).

First, we explored whole transcriptome differences in *PARP-1* KO in *KRAS*-mutant iCCA cell lines compared with their scrambled control clones using Wald's statistics and revealed a total of 1171 (660 down, 511 up) differentially expressed genes (p<0.05; online supplemental table S1). Accordingly, unsupervised hierarchical cluster analyses and principal component analysis plot confirmed that *PARP-1* KO clones of both *KRAS*-mutant iCCA cell lines display distinct molecular profiles (figure 2A).

We also evaluated functional signalling pathways related to the differential response to *PARP-1* deficiency and identified that gene sets related to cell cycle control, for example, G1/S checkpoint regulation as well as BRCA1-mediated DNA damage, among others, were significantly dysregulated after *PARP-1* KO (figure 2B). In addition, oxidative stress response (NRF-2 mediated oxidative stress response, HIF1α signalling) as well as apoptosis-related pathways (death receptor signalling, apoptosis signalling, Necroptosis signalling, and Myc-mediated apoptosis) were affected by selective depletion of *PARP-1* in *KRAS*-mutant iCCA cells (figure 2B). Further, the cell lines also showed disruption in known oncogenic signalling resembling ERK/MAPK, p53, HIF1α and NF-κB signalling after *PARP-1* depletion. Moreover, *PARP-1* KO enhanced adverse processes in *KRAS*-mutant iCCA cell lines (online supplemental figure S4A), known to promote hepatobiliary carcinogenesis. Consistently, gene sets related to DNA repair mechanisms, such as the G2/M DNA damage checkpoint and BER, apoptosis and TGFβ signalling were significantly enriched in *KRAS*-mutant *PARP1* KO cells (online supplemental figure S4B). Overall, transcriptomic analyses indicated a dependency of *KRAS*-mutant iCCA cells on functional DNA repair mechanisms to compensate for increased oxidative stress, apoptotic stimuli and replicative stress induced by a high cellular turnover and proliferative capacity of *KRAS*-mutant iCCA cell lines on *PARP-1* KO, which might confer the distinct effects in *KRAS*-mutant iCCAs.

We further evaluated the impact of irradiation and oxidative stress on *KRAS*-mutant and *KRAS*-wildtype iCCA cell lines on *PARP-1* KO. First, we investigated the impact of irradiation-induced DNA damage in *PARP-1* KO clones by measuring phospho-γH2AX foci as a marker for DNA double-strand breaks. Irradiation led to a significantly increased number of DNA double-strand breaks in *KRAS*-mutant iCCA cell line RBE only in *PARP-1* KO clones compared with control conditions (online supplemental figure S5A). In contrast, *KRAS*-wildtype iCCA cell line CCC33 showed a significantly increased number of DNA double-strand breaks independent of *PARP-1* KO status. Assessment of ROS level showed that in *KRAS*-mutant iCCA cell line RBE the basal ROS levels were significantly higher in the *PARP-1* KO clones when compared with their respective scrambled control clones. In contrast, the basal status of ROS did not differ in *PARP-1* KO clone of *KRAS*-wildtype iCCA cell line CCC33. Consistently, H_2O_2 administration led to a significant increase in oxidative stress in *KRAS*-mutant iCCA cell lines, whereas levels of oxidative stress in *KRAS*-wildtype iCCA cell line CCC33 remained unaffected (online supplemental figure S5B).

Mechanism of PARP-1 regulation was further explored in authentic iCCA tumours harbouring *KRAS* mutation. *KRAS*-mutated iCCA showed upregulation of genes associated with DNA double-strand break repair mechanisms. In addition, genes associated with HR (eg, *BARD1, EXO1, RAD54L, CHEK1, UIMC1, RAD51, BRCA2*) and both canonical and alternative NHEJ (c-NHEJ; eg, *XRCC4, DCLRE1C*; alt-NHEJ; eg, *POLQ, LIG1, FEN1, XRCC1*) were activated (online supplemental figure S5C). We further tested enrichment of gene sets in *KRAS*-mutant tumours to test association with PARP-1 and DNA damage control. Analyses revealed enrichment of BRCA1 and HR in the tumours carrying *KRAS* mutation (online supplemental figure S5D). To substantiate these observations, we performed RPPA analyses of two primary cell lines representing the mutational *KRAS* status and confirmed that proteins involved in HR are significantly increased in *KRAS*-mutated cells (CCC16) (CtIP, RAD50 and RAD51) (online supplemental figure S5E). Thus, these investigations underline that major mechanisms of DNA damage repair, including *PARP-1*, are closely associated with *KRAS* mutation in iCCA.

In addition, we preformed single-cell analysis of tumours from 11 iCCA patients. These analyses confirmed differential expression of DDR genes in malignant cells from patients with *KRAS* mutations compared with those cells derived from patients without the mutations. This was not observed in non-malignant cells, suggesting that the phenomenon is tumour cell specific (online supplemental figure S6A-C).

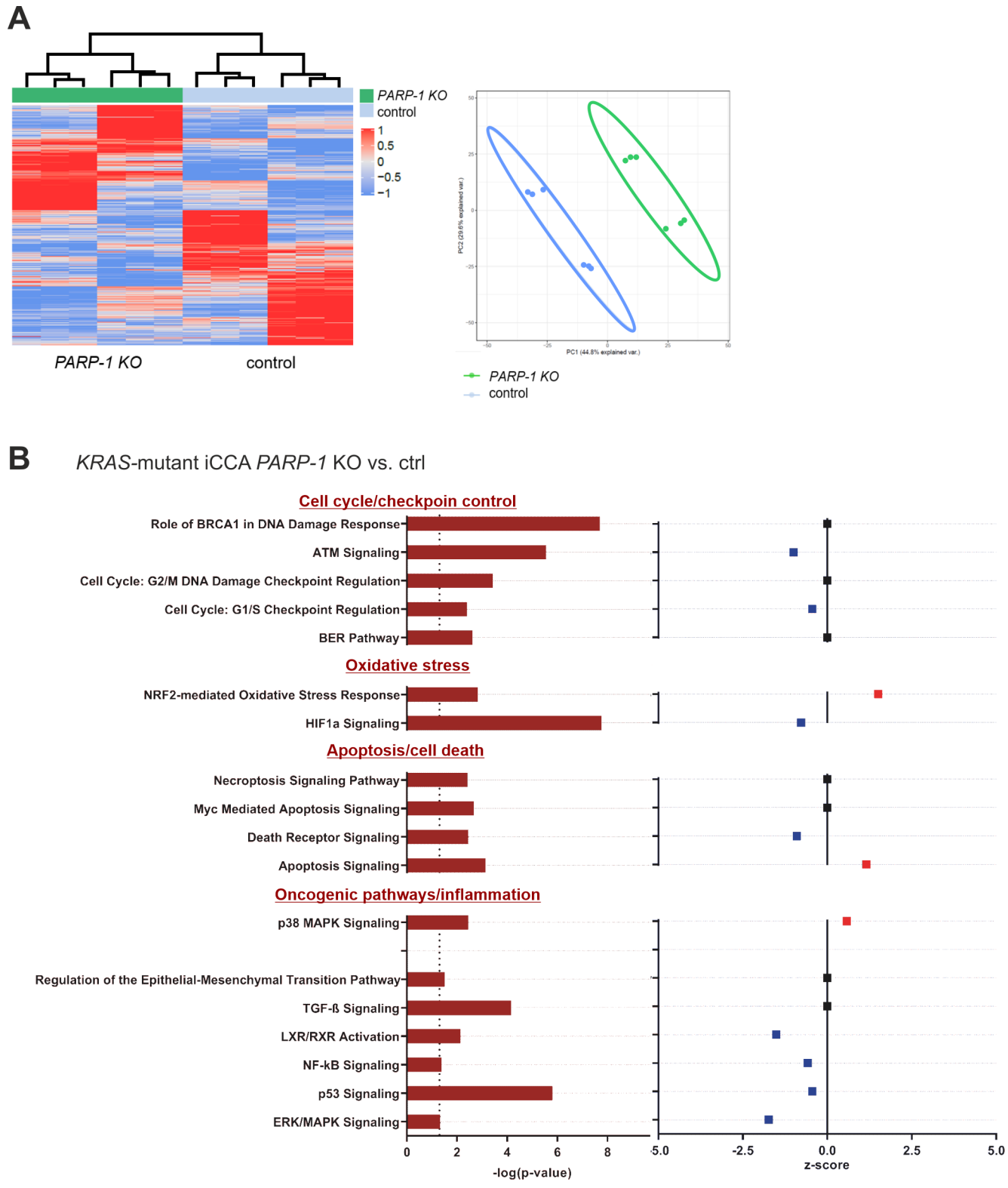

Figure 2 Differential gene expression in *KRAS*-mutant iCCA cell lines on *PARP-1* KO. (A) Unsupervised cluster and PCA of significant genes (p<0.05) of *KRAS*-mutant iCCA cell lines (HuCCT1, RBE) on *PARP-1* KO versus control. (B) Canonical pathways significantly regulated in *KRAS*-mutant iCCA cell lines on *PARP-1* KO versus control identified by IPA. The dashed line indicates the significance threshold of –log (p value >1.3). Shown are z-scores of respective canonical pathways (positive z-score=red/activated, negative z-score=blue/inhibited). iCCA, intrahepatic cholangiocarcinoma; IPA, ingenuity pathway analysis; PCA, principal component analysis.

Hepatobiliary carcinogenesis is selectively impaired in *Kras/Tp53*-driven tumours with genetic *Parp-1* deficiency

To dissect the relevance of *PARP-1* in *KRAS*-driven and non-*KRAS*-mutant iCCA development, we employed HDTV-induced hepatobiliary carcinogenesis in genetically modified *Parp-1* proficient and deficient mice. Herein, *Kras* induction

together with *Tp53* knockdown (*Kras*/*Tp53*) led to preferential occurrence of distinct solid tumours within 10 weeks after injection in *Parp-1* proficient mice (online supplemental figure S7A). Histopathological analyses of an expert hepatopathologist revealed tumours with gland-like structures in accordance with the diagnosis of iCCA, most often well differentiated, in one example also with signs of dedifferentiation with sarcomatoid tumour cells including tumour giant cells (figure 3A, online supplemental figure S8A). No mucin production was observed, that is, the tumours resemble iCCA of small-duct type. In addition, *Parp-1* proficient mice also displayed multiple small-cell dysplastic foci and nodules with development of early hepatocellular carcinoma and focal tumourous vein invasion (online supplemental figure S8B).

In striking contrast, animals with *Parp-1* deficient genotype were characterised by a complete absence of CCA features. Histopathological assessment revealed multiple, diffuse hepatocellular carcinomas as well as dysplastic nodules with focal tumourous vein invasion (figure 3A). Further, moderate macrovesicular steatosis (11%–50%) and disrupted architecture of liver parenchyma was also observed (online supplemental figure S8A,B). These investigations suggest that the *Parp-1* deficiency preferentially inhibits cholangiocarcinogenesis.

Mice with tumours induced by *Kras*/*Tp53* combination showed significant differences in their average body weight between *Parp-1*$^{+/+}$ and *Parp-1*$^{-/-}$ animals with 27.8 g and 29.7 g, respectively (p=0.0234). Further, the average liver weight significantly differed depending on the *Parp-1* status with 2.75 g for *Parp-1*$^{+/+}$ and 6.10 g for *Parp-1*$^{-/-}$ mice (p<0.0001), likely due to the presence of tumour nodules (online supplemental figure S7B). Consistently, we observed pronounced differences in liver to body weight (L/B)-ratio and scoring on *Kras*/*Tp53* injection between *Parp-1*$^{+/+}$ and *Parp-1*$^{-/-}$ experimental groups (L/B-ratio p<0.0001, tumour scoring p=0.003) (figure 3B-D).

Interestingly, classic biliary marker (Sox9) confirmed cholangiocarcinoma in tumour sections of *Parp-1*$^{+/+}$ mice injected with *Kras*/*Tp53*, whereas dysplastic nodules in surrounding liver sections of *Parp-1*$^{+/+}$ mice as well as of *Parp-1*$^{-/-}$ mice were expectedly negative for Sox9 expression, confirming the hepatocellular lineage of these cells (figure 3A). Nuclear Parp-1 expression was detectable in all sections of *Parp-1*$^{+/+}$ mice, whereas no Parp-1 expression was determined in *Parp-1* deficient liver sections (*Parp-1*$^{+/+}$ tumour vs *Parp-1*$^{-/-}$ dysplastic foci p<0.0001; *Parp-1*$^{+/+}$ dysplastic foci vs *Parp-1*$^{-/-}$ dysplastic foci p<0.0001) (online supplemental figure S9A). As expected, significantly higher proliferation (Ki67) was detected in tumour tissue of *Parp-1* proficient mice compared with dysplastic nodules (*Parp-1*$^{+/+}$ tumour vs *Parp-1*$^{+/+}$ dysplastic foci p<0.0001; *Parp-1*$^{+/+}$ tumour vs *Parp-1*$^{-/-}$ dysplastic foci p<0.0001) (online supplemental figure S9A). Further, DNA damage sites represented by γH2ax positive foci were randomly distributed in both tumour and surrounding liver sections of *Parp-1*$^{+/+}$ mice and significantly more pronounced than in *Parp-1*$^{-/-}$ mice (*Parp-1*$^{+/+}$ tumour vs *Parp-1*$^{-/-}$ dysplastic foci p<0.0001; *Parp-1*$^{+/+}$ dysplastic foci vs *Parp-1*$^{-/-}$ dysplastic foci p=0.009) (online supplemental figure S9A). Taken together, the histopathological assessment of the *Kras*/*Tp53*-induced tumours showed differences in tumour entity from the evolution of cholangiocellular carcinoma instead of hepatocellular carcinoma, confirming that iCCA development in *Kras*-mutant cancers is highly dependent on proficient *Parp-1* signalling.

To confirm the relevance of activated *Kras* in a *Parp-1* deficient background, non-*Kras*-driven iCCAs were induced by myrAkt/myc-tagged Nicd (combination referred to as *Akt*/*Nicd*). Average body and liver weight did not differ significantly dependent on the *Parp-1* genotype in the *Akt*/*Nicd* model (online supplemental figure S7B). Further, animals injected with *Akt*/*Nicd* developed tumours and cystic alterations 7 weeks after HDTV with pronounced hepatomegaly as well as steatohepatitis independent of the *Parp-1* genotype (figure 3A, online supplemental figure S8A). An expert pathologist classified the tumours as iCCA with well to moderate differentiation grade (G1–2), severe macrovesicular steatosis (>50%) and disrupted architecture of liver parenchyma due to the occurrence of multiple tumour foci (online supplemental figure S8B). Sporadic or unspecific effects of HDTV were excluded in livers of mice injected with empty vector (EV) control (results not shown). In contrast to *Kras*/*Tp53*-induced hepatobiliary tumour growth, EV-injected and *Akt*/*Nicd*-injected animals showed no differences in morphology, histological classification and quantification (L/B-ratio, tumour scoring) of tumours/livers (figure 3B–D, online supplemental figures S8A,B and S9B). Thus, a selective effect of *Parp-1* depletion in *Kras*/*Tp53*-driven tumours was confirmed.

Impact of *Parp-1* deficiency on the transcriptome of *Kras*/*Tp53*-induced cholangiocarcinogenesis via HDTV

To further define the molecular features underlying distinct morphological and histopathological differences in the groups, we performed RNA sequencing of HDTV-induced tumours driven by *Kras*/*Tp53* or *Akt*/*Nicd*.

We identified a total of 7661 differentially expressed genes (4577 downregulated, 3084 upregulated) between liver/tumour tissue samples of *Kras*/*Tp53 Parp-1*$^{+/+}$ and *Parp-1*$^{-/-}$ animals (p<0.05) (figure 4A; online supplemental table S2). Pathways related to cell cycle control, like G1/S checkpoint regulation and G2/M DNA damage checkpoint regulation and ATM signalling were among the prominent molecular changes associated with the phenotype (figure 4B, online supplemental figure S10). Further, the DNA double-strand break repair pathway associated with BRCA1 was predicted to be negatively regulated in *Parp-1* deficient animals versus *Parp-1* proficient animals. These findings suggest that DDR mechanisms are dysregulated in *Kras*/*Tp53*-injected animals in a *Parp-1*-dependent manner. Further functional networks involved inhibition of oxidative stress pathways (NRF-2-mediated oxidative stress response, HIF1α signalling), whereas apoptosis-related pathways were activated (death receptor signalling) in *Parp-1* deficient animals. *Kras*/*Tp53* induced tumours under *Parp-1* KO showed enrichment of LXR/RXR, p53, PTEN and HIPPO signalling. Inhibition of pathways was shown in key oncogenic pathways like TGFβ, NF-κB, Notch and ERK/MAPK signalling (figure 4B). Interestingly, several DNA repair pathways were significantly enriched in *Parp-1*$^{+/+}$ mice injected with *Kras*/*Tp53*. Besides DNA single-strand break repair mechanisms, also double-strand break repair pathways (NHEJ, HR) were enriched suggesting that *Parp-1* proficiency is important for DDR and repair mechanisms in *Kras*-driven hepatobiliary tumourigenesis (online supplemental figure S11A). Activation of key pathways identified at the transcriptomic level was validated by IHC in *Kras*/*Tp53 Parp-1*$^{-/-}$ animals (online supplemental figure S10C). These findings are in concordance with our in vitro findings (figure 2, online supplemental figure S4).

To confirm the selective effects of *Kras* in *Parp-1* deficient animals, we analysed transcriptomic profiles of *Parp-1* deficient and proficient mice injected with *Akt*/*Nicd*. The number of significantly altered genes was considerably less, comprising only 158 (95 down, 63 up) differentially expressed genes (p<0.05)

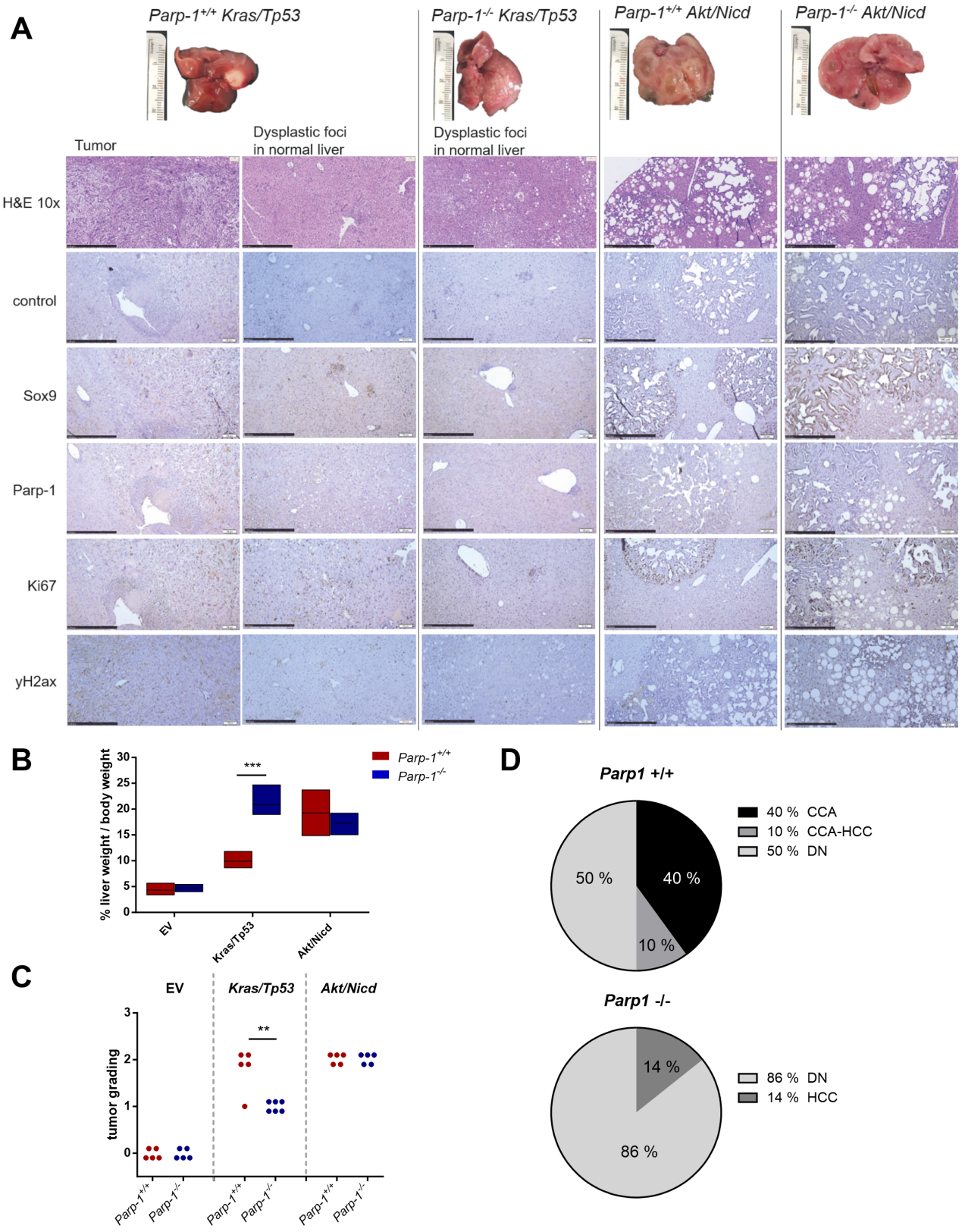

Figure 3 Histology and immunohistochemistry (IHC) of liver sections injected with *Kras/Tp53* via HDTV and *Akt/Nicd* via HDTV and quantification of in vivo tumour growth. (A) Representative images of livers with tumour induction via HDTV (*Kras/Tp53; Akt/Nicd*) in *Parp-1*$^{+/+}$ (n=5/6) and *Parp-1*$^{-/-}$ mice (n=6). H&E and IHC staining of selected proteins (Sox9, Parp-1, Ki67 and γH2ax) of representative paraffin-embedded tumour sections are shown (3.5 µm). Scale bars indicate 500 µm (×10, H&E) and 1000 µm (×5, IHC). (B) Liver weight/body weight ratio (%) of *Parp-1*$^{+/+}$ mice (blue) and *Parp-1*$^{-/-}$ mice (red) after HDTV of empty vector (EV), *Akt/Nicd* or *Kras/Tp53* plasmid combinations with HSB2. Mean±SD, n=5, **p<0.01, ***p<0.001. (C) Quantification of tumour growth shown as scores: 0=no tumour, 1=small foci/nodules, 2=distinct solid tumour. EV n=5, *Akt/Nicd* n=5, *Kras/Tp53* n=5/6, **p<0.01. (D) Percentage of different lesions in *Parp-1*$^{+/+}$ and *Parp-1*$^{-/-}$ mice with *Kras/Tp53* plasmid combination. HDTV, hydrodynamic tail vein.

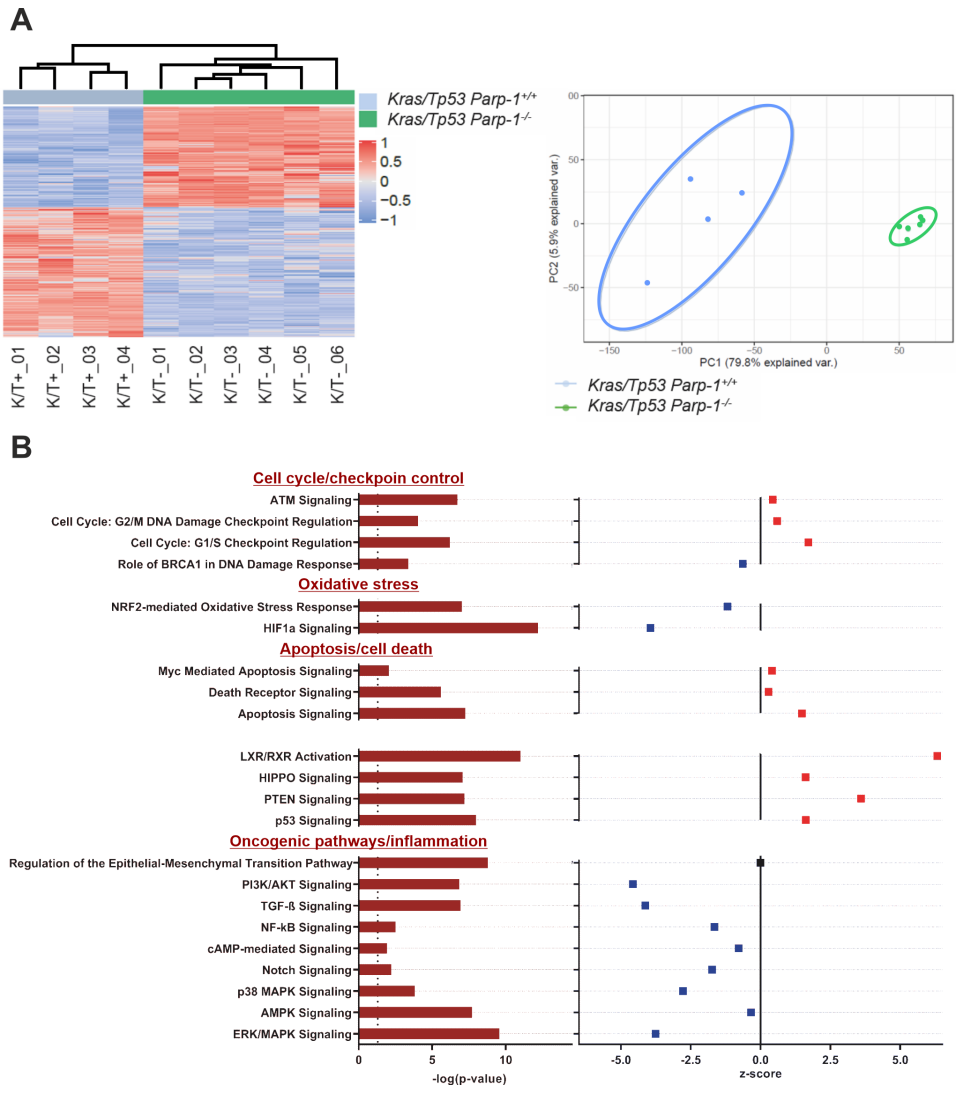

Figure 4 Differential expressed genes after HDTV with *Kras/Tp53* in *Parp-1*$^{-/-}$ versus *Parp-1*$^{+/+}$ mice. (A) Unsupervised cluster and PCA plot of significant genes (p<0.05) after HDTV with *Kras/Tp53* in *Parp-1*$^{-/-}$ versus *Parp-1*$^{+/+}$ mice. (B) Canonical pathways significantly regulated in tumours induced with *Kras/Tp53* in *Parp-1*$^{-/-}$ versus *Parp-1*$^{+/+}$ mice identified by IPA. Dashed line indicated significance threshold of –log (p value >1.3). Shown are z-scores of respective canonical pathways (positive z-score=red/activated, negative z-score=blue/inhibited). HDTV, hydrodynamic tail vein; IPA, ingenuity pathway analysis; PCA, principal component analysis.

vs 7661 in *Kras/Tp53* (online supplemental figures S12 and S13; online supplemental tables S2 and S3). These findings are in concordance with the equivalent tumour growth and histopathological features of *Akt/Nicd*-induced cholangiocarcinogenesis independent of the *Parp-1* genotype (figures 3 and 4, online supplemental figure S12). However, several components of DNA repair pathways of DSB repair (NHEJ, HR) showed upregulated expression in *Parp-1* proficient mice injected with *Akt/Nicd* confirming that the role of *Parp-1*, although important for DNA damage control, is independent of cholangiocarcinogenesis in *Akt/Nicd* experimental group.

Mechanisms of *PARP-1* activation in KRAS-mutated iCCA

Transcriptome analyses confirmed preferential impairment of cell cycle regulation, DDR pathways and replicative stress response in human iCCA cells, mouse model, as well as patient samples harbouring *KRAS* mutation. To elucidate the molecular mechanisms underlying the selective impairment of these pathways in KRAS-mutant iCCA, we first examined the expression of DDR genes in *Kras*-mutant and wild-type animals with functional *Parp-1*. Genes associated with HR, c-NHEJ and alt-NHEJ were significantly upregulated. In addition, a dominant activation of *Chk1* expression was observed. Interestingly, on Parp-1 inhibition in *Kras*-mutant animals, the expression of *Chk1* was also downregulated, suggesting an important relevance for Chk1 kinase in *Kras*-mutated iCCA (figure 5A). We further used GSEA in our different datasets to investigate molecular differences in *KRAS*-mutated and wildtype iCCAs. Commonly enriched set of genes across iCCA models encompassed cell cycle regulation and activation of E2F targets, G2M and spindle checkpoint activation, as well as DNA-damage repair via HR. Importantly, we have consistently observed activation of gene sets associated with CHK1/CHK2, key regulators of the cell cycle and cell survival (figure 5B). We further recognised that *CHK1* was highly expressed in iCCA but not normal liver tissue and showed a significant upregulation predominantly in *KRAS*-mutated cancers (figure 5C). Accordingly, public data also show a significant correlation of *CHK1* and *PARP-1* suggesting a regulatory network in *KRAS*-mutated iCCA that might be induced by the high replicative stress in this subgroup of tumours.

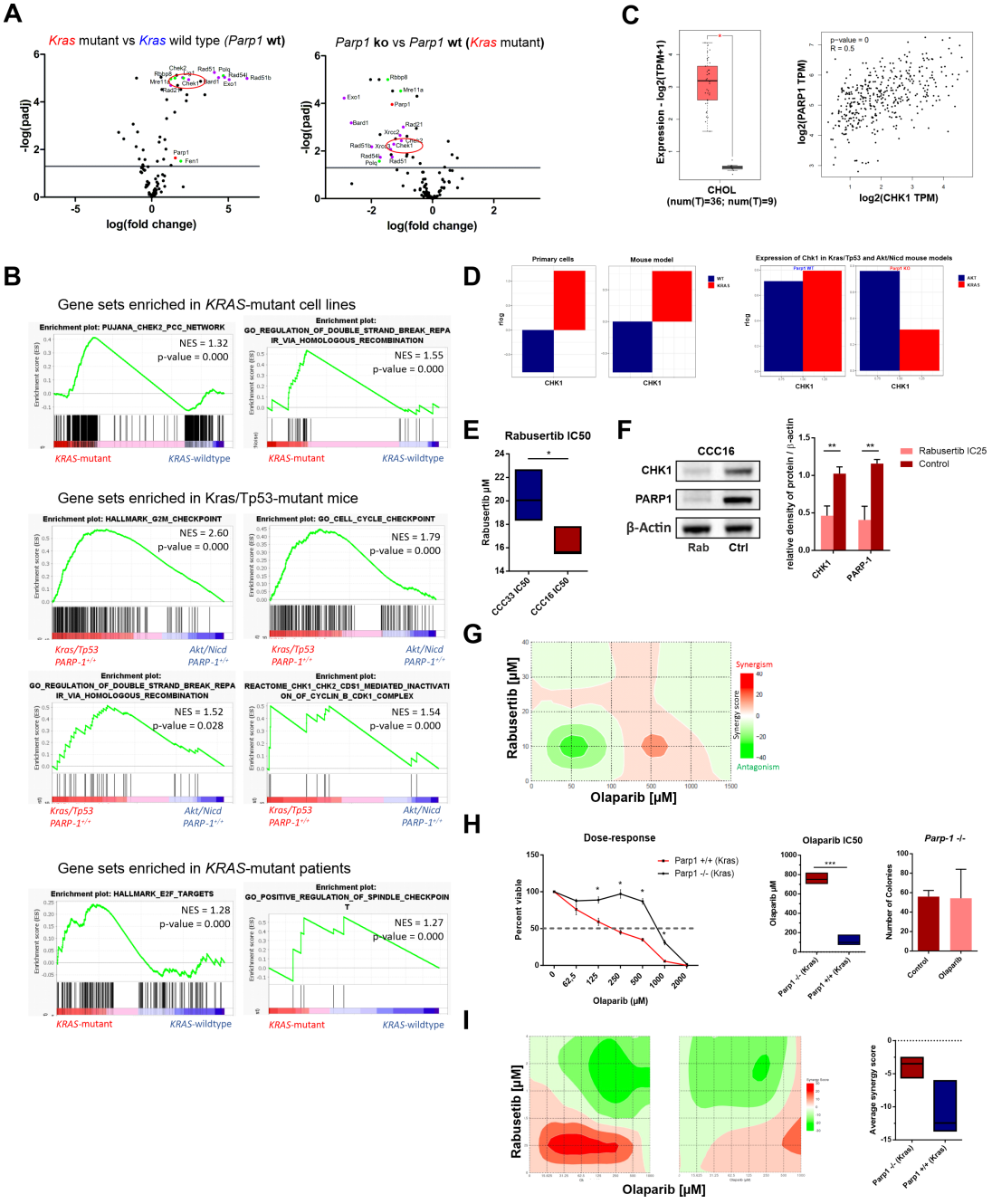

Figure 5 Molecular mechanisms of *PARP-1* regulation in *KRAS*-mutated iCCA. (A) Expression of DNA damage response genes including *Chk1* in *Parp-1*$^{-/-}$ and *Parp-1*$^{+/+}$ mice after *Kras/Tp53* injection. Volcano plots are depicted with the log (fold change) of each gene and the –log (p adjusted) was calculated by performing Wald test. Selected genes associated with HR, c-NHEJ and alt-NHEJ are coloured and gene names are displayed. Expression of *Chk1* is depicted with red ellipse (B) Gene set enrichment analysis (GSEA) in *KRAS*-mutated cell lines, *Kras/Tp53 Parp-1*$^{+/+}$ mouse model and patient samples. The selection of gene sets was based on statistical significance calculated by nominal p<0.05 and FDR<0.25. NES indicates the degree of overexpression for each group at the peak of the entire gene set. (C) *CHK1* gene expression profiles (TCGA) in cholangiocarcinoma versus normal liver tissue (CHOL) presented in box plots and correlation between *PARP-1* and *CHK1*. Values of *p<0.05 were considered as of significant difference. (D) Upper graphs depict gene expression level of *CHK1* in *KRAS*-mutated cell lines and *Kras/Tp53 Parp-1*$^{+/+}$/wildtype mouse model, Lower graphs show expression of *Chk1* in *Kras/Tp53* and *Akt/Nicd* mouse model with *Parp-1*$^{+/+}$ and *Parp-1*$^{-/-}$ genotype. (E) Shown are IC50 concentrations of Rabusertib for *KRAS*-mutated and non-mutated primary iCCA cell lines. Mean±SD, n=3, *p<0.05. (F) Representative Western blot and densitometric analysis of CHK1 and PARP-1 protein expression on treatment with IC25 concentration of Rabusertib in *KRAS*-mutant iCCA cell line. Relative density of PARP-1 expression normalised to β-actin is shown. Mean±SD, n=3, *p<0.05, **p<0.01, ***p<0.001. (G) Evaluation of synergistic or antagonistic effects between Rabusertib/Olaparib in primary human cell line. Plots indicate level of synergism between investigated drugs, where red colour represents synergism and green colour antagonism. (H) Dose-response curves of *Kras*-mutant mouse cell lines with and without functional Parp-1 treated with increasing concentrations of olaparib (left) and their respective IC50 values (middle). Right is shown total number of colonies with and without olaparib treatment. Mean±SD, n=3, *p<0.05. (I) Evaluation of synergistic or antagonistic effects between rabusertib/olaparib in mouse cell lines. Plots indicate level of synergism between investigated drugs, where red colour represents synergism and green colour antagonism. On the right, graph shows average synergy score (ZIP) for both cell lines. iCCA, intrahepatic cholangiocarcinoma; NHEJ, non-homologous end-joining.

Significant upregulation of *CHK1* was further demonstrated in our *KRAS*-mutated cell lines and *Kras/Tp53 Parp-1*$^{+/+}$ mouse model (figure 5D). As already demonstrated for PARP-1 inhibition, *KRAS*-mutated iCCA cells were significantly more sensitive to specific inhibition of CHK1 by the selective CHK1 inhibitor Rabusertib (figure 5E). Inhibition of CHK1 also led to a significant downregulation of PARP-1 while combined treatment with olaparib did not induce synergistic effects (figure 5F,G). Gene expression analysis following CHK1 inhibition showed upregulation of *CDC25C* and downregulation of *RAD51* and *XRCC2*, which could be actors of PARP-1 regulation in *KRAS*-mutated iCCAs. Interestingly, protein–protein interaction confirmed an association of these proteins with PARP-1 (online supplemental figure S14). Lastly, we tested the effect of Olaparib alone and in combination with rabusertib using an ex vivo model of primary cell lines derived from *Parp-1*$^{-/-}$ *Kras/Tp53* and *Kras*^{G12D}*;Rb*^{del}*;Tp53*^{del}. As expected, cell lines with *Kras* mutation and functional Parp-1 showed significantly higher sensitivity to Parp-1 inhibition while the observed synergistic effects in both cell lines were negative. Colony formation analysis in *Kras/Tp53 Parp-1*$^{-/-}$ after exposure to the IC50 concentration of olaparib unveiled that the number of colonies in the treatment was not significantly different from the control (figure 5H,I). The observed findings confirm that CHK1 has a profound effect on PARP-1 levels in this subtype of highly replicative cancers and contributes to the dependence of *KRAS*-mutated iCCA on functional PARP-1 signalling.

PARP-1 expression as prognostic factor in *KRAS*-mutant iCCA

To evaluate a potential prognostic impact of our molecular profiles, we integrated our identified in vitro and in vivo transcriptomic profiles with different established prognostic subgroups of PLC (poor and good prognosis).[8] Consistently, *KRAS*-mutant CRISPR/Cas9-mediated *PARP-1* KO clones grouped with good prognosis CCA patients, whereas *KRAS*-mutant control clones recapitulated transcriptomic features of poor prognosis CCA patients (figure 6A). Similarly, integration of in vivo data showed that *Parp-1* deficient mice with *Kras/Tp53* injection clustered with a good prognosis while *Parp-1* proficient mice grouped with poor prognosis (figure 6B). Importantly, mice injected with *Akt/Nicd* revealed no distinct clustering dependent on the *Parp-1* genotype (figure 6B). Overall, these results suggest that *PARP-1* depletion in iCCA with activated *KRAS* mutations leads to a shift from poor to good prognosis.

DISCUSSION

Recently, the PARP family has gained attention in cancer research due to its involvement in various oncogenic pathways and processes (DNA repair, genomic stability, chromatin modification, energy metabolism, apoptosis) mediated by the family members.[23] Elevated *PARP-1* expression was consistently observed in a variety of solid tumours.[24–28] Further, recent evidence suggests an association between *PARP-1* overexpression and *KRAS* mutations in different tumours, including in AML and CRC models.[12 13 29] However, until now, only very limited

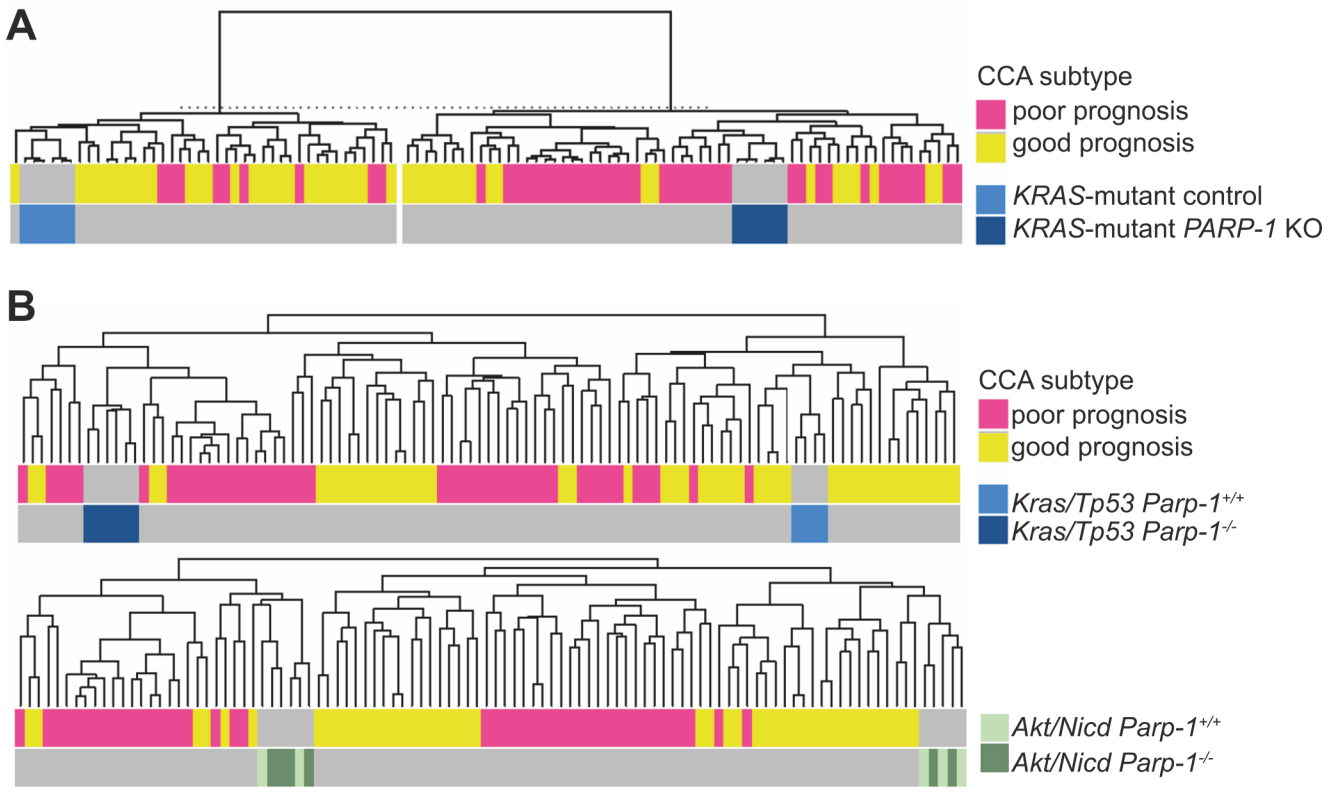

Figure 6 Integration of in vitro and in vivo transcriptomic data with prognostic subgroups of CCA patients. (A) The graph shows the integration of *KRAS*-mutant CRISPR/Cas9 *PARP-1* KO clones (dark blue) and respective control clones (light blue) with a previously published dataset of 45 CCA patients with good (pink) and poor (yellow) prognosis. (B) Upper graph shows the integration of *Parp-1*$^{-/-}$ mice (dark blue) and *Parp-1*$^{+/+}$ mice (light blue) with *Kras/Tp53*-induced carcinogenesis with a previously published dataset of 45 CCA patients with good (pink) and poor (yellow) prognosis. Lower graph shows integration of *Parp-1*$^{-/-}$ mice (dark green) and *Parp-1*$^{+/+}$ mice (light green) with *Akt/Nicd* -induced carcinogenesis with a previously published dataset of 45 CCA patients with good (pink) and poor (yellow) prognosis. CCA, cholangiocarcinoma.

information is available as to the role of *PARP-1* expression in the therapeutic response of *KRAS*-mutant iCCA. Here, we demonstrated an upregulation of *PARP-1* expression in *KRAS*-mutant iCCA tissue and cancer-derived cell lines in comparison to normal intrahepatic bile duct tissue and *KRAS*-wildtype cell lines (figure 1). We were able to show that this patient subgroup has significant association with decreased overall and recurrence-free survival (online supplemental figure S1). In concordance with recent studies, a significantly higher expression, and positive correlation of *KRAS* and *PARP-1* in cholangiocarcinoma (CHOL) tumour samples in comparison to normal tissue samples (online supplemental figure S1).[9 30 31]

Our data confirm that knockdown of *PARP-1* by RNAi as well as treatment with Olaparib, an effective PARP-1/2 inhibitor, exerted preferential effects in *KRAS*-mutant cell lines compared with *KRAS*-wildtype cell lines (figure 1, online supplemental figure S2). A comprehensive meta-analysis of Ku *et al* recently confirmed reduced proliferation on PARP inhibition in *KRAS*-mutant MCF10a cells (transfected with mutant *KRAS* constructs) compared with *KRAS*-wildtype. The study also implies that *KRAS*-mutant cells are highly dependent on DDR pathways confirming a synthetic lethality in *KRAS*-mutant cancers, which aligns with our hypothesis for *KRAS*-driven iCCA.[14]

Molecular analyses of iCCA cell lines on *PARP-1* KO confirmed that the lack of PARP-1 results in dysregulation of several DNA repair pathways (BER, DSB repair) predominantly in *KRAS*-mutant iCCA cell lines (figure 1, online supplemental figure S4).[12 14 32] This observation supports the hypothesis that *KRAS*-mutant tumours are more dependent on functioning DDR pathways in general and show preferential impairment of the *PARP-1*-associated DNA repair pathway alt-NHEJ.[13 14] However, stable *PARP-1* depletion lacks the effect of PARP-1-DNA trapping caused by PARP-1 inhibition,[33] which limits therapeutic predictions in this model. Nevertheless, dysregulation of DDR processes on *PARP-1* depletion was explained on the basis of multiple interactions of PARP-1 and PARylation with other DDR factors.[34 35] PARP-1 activation was associated with enhanced activation of the error-prone alt-NHEJ pathway over c-NHEJ by competing with Ku70 protein on the site of DNA damage.[36 37]

In addition to changes in DDR pathways, our transcriptomic data indicate an involvement of apoptotic signalling, inflammatory response and oxidative stress (figure 2, online supplemental figure S4). Further analyses are required to clarify the role of these pathways in the context of tumour initiation and progression and the proposed pro-apoptotic and anti-inflammatory effects of *PARP-1* deficiency and PARPi.[13 32 38] Hähnel *et al* showed that *KRAS*-mutant AML cells are sensitised towards apoptosis on PARP-1 inhibition in combination with the DNA damaging anticancer drug daunorubicin.[13] Further, *PARP-1* deficiency or PARPi was associated with decreased gene expression of proinflammatory cytokines in previous studies.[12 39] Other studies hypothesised that *PARP-1* activity might act as a double-edged sword during carcinogenesis, affecting apoptotic and oxidative processes and proinflammatory signalling, dependent on the cellular metabolic status and state of tumourigenesis.[12 16 23 40 41] Overall, our in vitro experiments exploring diverse modes of PARP-1 inhibition, including RNAi, and CRISPR/Cas9-mediated *PARP-1* KO confirmed that hypersensitivity of *KRAS*-mutant iCCA cell lines is related to altered tumourigenic properties. These findings propose a novel therapeutic strategy for a previously difficult-to-treat subgroup of progressed iCCA patients harbouring *KRAS* mutations. Of note, synergistic effects observed between Olaparib and commonly used chemotherapeutic compounds in *KRAS*-mutant cells indicate that a combination treatment might be of further therapeutic interest and could be pursued in future investigations (online supplemental figure S2D).

To further determine the role of *PARP-1* in tumour initiation and cancer development, we employed a model of *KRAS*-driven cholangiocarcinogenesis in *Parp-1* deficient animals.[11 42–44] In consistence with previous reports, *Parp-1* proficient mice display predominant development of solid iCCA (80%) accompanied by dysplastic hepatocellular foci and nodules as well as early hepatocellular carcinoma in the surrounding liver tissue 10 weeks after HDTV with *Kras*/*Tp53* (figure 3).[11] In stark contrast, in *Parp-1*-deficient mice, *Kras*-induced carcinogenesis was characterised by the absence of cholangiocarcinoma and the presence of multiple dysplastic foci and nodules as well as small HCC with tumourous vein invasion. Importantly, transcriptomic analyses of our in vivo data suggest a pronounced inhibition of NOTCH signalling (figure 4, online supplemental figures S8 and S12), a key oncogenic driver of iCCA and predicted factor for transdifferentiation of hepatocytes towards biliary traits, is present in our PARP-1-deficient lesions.[45 46] Furthermore, Ikenoue *et al* demonstrated that activated *Kras* in combination with active *Pten* results predominantly in HCC, whereas activated *Kras* in combination with homozygous inactive *Pten* leads to iCCA development in vivo.[47] In line with this, *Parp-1* deficiency in our study confirms activation of *Pten*. Taken together, activation or inactivation of the above-mentioned pathways, although not being exclusively specific to cholangiocarcinogenesis, might explain the absence of iCCA and shift towards HCC development in our *Kras*/*Tp53*-induced tumour model under *Parp-1* deficiency. Further studies are clearly warranted to define the underling molecular mechanisms responsible for the phenotypic shift.

Consistent with our in vitro data and previous studies with *Parp-1* deficient mice, our transcriptomic analyses of in vivo data showed enrichment of DNA repair pathways (alt-NHEJ, HR, BER) in all experimental groups of *Parp-1* proficient mice while in *Parp-1*$^{-/-}$ mice DNA repair pathways were not enriched.[32 48] Decreased gene expression of proinflammatory cytokines was already observed in *Parp-1*$^{-/-}$ mice and on PARPi and might explain the predicted inhibition of proinflammatory pathways (NF-κB, TGFβ) in our data (figure 4, online supplemental figures S10 and S12).[12 39] Importantly, neither histopathological assessment nor quantification of tumour burden or molecular analyses revealed a dependency on the *Parp-1* genotype in a non-*Kras*-driven iCCA model (*Akt*/*Nicd*) (figures 3 and 4; online supplemental figures S12 and S13).[45] The results clearly underscore the selective relevance of oncogenic *Kras* in *Parp-1* deficient background. Taken together, our in vivo studies confirm the association of *Parp-1* expression in *Kras*/*Tp53*-driven cholangiocarcinogenesis. Reduced cholangiocarcinoma development under *Parp-1* deficiency could be mechanistically explained by dysregulation of apoptotic and inflammatory processes as well as DDR.

It is well established that *KRAS*-mutated cancers exhibit enhanced replicative stress and constitutively activated stress response pathways.[49] Here, CHK1-mediated cell cycle checkpoints maintain genomic integrity and, thus, CHK1 activation might confer key protective mechanisms that protect *KRAS*-driven cancers from this therapeutic liability. Consistently, we could provide evidence that selective induction of PARP-1 in iCCA could be induced by activation of CHK1 in *KRAS*-mutant iCCA (figure 5). We observed a significant upregulation of *CHK1* in *KRAS*-mutated iCCA cell lines and *Kras*/*Tp53* *Parp-1*$^{+/+}$ mice while inhibiting Parp-1 in Kras/Tp53 Parp-1$^{-/-}$ mice resulted in *Chk1* inhibition, as observed in human patients. Furthermore, *KRAS*-mutated iCCA cells were significantly more

sensitive to CHK1 inhibition by Rabusertib, a selective CHK1 inhibitor, than KRAS-wildtype cells or mouse cells deficient in Parp-1 (figure 5). Inhibition of CHK1 significantly influenced components of HR (online supplemental figure S14). Importantly, inhibition of CHK1 also led to a significant reduction of PARP-1 levels in *KRAS*-mutant. When rabusertib was combined with Olaparib, there was no induction of synergistic effects, further implying a potential regulatory role of CHK1 (figure 5). These investigations are in line with several other recent investigations that established a formal association between CHK1 and PARP-1 in highly replicative cancers that rely on a functional DDR, particularly one mediated by HR.[50 51] Studies have also described a direct interaction between CHK1 and PARP-1 at the DNA damage site and subsequent promotion of HR.[52]

Thus, we propose a regulatory axis involving CHK1-mediated PARP-1 activation induced by replicative stress in *KRAS*-mutant iCCA that maintains cellular survival in this subtype of iCCA.

To validate our findings in authentic human tumours, we integrated our in vitro and in vivo findings with a publicly available dataset of well-characterised CCA patients.[8] Consistently, transcriptome profiles of the *PARP-1*-deficient cell lines as well as control cell lines with different established prognostic subgroups of PLC (poor and good prognosis) revealed a shift of *KRAS*-mutant iCCA cell lines from poor to good prognosis on *PARP-1* KO (figure 6). In concordance, *Parp-1* deficient samples from mice injected with *Kras/Tp53* clustered with good prognosis iCCA patient samples, whereas *Parp-1* proficient samples grouped with poor prognosis. Interestingly, this prognostic shift was not visible in *Akt/Nicd*-induced tumour samples, which clustered randomly together with poor prognostic patients. Hence, the obtained data clearly confirm a clear synthetic vulnerability and provide a rational for therapeutic targeting of PARP-1 in *KRAS*-mutant iCCA patients.

CONCLUSION

In conclusion, the study presented confirms upregulation of *PARP-1* and hypersensitivity towards PARP-1-based intervention preferentially detectable in *KRAS*-mutant iCCA in vitro and in vivo. Mechanistically, our data revealed that *PARP-1* inhibition provoked downregulation of DSB repair pathways and inhibition of oxidative and inflammatory processes.[13] Thus, our data open novel therapeutic options for this difficult-to-treat iCCA subgroup that warrant further clinical investigations (online supplemental visual abstract).

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Acknowledgements JUM and FLK thank Monika Herr for excellent technical support. Sorting of CRISPR/Cas9 clones was performed with the support of the Core Facility Flow Cytometry (CFFC) of the PaulKlein Center for Immune Intervention (PZKI), University Medical Center, Mainz. Tissue staining were provided by the tissue bank of the University Medical Center, Mainz in accordance with the regulations of the tissue biobank and the approval of the ethics committee of University Medical Center, Mainz. Aspects of this article are part of the doctoral thesis of FLK.

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Funding JUM is supported by grants from the Wilhelm Sander Foundation (2021.089.1) and the Volkswagen Foundation (Lichtenberg program). SR was supported by Deutsche Forschungsgemeinschaft (DFG, Project-ID 314905040) within SFB/TRR 209 Liver Cancer, by Eurostars (grant E! 113707, LiverQR) and by the German Cancer Aid (no. 70113922). XWW is supported by grants (ZIA BC010313 and ZIA BC011870) from the Intramural Research Program of the Center for Cancer Research of the National Cancer Institute.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as online supplemental information.

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REFERENCES

1 Khan SA, Tavolari S, Brandi G. Cholangiocarcinoma: epidemiology and risk factors. *Liver International* 2019;39:19–31.
2 Banales JM, Marin JJG, Lamarca A, *et al*. Cholangiocarcinoma 2020: the next horizon in mechanisms and management. *Nat Rev Gastroenterol Hepatol* 2020;17:557–88.
3 Clements O, Eliahoo J, Kim JU, *et al*. Risk factors for Intrahepatic and extrahepatic Cholangiocarcinoma: a systematic review and meta-analysis. *J Hepatol* 2020;72:95–103.

4 Braconi C, Roessler S, Kruk B, *et al*. Molecular perturbations in Cholangiocarcinoma: is it time for precision medicine *Liver International* 2019;39:32–42.
5 Czauderna C, Kirstein MM, Tews HC, *et al*. Molecular subtypes and precision oncology in Intrahepatic Cholangiocarcinoma. *J Clin Med* 2021;10:2803.
6 Moeini A, Sia D, Bardeesy N, *et al*. Molecular pathogenesis and targeted therapies for Intrahepatic Cholangiocarcinoma. *Clinical Cancer Research* 2016;22:291–300.
7 Andersen JB. Molecular pathogenesis of Intrahepatic Cholangiocarcinoma. *J Hepato Biliary Pancreat* 2015;22:101–13.
8 Andersen JB, Spee B, Blechacz BR, *et al*. Genomic and genetic characterization of Cholangiocarcinoma identifies therapeutic targets for tyrosine kinase inhibitors. *Gastroenterology* 2012;142:1021–31.
9 Marquardt JU, Andersen JB, Thorgeirsson SS. Functional and genetic deconstruction of the cellular origin in liver cancer. *Nat Rev Cancer* 2015;15:653–67.
10 Grabocka E, Commisso C, Bar-Sagi D. Molecular pathways: targeting the dependence of mutant RAS cancers on the DNA damage response. *Clin Cancer Res* 2015;21:1243–7.
11 O'Dell MR, Huang JL, Whitney-Miller CL, *et al*. Kras(G12D) and P53 Mutation cause primary Intrahepatic Cholangiocarcinoma. *Cancer Res* 2012;72:1557–67.
12 Dörsam B, Seiwert N, Foersch S, *et al*. PARP-1 protects against colorectal tumor induction, but promotes inflammation-driven colorectal tumor progression. *Proc Natl Acad Sci U S A* 2018;115:E4061–70.
13 Hähnel PS, Enders B, Sasca D, *et al*. Targeting components of the alternative NHEJ pathway sensitizes KRAS mutant Leukemic cells to chemotherapy. *Blood* 2014;123:2355–66.
14 Ku AA, Hu H-M, Zhao X, *et al*. Integration of multiple biological contexts reveals principles of synthetic lethality that affect reproducibility. *Nat Commun* 2020;11:2375.
15 Pascal JM, Ellenberger T. The rise and fall of Poly(ADP-ribose): an enzymatic perspective. *DNA Repair* 2015;32:10–6.
16 Ray Chaudhuri A, Nussenzweig A. The Multifaceted roles of Parp1 in DNA repair and chromatin remodelling. *Nat Rev Mol Cell Biol* 2017;18:610–21.
17 Lord CJ, Ashworth A. PARP inhibitors: synthetic lethality in the clinic. *Science* 2017;355:1152–8.
18 Kaufman B, Shapira-Frommer R, Schmutzler RK, *et al*. Olaparib monotherapy in patients with advanced cancer and a Germline Brca1/2 Mutation. *J Clin Oncol* 2015;33:244–50.
19 Jain PG, Patel BD. Medicinal chemistry approaches of poly ADP-ribose polymerase 1 (Parp1) inhibitors as anticancer agents - A recent update. *Eur J Med Chem* 2019;165:198–215.
20 Ricci AD, Rizzo A, Bonucci C, *et al*. PARP inhibitors in biliary tract cancer: A new kid on the block *Medicines* 2020;7:54.
21 Tang Z, Kang B, Li C, *et al*. Gepia2: an enhanced web server for large-scale expression profiling and interactive analysis. *Nucleic Acids Res* 2019;47:W556–60.
22 Weinstein JN, Collisson EA, Mills GB, *et al*. The cancer genome Atlas Pan-cancer analysis project. *Nat Genet* 2013;45:1113–20.
23 Pazzaglia S, Pioli C. Multifaceted role of PARP-1 in DNA repair and inflammation: pathological and therapeutic implications in cancer and non-cancer diseases. *Cells* 2019;9:41.
24 Bi F-F, Li D, Yang Q. Hypomethylation of ETS transcription factor binding sites and upregulation of Parp1 expression in endometrial cancer. *Biomed Res Int* 2013;2013:946268.
25 Byers LA, Wang J, Nilsson MB, *et al*. Proteomic profiling identifies Dysregulated pathways in small cell lung cancer and novel therapeutic targets including Parp1. *Cancer Discov* 2012;2:798–811.
26 Dziaman T, Ludwiczak H, Ciesla JM, *et al*. PARP-1 expression is increased in colon adenoma and carcinoma and correlates with Ogg1. *PLoS One* 2014;9:e115558.
27 Liu Y, Zhang Y, Zhao Y, *et al*. High PARP-1 expression is associated with tumor invasion and poor prognosis in gastric cancer. *Oncol Lett* 2016;12:3825–35.
28 Xu F, Sun Y, Yang S-Z, *et al*. Cytoplasmic PARP-1 promotes Pancreatic cancer tumorigenesis and resistance. *Int J Cancer* 2019;145:474–83.
29 Fahrer J, Kaina B. O6-Methylguanine-DNA methyltransferase in the defense against N-nitroso compounds and colorectal cancer. *Carcinogenesis* 2013;34:2435–42.
30 Taketomi A, Shirabe K, Muto J, *et al*. A rare point Mutation in the Ras Oncogene in hepatocellular carcinoma. *Surg Today* 2013;43:289–92.
31 Xue R, Chen L, Zhang C, *et al*. Genomic and Transcriptomic profiling of combined hepatocellular and Intrahepatic Cholangiocarcinoma reveals distinct molecular subtypes. *Cancer Cell* 2019;35:932–47.
32 de Murcia JM, Niedergang C, Trucco C, *et al*. Requirement of Poly(ADP-ribose) polymerase in recovery from DNA damage in mice and in cells. *Proc Natl Acad Sci U S A* 1997;94:7303–7.
33 Murai J, Huang SN, Das BB, *et al*. Trapping of Parp1 and Parp2 by clinical PARP inhibitors. *Cancer Res* 2012;72:5588–99.
34 Isabelle M, Moreel X, Gagné J-P, *et al*. Investigation of PARP-1, PARP-2, and PARG Interactomes by affinity-purification mass Spectrometry. *Proteome Sci* 2010;8:22.
35 Pines A, Vrouwe MG, Marteijn JA, *et al*. Parp1 promotes nucleotide Excision repair through Ddb2 Stabilization and recruitment of Alc1. *J Cell Biol* 2012;199:235–49.
36 Paddock MN, Bauman AT, Higdon R, *et al*. Competition between PARP-1 and Ku70 control the decision between high-fidelity and Mutagenic DNA repair. *DNA Repair (Amst)* 2011;10:338–43.
37 Wang M, Wu W, Wu W, *et al*. PARP-1 and Ku compete for repair of DNA double strand breaks by distinct NHEJ pathways. *Nucleic Acids Res* 2006;34:6170–82.
38 Zhong L, Wang R, Wang Y, *et al*. Dual inhibition of VEGF and PARP suppresses KRAS-mutant colorectal cancer. *Neoplasia* 2020;22:365–75.
39 Quiles-Perez R, Muñoz-Gámez JA, Ruiz-Extremera Á, *et al*. Inhibition of poly adenosine diphosphate-ribose polymerase decreases hepatocellular carcinoma growth by modulation of tumor-related gene expression. *Hepatology* 2010;51:255–66.
40 Morales J, Li L, Fattah FJ, *et al*. Review of poly (ADP-ribose) polymerase (PARP) mechanisms of action and rationale for targeting in cancer and other diseases. *Crit Rev Eukaryot Gene Expr* 2014;24:15–28.
41 Swindall AF, Stanley JA, Yang ES. PARP-1: friend or foe of DNA damage and repair in tumorigenesis *Cancers (Basel)* 2013;5:943–58.
42 Gürlevik E, Fleischmann-Mundt B, Armbrecht N, *et al*. Adjuvant Gemcitabine therapy improves survival in a locally induced, R0-Resectable model of metastatic Intrahepatic Cholangiocarcinoma. *Hepatology* 2013;58:1031–41.
43 Hill MA, Alexander WB, Guo B, *et al*. Kras and Tp53 mutations cause Cholangiocyte- and hepatocyte-derived Cholangiocarcinoma. *Cancer Res* 2018;78:4445–51.
44 Saborowski A, Lehmann U, Vogel A. FGFR inhibitors in Cholangiocarcinoma: what's now and what's next. *Ther Adv Med Oncol* 2020;12.
45 Fan B, Malato Y, Calvisi DF, *et al*. Cholangiocarcinomas can originate from hepatocytes in mice. *J Clin Invest* 2012;122:63212:2911–5:.
46 Zender S, Nickeleit I, Wuestefeld T, *et al*. A critical role for notch signaling in the formation of Cholangiocellular Carcinomas. *Cancer Cell* 2016;30:353–6.
47 Ikenoue T, Terakado Y, Nakagawa H, *et al*. A novel mouse model of Intrahepatic Cholangiocarcinoma induced by liver-specific Kras activation and Pten deletion. *Sci Rep* 2016;6:23899.
48 Wang ZQ, Auer B, Stingl L, *et al*. Mice lacking ADPRT and Poly(ADP-Ribosyl)Ation develop normally but are susceptible to skin disease. *Genes Dev* 1995;9:509–20.
49 Al Zubaidi T, Gehrisch OHF, Genois M-M, *et al*. Targeting the DNA replication stress phenotype of KRAS mutant cancer cells. *Sci Rep* 2021;11:3656.
50 Smith HL, Prendergast L, Curtin NJ. Exploring the synergy between PARP and Chk1 inhibition in matched Brca2 mutant and corrected cells. *Cancers (Basel)* 2020;12:878.
51 Vance S, Liu E, Zhao L, *et al*. Selective Radiosensitization of P53 mutant Pancreatic cancer cells by combined inhibition of Chk1 and Parp1. *Cell Cycle* 2011;10:4321–9.
52 Peng B, Shi R, Bian J, *et al*. Parp1 and Chk1 coordinate Plk1 enzymatic activity during the DNA damage response to promote Homologous Recombination-mediated repair. *Nucleic Acids Res* 2021;49:7554–70.

Supplementary materials and methods

Cell lines

KRAS-mutant iCCA cell lines, HuCCT1 (*KRAS*^{G12D}) and RBE (*KRAS*$^{G12V)}$) and *KRAS*-wildtype CCA cell lines HuH28 and WITT were obtained from JCRB Cell Bank or kindly provided by Gregory Gores (Mayo Clinic, Rochester, USA). Primary iCCA cell lines (*KRAS*-mutant cell line CCC16 (*KRAS*^{G12D}) and *KRAS*-wildtype cell line CCC33) were established at the University Medical Center, Mainz in accordance with ethical guidelines [1]. Primary mouse Parp1$^{-/-}$ (Kras/Tp53 Parp1$^{-/-}$) cell line was established at the University Medical Center Mainz upon extraction of the tumors from the HDTV mouse model. *Kras*^{G12D}*;Rb*^{del}*;Tp53*^{del} cell line was kindly provided by Ursula Ehmer. None of the cell lines harbor a loss of function variant in *BRCA1/2* [1–4]. HuCCT1, RBE, WITT, CCC16, CCC33, *Kras*^{G12D}*;Rb*^{del}*;Tp53*^{del}, were cultivated in DMEM (Gibco), supplemented with 1 unit/ml penicillin/streptomycin (P/S, Sigma Aldrich), 5% FCS (Pan-Biotech). HuH28 cells were cultivated in RPMI-1640 medium (Sigma Aldrich) (1 unit/ml P/S, 5% FCS) (Pan-Biotech). All cell lines were maintained at 37°C and 5% CO_2, routinely mycoplasma tested and, when possible, either purchased fresh or authenticated by STR testing.

Nucleic acid extraction and RNA sequencing

DNA was extracted by performing peqGOLD Tissue DNA mini kit (VWR International) following the manufacturer's instructions. Total RNA was extracted using peqGOLD total RNA kit (VWR International) according to the manufacturer's instructions. RNA quality and purity was determined by Nanodrop ND-1000 spectrophotometer (NanoDrop Technologies) and the integrity was measured by Agilent 2100 Bioanalyzer (Agilent). RNA sequencing was performed using Illumina Novaseq 6000. DESeq2 pipeline was used for differential expression analysis. Principal Components Analysis (PCA) and unsupervised hierarchical clustering were conducted using ComplexHeatmap [5]. Ingenuity Pathway Analysis (IPA) online tool provided by Qiagen was used to identify the regulation of pathways and networks. The scoring system provided by IPA tool was employed to identify significantly regulated pathways [6]. Gene set enrichment analysis (GSEA) was performed using GSEA software provided by Broad Institute (Broad Institute Inc, Cambridge, USA). Gene sets with nominal $p<0.05$ and false discovery rate (FDR)<0.25 were considered enriched in a priori defined sets of genes [7]. Gene expression profiling interactive analysis (GEPIA2) was employed for gene expression and correlation analyses of data sets of cholangiocarcinoma (CHOL) and liver hepatocellular carcinoma (LIHC) from The Cancer Genome Atlas Program (TCGA). Differential analysis was calculated with one-way ANOVA, using disease state (tumor or normal) after log2(TPM+1) transformation [8].

Quantitative real-time polymerase chain reaction

Two-step reverse-transcription quantitative polymerase chain reaction using iScript cDNA Synthesis kit (Bio-Rad Laboratories), SYBR Green Master-Mix (Bio-Rad Laboratories) and CFX Connect (Bio-Rad Laboratories) was performed. Oligonucleotide primers were designed using Primer3 v.0.4.0 (http://frodo.wi.mit.edu/primer3/) as described before (*PARP-1* forward 5‘-CGAATGCCAGCGTTACAAGC-3‘, *PARP-1* reverse 5‘-AACATGTAGCCTGTCACGGG-3‘, *PARP-2* forward 5‘-TCCCCTGCCAAGAAAACTCG-3‘, *PARP-2* reverse 5‘-TCAGAGACCCTTTTGCTGGC-3‘, *GAPDH* forward 5’-CAACGACCACTTTGTCAAGC-3’, *GAPDH* reverse 5’-TCTTCCTCTTGTGCTCTTGC-3’, *CHK1* forward 5’-GGCTTGGCAACAGTA-3’ *CHK1* reverse 5’- CAGGACCAAACATCA-3’, *RAD51* forward 5’-GCAGTGGCTGAGAGGTATGGT-3’ *RAD51* reverse 5’-TTCTGTAAAGGGCGGTGGCA-3’, *XRCC2* forward 5’-ACCTTCTCATGCCTCTCGACG-3’ *RAD51* reverse 5’-TGCTTCACCAGTTGCTGCCA-3’, *CDC25C* forward 5’-TGGCCAAGGAAAGCTCAGGA-3’ *CDC25C* reverse 5’-TTGGCAGCGCACATACCTTG-3’) (Eurofins).

Western blotting

Cell lysates were prepared using M-PER tissue extraction buffer (Thermo Fisher) containing complete protease inhibitor cocktail (Gibco). 25 µg of protein lysate were separated by SDS-PAGE and transferred onto nitrocellulose membrane (Sigma Aldrich). Membranes were probed with the indicated antibodies (beta-Actin Clone 2Q1055 (mouse, monoclonal, Santa Cruz #sc-58673); PARP-1 (46D11) (rabbit, monoclonal, Cell signaling #9532), PARP-2 (rabbit, monoclonal, EMD Millipore #MABE18), CHK1 (mouse, monoclonal, Santa Cruz #SC8408)). Quantification of expression levels was performed by densitometric analyses using ImageJ (NIH).

siRNA-mediated knockdown

For transfection, cells were seeded at low confluency (30-50%) in 6-well plates. After 24 h 100 pmol siRNA (non-sense control, two different siRNAs targeting *PARP-1,* Eurofins) was introduced by using transfection reagent Lipofectamine 3000 (Thermo Fisher) following the manufacturer’s instructions. Subsequent functional assays were conducted 72 h after transfection.

CRISPR/Cas9-mediated knockout

Cells transfected with Clustered Regularly Interspaced Short Palindromic Repeats/Caspase9 (CRISPR/Cas9) plasmids (pNV-sgRNA-Cas9-2A-GFP; abm; 2 µg) were transferred to 10 cm dishes and after reaching 80-90% confluency sorted into single cells based on the integrated selection marker GFP using BD FACSAria optimally 5-7 days after transfection (Core Facility

Flow Cytometry, Paul-Klein Center for Immune Intervention, University Medical Center Mainz). Successful knockout of single cell clones was verified by Western blot analysis and Sanger Sequencing (StarSEQ GmbH).

Dose response and viability assay

Cell viability was determined using a colorimetric assay (WST-1) following the manufacturer's protocol (Roche). Inhibitor stock solutions were prepared by dissolving in dimethyl sulfoxide (DMSO; Carl Roth), according to the manufacturer's recommendations. Working solutions were prepared by dilution in DMEM (10% FCS, 1% P/S). Into each 96-well, $5x10^3$ cells were plated for 24 h before treatment followed by administration and incubation with inhibitors for 72 h. Olaparib (Chemietek) was applied in the range of concentrations from 8-2048 µM alone or in combination with Doxorubin (60 nM) (Sellekchem), while Rabusertib (TargetMol) was applied from 0.25-40 µM alone in combination with Olaparib. Cisplatin was applied in the range from 1.25-80 µM and Gemcitabine from 0.325-20 µM together with Olaparib. KU57788 was applied in the range from 2.5-160 µM. Cell viability was expressed as the absorbance in the treatment group compared to control group as viability percent ± SD (n=3). Median inhibitory concentration (IC50) values were calculated from dose-response curves of three independent experiments by nonlinear regression using Prism software (GraphPad Software). Synergistic effects were determined using SynergyFinder online tool (http://www.synergyfinderplus.org/#!/)

Colony and sphere formation assay

Cells were treated for 72 h with the cell line specific IC50 of Olaparib, or siRNA-mediated knockdown of *PARP-1*. $1x10^3$ cells were plated on 6-well plates for colony formation (CFU) and $1x10^3$ cells were plated on 48-well plates for sphere formation (SFU) assay into a semi-solid soft agar (Carl Roth). After 14 days colony and sphere formation capacities were determined and represented as number of colonies/spheres for each treatment group in comparison to the control group in percentage.

Cell cycle analysis

Cells were treated with IC25 concentration of Olaparib for 48 hours, harvested and cell cycle analysis was performed using flow cytometry and propidium iodide staining protocol. A total of 100000 events were recorded and different phases of the cell cycle were determined using FlowJo V10.

Detection of oxidative stress

2',7'-dichlorodihydrofluorescein-diacetate (DCH2FC-DA; Sigma Aldrich) was used to monitor oxidative stress in the iCCA cells. The method is based on the intake of non-fluorescent DCH2FC-DA into the cells by diffusion, where it gets hydrolyzed to 2',7'-dichlorofluorescin (DCFH) and is trapped inside the cells. Upon cellular oxidative stress, DCFH is oxidized by ROS to the highly fluorescent form 2',7'-dichlorofluorescein (DCF), which was detected at a specific excitation/emission spectrum (495 nm / 535 nm) using a microplate spectrofluorometer (TECAN infinite M 200Pro). Oxidation of DCFH was correlated quantitatively to the level of oxidative stress mediated by H_2O_2 (Carl Roth) and other reactive oxygen species.

Induction of DNA damage via irradiation

The iCCA cell lines were seeded on coverslips placed in 3 cm plates ($1x10^5$ cells) and cultured in DMEM (10% FBS) for 24 hours. Next, cells were placed into an irradiator (Gammacell 2000) and irradiated with 5 Gy (500 rad = 1:59 sec). After incubation for 1 hour at 37°C, cells were fixed, and immunofluorescence staining was performed. Cells were stained for phospho-γH2AX (Cell Signaling Technology, 1:500) using standard protocol and visualized and recorded using a Laser Scanning Microscope LSM-710 (Zeiss) with 63 x magnification oil objective.

Experiments involving animals

All procedures were performed in accordance with the National Animal Protection Guidelines following approval by the local authorities. The origin and properties of the mouse strain with *Parp-1* knockout (129/Sv x C56BL/6J genetic background) was previously described [9,10]. Plasmids for HDTV were kindly provided by Matthias S. Matter, Institute of Pathology, University Hospital Basel, Switzerland. HDTV with plasmid solutions of pT3-EF1a-$Kras^{G12V}$/pT3-EF1a-shRp53-844-866 *or* pT3-EF1a-myrAkt/pT3-EF1a-Nicd (myc-tagged) in combination with pCMV-HSB2 plasmid (ratio 1:5) was performed as described before [11–13]. Experimental design comprised three experimental groups with 7-8 week old male *Parp-1*$^{+/+}$ and *Parp-1*$^{-/-}$ mice (genotype was determined beforehand). Animals were monitored weekly for signs of liver failure due to tumor growth and significant changes in body weight. Mice injected with *Kras/Tp53* were sacrificed after 10 weeks, mice injected with *Akt/Nicd* after 7-8 weeks. Quantification was performed by liver weight / body weight ratio and a scoring system to assess the morphological differences. After sacrifice, the liver was dissected and either fixed in 4% PFA or preserved at -80°C.

Immunohistochemistry and confocal microscopy

Tissue samples were fixed in 4% PFA, embedded in paraffin and cut into 3.5 µm sections. H&E staining was performed by standard techniques using Mayer's Hemalaun (Merck KGaA) and Eosin-y Alcoholic solution (Thermo Fisher). Immunohistochemistry was done by automated immunostaining with DAB staining (Dako) according to the manufacturer's instructions. Visualization was performed by a Zeiss Axioskop microscope with 5x and 10x magnification objectives and analyzed in AxioVision 3.1 software.

Tissue microarray was performed as follows: paraffin-embedded formalin-fixed (FFPE) tissue samples from 197 patients with Cholangiocarcinoma diagnosed with Cholangiocarcinoma at the Institute of Pathology, University Medical Center Mainz, between 2006 and 2020 were collected. These samples were processed following the Tissue Biobank's protocols at the University Medical Center Mainz. Tissue microarrays (TMAs) featuring 2 mm cores were assembled. Immunohistochemistry (IHC) analysis was conducted on FFPE specimens sliced to a thickness of 2-4 µm. A rabbit monoclonal antibody targeting PARP-1 (clone 46D11; Cell Signaling Technology Europe B.V., Leiden, Netherlands) was employed at a 1:600 dilution. The immune reactive score (IRS) system was utilized to assess PARP-1 immunohistochemistry [14], generating scores ranging from 0 to 12, derived from multiplying the proportion of positive cells (scored 0–4) by the staining intensity (scored 0–3). The mean IRS was determined for patients with the same entity.

RPPA

Functional Proteomics RPPA Core facility, supported by MD Anderson Cancer Centre, Houston, Texas. Proteins were extracted from the cell pellets, denatured using 1% SDS + B-Me, serial diluted and arrayed on nitrocellulose-coated slides and the antigen-antibody reaction was determined. The emitted signals were captured by tyramide dye deposition and a DAB colorimetric reaction. The stained slides were scanned on a Huron TissueScope scanner to produce a 16-bit till image and sample densities were quantified by Array-Pro Analyser. Obtained data obtained was further quantitatively analyzed using Supercurve software and presented as expression relative to standard control cells on the array.

STRING

Explore functional connections with the biological implications between targets of interest (i.e., CHK1, PARP1 RAD51, CDC25C, XRCC2) the STRING database (https://string-db.org/) (version 12.0) was used. Computational prediction of direct/indirect protein-protein association is based on already reported findings from other databases [15].

Statistical analyses

Statistical analyses were performed using Student's t-test, one-way ANOVA, or Mann-Whitney U test as indicated. $p \leq 0.05$ were considered statistically significant. All results were presented as means ± standard deviation (SD) from at least three independent experiments.

Supplementary figures

Figure S1: Transcriptomic, correlation and survival analysis of *PARP-1* and *KRAS* expression in TCGA and own dataset.

A) *PARP-1* and B) *KRAS* gene expression profiles (TCGA) in cholangiocarcinoma vs. normal liver tissue (CHOL) and liver hepatocellular carcinoma vs. normal liver tissue (LIHC) presented in box plots. Values of p<0.01 (*) were considered as of significant difference. red=tumor, blue=liver C) Multiple comparisons of *PARP-1* and *KRAS* expression in cholangiocarcinoma vs. normal liver tissue (CHOL) and hepatocellular carcinoma vs. normal liver tissue (LIHC) (log2(TPM+1) D) Pair-wise gene expression correlation analysis of *PARP-1* and *KRAS* expression in cholangiocarcinoma (CHOL) (Pearson correlation coefficient, TCGA CHOL Tumor/TCGA CHOL normal). E) Pair-wise gene expression correlation analysis of *PARP-1* and *KRAS* expression in hepatocellular carcinoma (LIHC) (Pearson correlation coefficient R, TCGA LIHC Tumor/TCGA LIHC normal). F) Immunohistochemical analysis of PARP1 expression in a human cohort of 194 iCCA patients. PARP-1 was evaluated using the mean immunoreactive score (IRS), which ranges from 0 to 12. A score of 0 indicates no staining, whereas a score of 12 signifies the strongest staining possible p<0.0001 (***). G) Expression level of *PARP1* in the Andersen iCCA cohort in comparison with the surrounding liver and normal bile ducts H) Chiang's liver cancer proliferation signature shows a positive correlation with *PARP1* expression. I) Estimated median overall survival and recurrence free survival for iCCA patients with and without *KRAS* mutation obtained from cBioportal. Shown is Kaplan-Meir curve with a total of 412 patients.

Figure S2: Effect of PARP-1 inhibition via Olaparib treatment on cell viability, colony and sphere formation capacity and synergistic effects with approved iCCA drugs.

A) Shown are dose-response curves of *KRAS*-mutant and *KRAS*-wildtype iCCA cell lines treated with increasing concentrations of Olaparib to determine IC50 value and impact on proliferation. Mean ± SD, n=3, p<0.05 (*), p<0.01 (**). B) Phases of cell cycle after 48 h treatment with IC25 concentration of Olaparib. Shown are normalized values to untreated control cells. Mean ± SD, n=3, p<0.01 (**). C) Colony and sphere formation assay shown as % of control after Olaparib treatment in *KRAS*-mutant and *KRAS*-wildtype iCCA cell lines. Mean ± SD, n=3, p<0.05 (*), p<0.001 (***). D) Synergistic effects of Olaparib/Cisplatin and Olaparib/Gemcitabine in *KRAS*-mutant and *KRAS*-wildtype iCCA cell lines. Plots indicate level of synergism between investigated drugs, where red color represents synergism and green color antagonism. Bars on the right represent quantification of an average synergy score between *KRAS*-mutant and *KRAS*-wildtype iCCA cell lines. Mean ± SD, n=3, p<0.001 (***). E) Shown are IC50 values for primary CCC33 and CCC16 cell lines after treatment with KU-5778 inhibitor. Mean ± SD, n=3.

Figure S3: PARP-1 protein expression in primary and established iCCA cell lines after CRISPR/Cas9-mediated knockout.

A) Representative Western blot of PARP-1, PARP-2, and β-actin protein levels after *PARP-1* KO in *KRAS*-mutant (HuCCT1, RBE; red) and *KRAS*-wildtype iCCA cell lines (CCC33, WITT; blue).

Figure S4: Enriched gene sets in *KRAS*-mutant iCCA cell lines upon *PARP-1* KO.

A) Clinical endpoints and networks significantly regulated in *KRAS*-mutant iCCA cell lines upon *PARP-1* KO vs. control identified by IPA. The dashed line indicates the significance threshold of –log(p-value>1.3). Shown are z-scores of respective canonical pathways (positive z-score =red/activated, negative z-score = blue/inhibited). B) Gene set enrichment analysis (GSEA) in

KRAS-mutant iCCA cell lines upon *PARP-1* KO vs. control clones. The selection of gene sets was based on statistical significance calculated by nominal p<0.05 and FDR<0.25. NES indicates the degree of overexpression for each group at the peak of the entire gene set.

Figure S5: Regulatory mechanism of PARP1 in KRAS mutated human tissue and cell lines

A) Immunofluorescence staining of p-γH2AX foci by confocal microscopy. Shown is quantification of p-γH2AX foci in KRAS-mutant (RBE; red) and KRAS-wildtype iCCA cell lines (CCC33; blue) and their respective PARP-1 KO clones under control conditions and after irradiation with 5 Gy. Quantification indicating fold change of the number of cells with foci > 5 as % of total cell number. Mean ± SD, n=3, p < 0.05 (*), p < 0.01 (**). B) Shown are basal and H_2O_2-induced (25 µM H_2O_2) changes in redox status using ROS-indicator CM-H2DCF-DA in KRAS-mutant (RBE; red) and KRAS-wildtype iCCA cell lines (CCC33; blue) and their respective PARP-1 KO clones. Shown is the mean fluorescence intensity. Mean ± SD, n=3, p < 0.05 (*), p < 0.01 (**), p < 0.001 (***). C) Analysis of 5 KRAS mutated tissue samples and matched non-tumoral liver tissue. Vulcano plots are depicted with the log(fold change) of each gene and the –log(p adjusted) was calculated by performing Wald test. Selected genes associated with HR, c-NHEJ, and alt-NHEJ are colored and gene names are displayed. D) Gene set enrichment analysis (GSEA) of KRAS-mutant tumor. The selection of gene sets was based on statistical significance calculated by nominal p-value < 0.05 and FDR < 0.25. NES indicates the degree of overexpression for each group at the peak of the entire gene set. E) Normalized protein level in primary cell lines with (CCC16) and without (CCC33) *KRAS* mutation detected by Reverse-phase protein array (RPPA). Mean ± SD, n=5, p<0.05 (*), p<0.01 (**), p<0.001 (***).

Figure S6: Single cell analysis of DNA damage repair pathways in iCCA patients with or without *KRAS* mutations tumor cells

Average expression of genes involved in DNA damage repair pathways of A) DNA repair_Hallmarks, B) BER_KEGG and C) NHEJ_KEGG in malignant and non-malignant cells from iCCA patients with or without *KRAS* mutations.

Figure S7: Experimental design of iCCA tumor initiation via HTDV in *Parp-1*$^{+/+}$ and *Parp-1*$^{-/-}$ mice.

A) 7-8-weeks old mice were injected with i) 2000 µg HSB2-plasmid (empty vector control; EV); ii) 5000 µg *Kras*^{G12V}-plasmid, 5000 µg *shRp53*-plasmid and 2000 µg *HSB2*-plasmid (*Kras/Tp53*); or iii) 2500 µg *myrAkt*-plasmid, 2500 µg myc-tagged *Nicd*-plasmid and 1000 µg *HSB2*-plasmid (*Akt/Nicd*) and sacrificed at the age of 14-18 weeks. B) List shows information (ID, gender, bodyweight, liver weight on the day of sacrifice) of *Parp-1*$^{+/+}$ and *Parp-1*$^{-/-}$ mice injected with empty vector and plasmid combinations *Kras/Tp53* and *Akt/Nicd.* *Mouse was excluded after analysis of transcriptomic data (outlier analysis).

Figure S8: Histopathological classification of *in vivo* tumors.

A) Scheme of histopathological assessment of tumor sections induced by HDTV (*Kras/Tp53*; *Akt/Nicd)* in *Parp-1*$^{-/-}$ and *Parp-1*$^{+/+}$ mice. B) Table shows information (grading, number of foci, size, hematogenous spread) of paraffin-embedded tumor sections.

Figure S9: Quantification of immunohistochemistry staining in liver sections after HDTV with *Kras/Tp53* and *Akt/Nicd*.

Quantification of selected immunohistochemical markers (Parp-1, Ki67, and yH2ax) in liver sections of mice injected with A) *Kras/Tp53* and B) *Akt/Nicd*. The number of stained nuclei was determined by ImageJ and adjusted to control staining. Mean ± SD, n=5, p<0.05 (*), p<0.01 (**), p<0.001 (***).

Figure S10: Expression of the genes and proteins associated with defined pathways after HDTV with *Kras/Tp53* in *Parp-1*$^{-/-}$ and *Parp-1*$^{+/+}$ mice.

Cluster analysis of samples from Parp-1$^{-/-}$ and Parp-1$^{+/+}$ animals with Kras/Tp53 mutations. Analysis was performed based on the Broad Institute gene sets regulating cell cycle, Hippo signaling, apoptosis, MAPK, TGF-β using r-log values. A) Heatmaps and cluster analyses of Kras/Tp53 Parp-1$^{-/-}$ vs Parp-1$^{-/-}$ empty vector B) Heatmaps and cluster analyses of Kras/Tp53 Parp-1$^{-/-}$ vs of Kras/Tp53 Parp-1$^{+/+}$ C) Immunohistochemistry staining of selected proteins (Cdc25a, Caspase 3, Yap, and Mapk p38) of *Parp-1*$^{-/-}$*Kras/Tp53* mouse in normal and tumor tissue. Representative images of normal liver and tumor tissue from animal model are shown. Scale bars indicate 200 µm (20x magnification).

Figure S11: Enriched gene sets in *Parp-1*$^{-/-}$ mice injected with *Kras/Tp53* vs. *Parp-1*$^{+/+}$ mice.

A) Gene set enrichment analysis (GSEA) of *Parp-1*$^{-/-}$ mice injected with *Kras/Tp53* vs. *Parp-1*$^{+/+}$ mice. Selection of gene sets was based on statistical significance calculated by nominal p<0.05 and FDR<0.25. NES indicates degree of overexpression for each group at the peak of the entire gene set.

Figure S12: Differential expressed genes after HDTV with *Akt/Nicd* in *Parp-1*$^{-/-}$ vs. *Parp-1*$^{+/+}$ mice.

A) Unsupervised cluster and PCA plot of significant genes (p<0.05) after HDTV with *Akt/Nicd* in *Parp-1*$^{-/-}$ vs. *Parp-1*$^{+/+}$ mice. B) Canonical pathways and clinical endpoints and networks significantly regulated in tumors induced with *Akt/Nicd* in *Parp-1*$^{-/-}$ vs. *Parp-1*$^{+/+}$ mice identified by IPA. Dashed line indicated significance threshold of –log(p-value > 1.3). Shown are z-scores of respective canonical pathways (positive z-score = red/activated, negative z-score = blue/inhibited).

Figure S13: Enriched gene sets in *Parp-1*$^{-/-}$ mice injected with *Akt/Nicd* vs. *Parp-1*$^{+/+}$ mice.

A) Gene set enrichment analysis (GSEA) of *Parp-1*$^{-/-}$ mice injected with *Akt/Nicd* vs. *Parp-1*$^{+/+}$ mice. Selection of gene sets was based on statistical significance calculated by nominal p<0.05 and FDR<0.25. NES indicates degree of overexpression for each group at the peak of the entire gene set.

Figure S14: Regulatory mechanism of CHK-1 and PARP-1 in KRAS mutated primary human cell lines

A) Relative gene expression of CHK-1, CHK-1-related genes and PARP-1 in KRAS-mutated cell lines CCC16 after treatment with rabusertib. Expression was normalized to untreated CCC16 control cells. Mean ± SD, n=3, p<0.05 (*), p<0.01 (**), p<0.001 (***). B) STRING functional association network between CHK-1 and its regulators and direct/indirect connection with PARP-1.

Figure S1

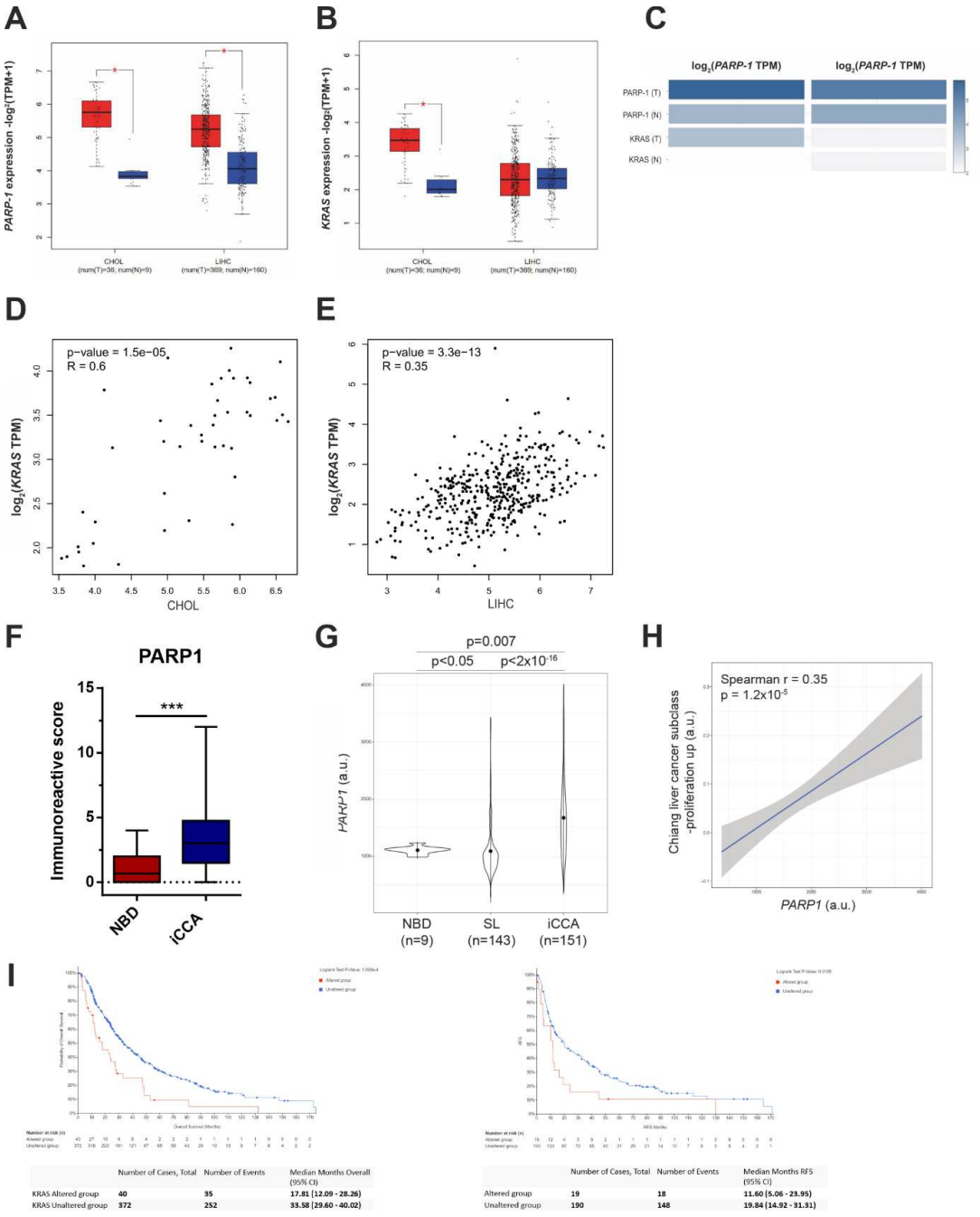
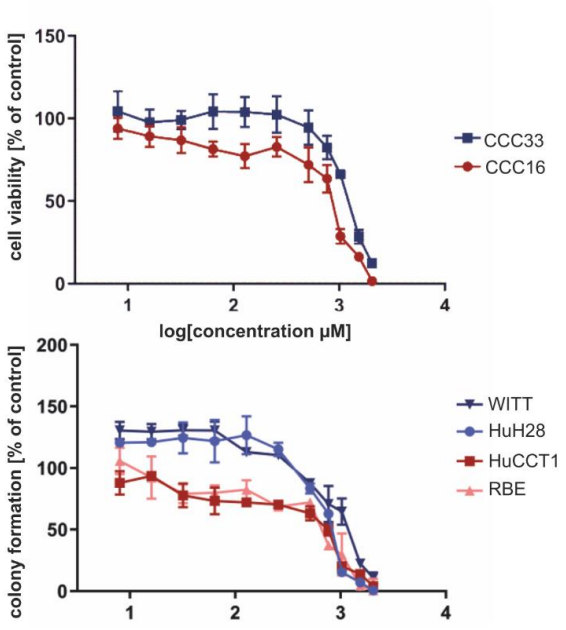

A
PARP-1 expression -log2(TPM+1)
CHOL
(num(T)=36; num(N)=9)
LIHC
(num(T)=369; num(N)=160)
B
KRAS expression -log2(TPM+1)
CHOL
(num(T)=36; num(N)=9)
LIHC
(num(T)=369; num(N)=160)
C
log2(PARP-1 TPM)
log2(PARP-1 TPM)
PARP-1 (T)
PARP-1 (N)
KRAS (T)
KRAS (N)
D
p−value = 1.5e−05
R = 0.6
log2(KRAS TPM)
CHOL
E
p−value = 3.3e−13
R = 0.35
log2(KRAS TPM)
LIHC
F
PARP1
***
Immunoreactive score
NBD
iCCA
G
p=0.007
p<0.05
p<2x10-16
HAIKP1 (a.u.)
NBD
(n=9)
SL
(n=143)
iCCA
(n=151)
H
Spearman r = 0.35
p = 1.2x10-5
Chiang liver cancer subclass
-proliferation up (a.u.)
PARP1 (a.u.)
I
Number of Cases, Total
Number of Events
Median Months Overall (95% CI)
KRAS Altered group 40 35 17.81 [12.09 - 28.26]
KRAS Unaltered group 372 252 33.58 [29.60 - 40.02]
Number of Cases, Total
Number of Events
Median Months RFS (95% CI)
Altered group 19 18 11.60 [5.06 - 23.95]
Unaltered group 190 148 19.84 [14.92 - 31.31]

Figure S2

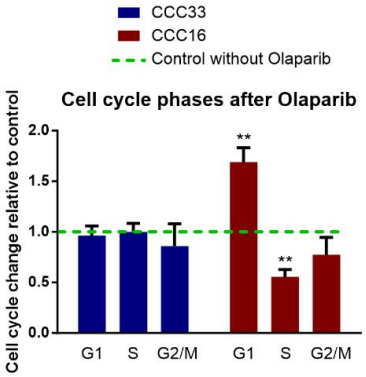
A

	CCC33	CCC16	WITT	HuH28	HuCCT1	RBE
IC50 [µM]	1175.0 ± 63.88	694.9 ± 148.7	1080.0 ± 129.9	805.3 ± 21.57	387.2 ± 205.5	464.5 ± 80.59

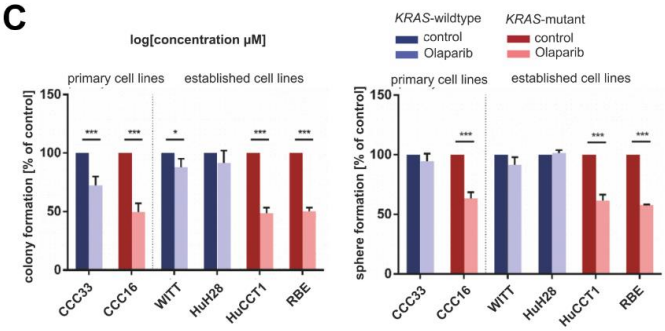
	p-value
CCC33 vs. CCC16	p = 0.0068 (**)
WITT vs. HuCCT1	p = 0.0078 (**)
WITT vs. RBE	p = 0.0026 (**)
WITT vs. HuH28	p = 0.0698 (ns)
HuH28 vs. HuCCT1	p = 0.0725 (ns)
HuH28 vs. RBE	p = 0.0114 (*)
HuCCT1 vs. RBE	p = 0.5769 (ns)



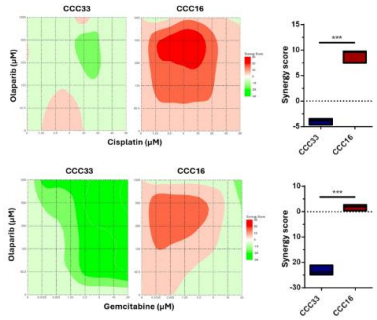
B



C



D



E

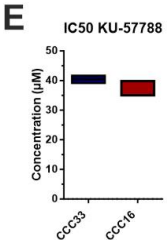


Figure S3

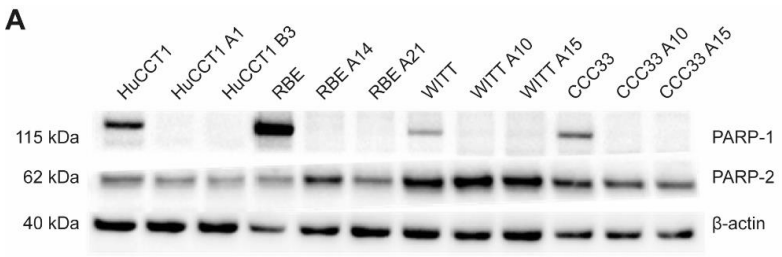

A
HuCCT1
HuCCT1 A1
HuCCT1 B3
RBE
RBE A14
RBE A21
WITT
WITT A10
WITT A15
CCC33
CCC33 A10
CCC33 A15
115 kDa
62 kDa
40 kDa
PARP-1
PARP-2
β-actin

Figure S4

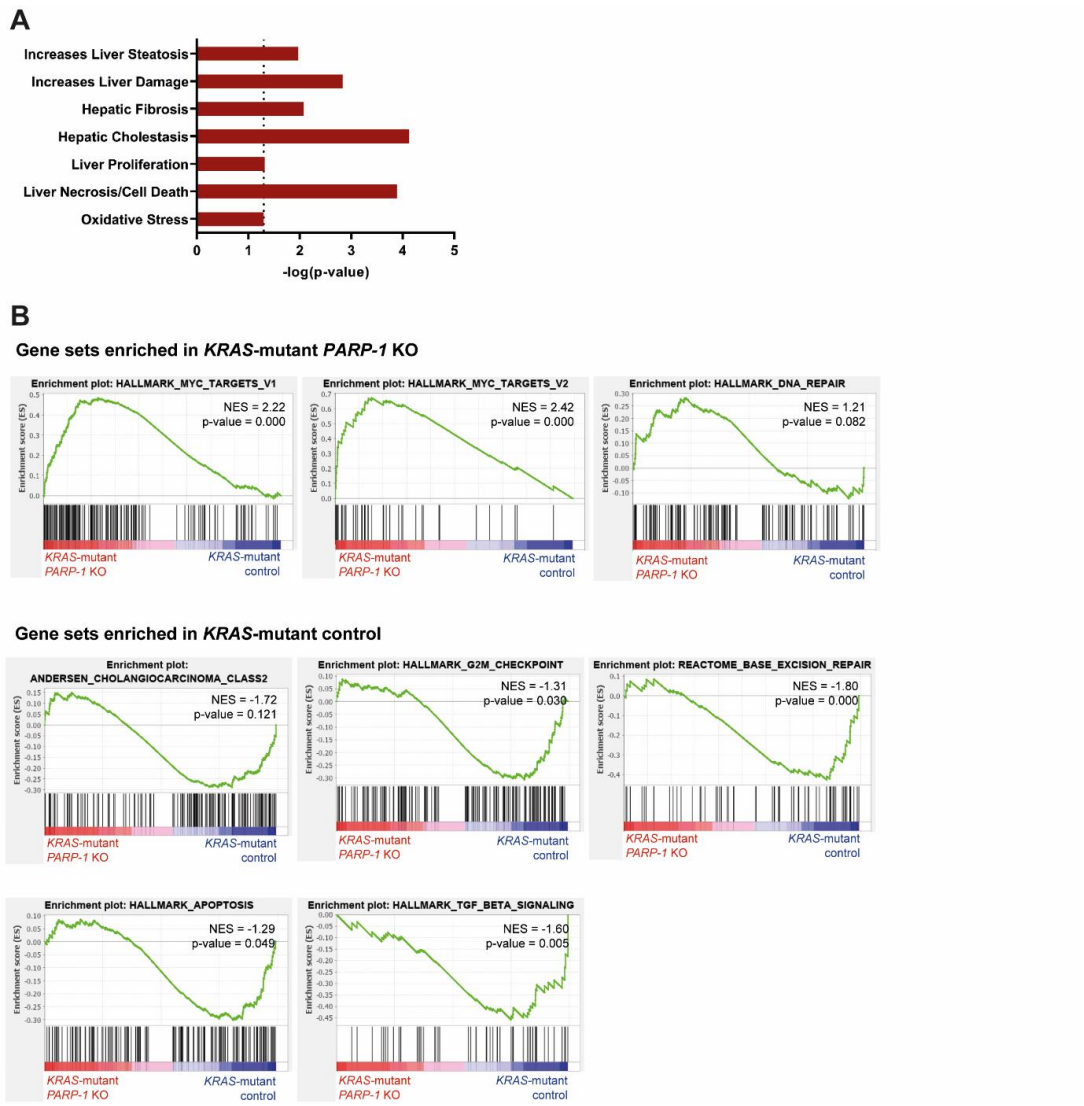

A
Increases Liver Steatosis
Increases Liver Damage
Hepatic Fibrosis
Hepatic Cholestasis
Liver Proliferation
Liver Necrosis/Cell Death
Oxidative Stress
0
1
2
3
4
5
-log(p-value)
B
Gene sets enriched in KRAS-mutant PARP-1 KO
Enrichment plot: HALLMARK_MYC_TARGETS_V1
NES = 2.22
p-value = 0.000
Enrichment plot: HALLMARK_MYC_TARGETS_V2
NES = 2.42
p-value = 0.000
Enrichment plot: HALLMARK_DNA_REPAIR
NES = 1.21
p-value = 0.082
KRAS-mutant PARP-1 KO
KRAS-mutant control
Gene sets enriched in KRAS-mutant control
Enrichment plot: ANDERSEN_CHOLANGIOCARCINOMA_CLASS2
NES = -1.72
p-value = 0.121
Enrichment plot: HALLMARK_G2M_CHECKPOINT
NES = -1.31
p-value = 0.030
Enrichment plot: REACTOME_BASE_EXCISION_REPAIR
NES = -1.80
p-value = 0.000
Enrichment plot: HALLMARK_APOPTOSIS
NES = -1.29
p-value = 0.049
Enrichment plot: HALLMARK_TGF_BETA_SIGNALING
NES = -1.60
p-value = 0.005
Enrichment score (ES)

Figure S5

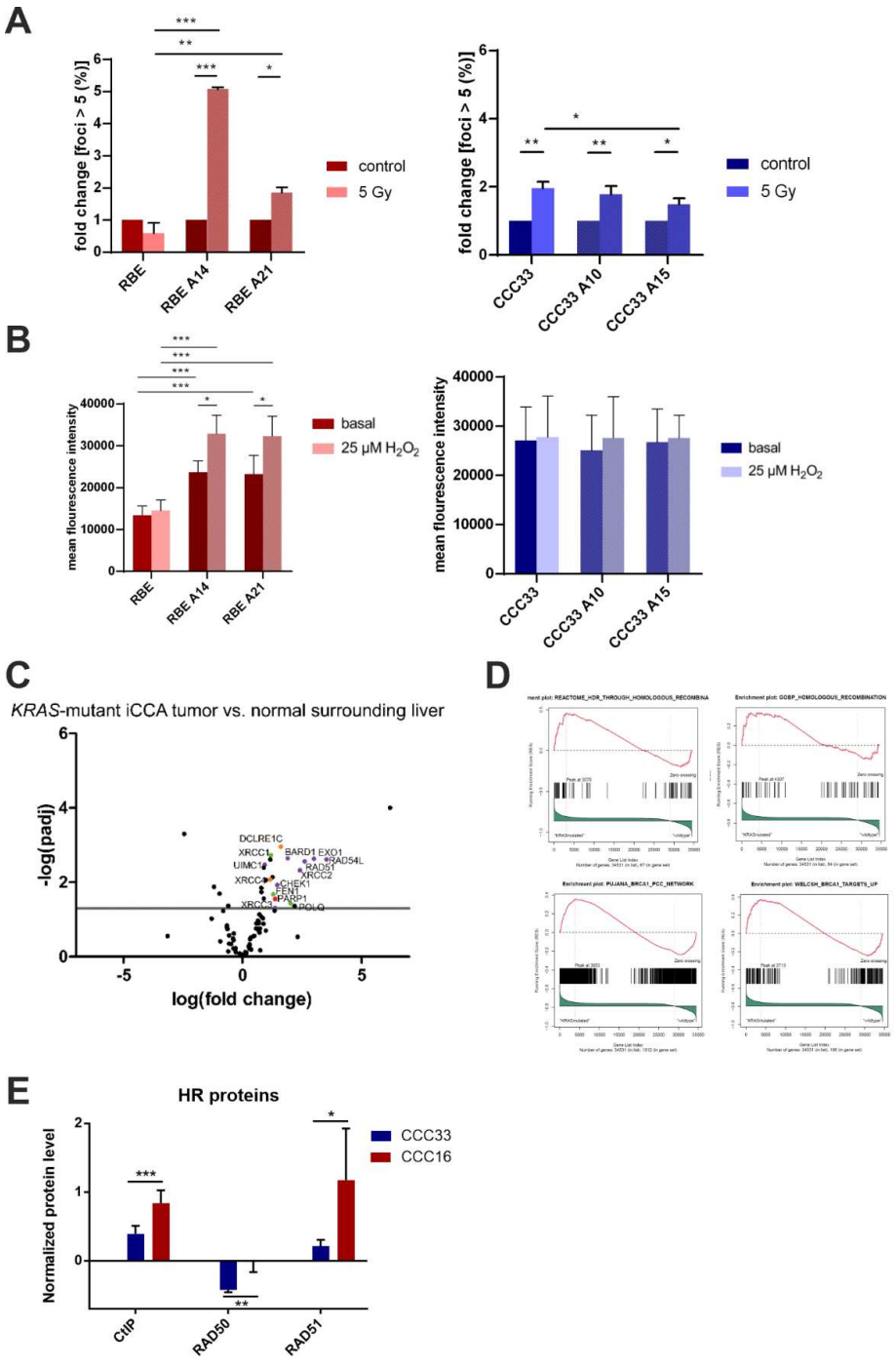

A
fold change [foci > 5 (%)]
control
5 Gy
RBE
RBE A14
RBE A21
CCC33
CCC33 A10
CCC33 A15
B
mean flourescence intensity
basal
25 μM H2O2
C
KRAS-mutant iCCA tumor vs. normal surrounding liver
-log(padj)
log(fold change)
DCLRE1C
XRCC1
BARD1
EXO1
RAD54L
UIMC1
RAD51
XRCC2
XRCC4
CHEK1
FEN1
PARP1
POLQ
D
E
HR proteins
Normalized protein level
CCC33
CCC16
ChIP
RAD50
RAD51

Figure S6

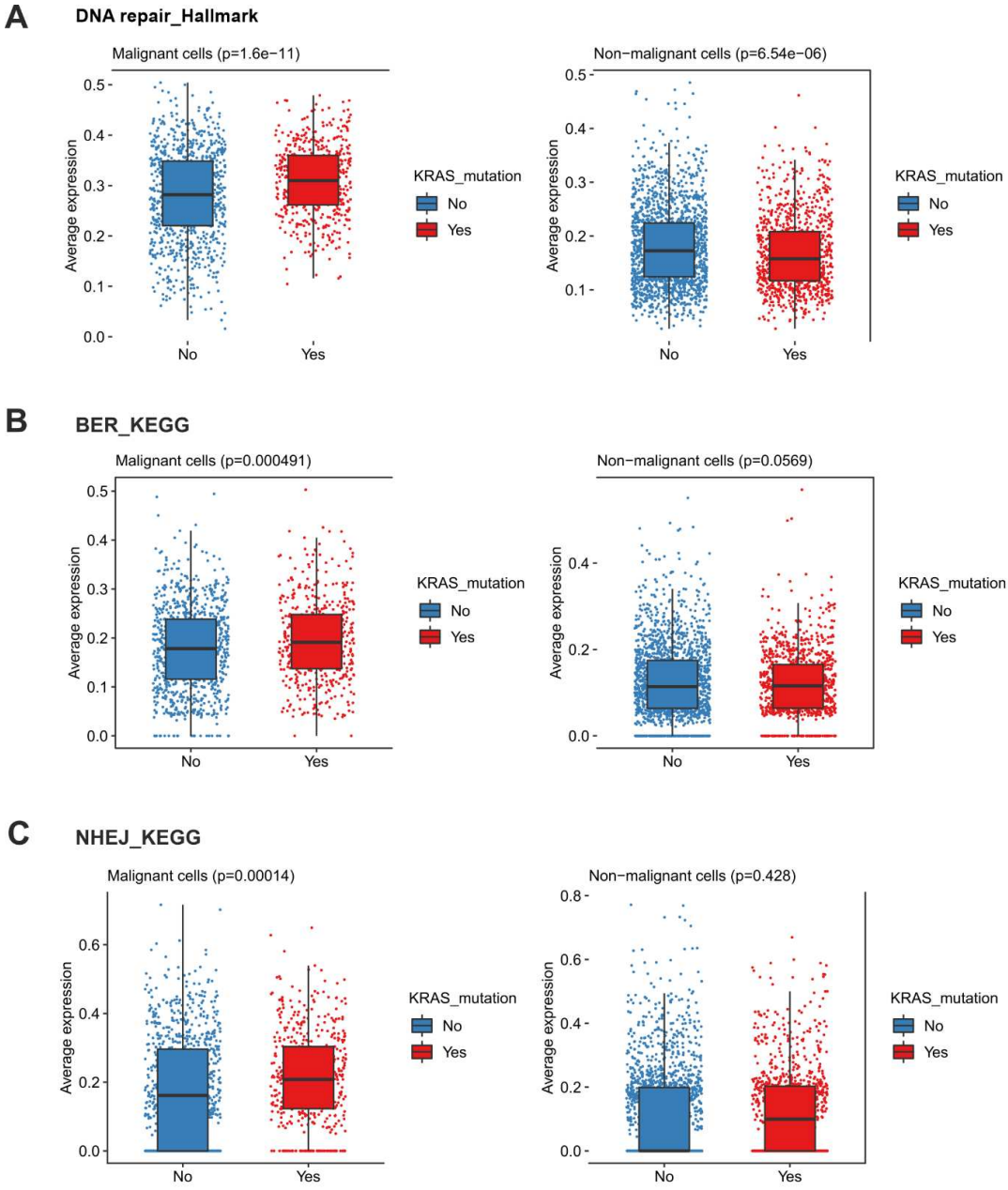
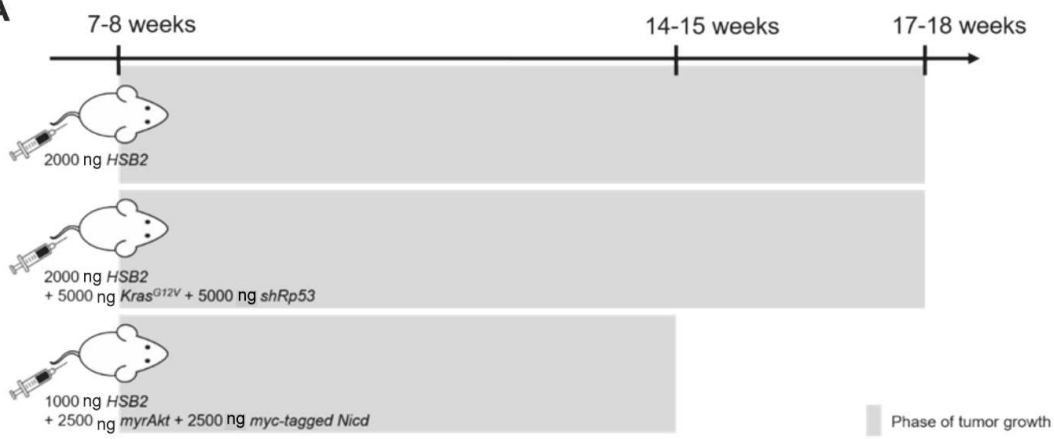

A
DNA repair_Hallmark
Malignant cells (p=1.6e−11)
Non−malignant cells (p=6.54e−06)
Average expression
KRAS_mutation
No
Yes
B
BER_KEGG
Malignant cells (p=0.000491)
Non−malignant cells (p=0.0569)
C
NHEJ_KEGG
Malignant cells (p=0.00014)
Non−malignant cells (p=0.428)

Figure S7

A

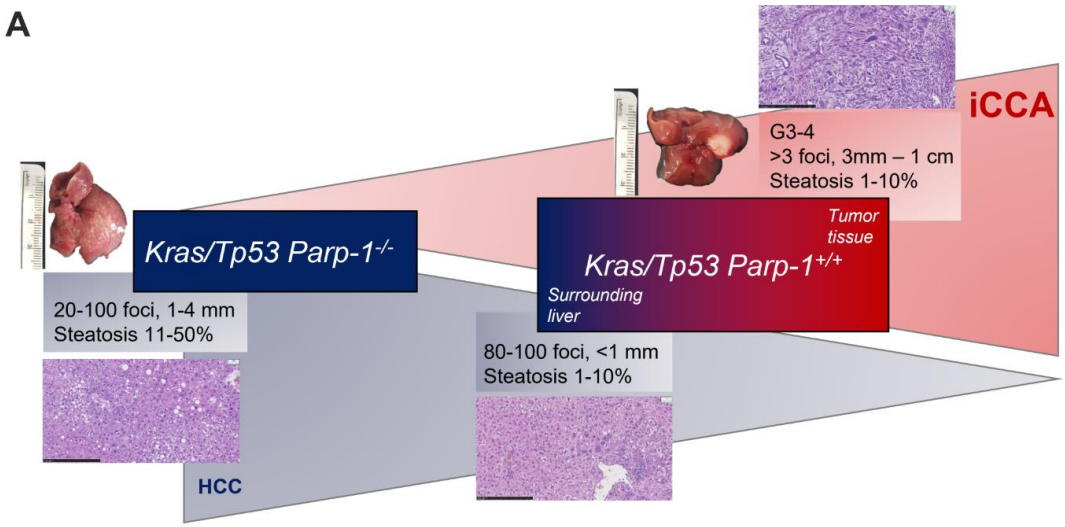


B

Injection (plasmid)	genotype	ID	gender	body weight [g]	liver weight [g]
Empty vector	*PARP-1 +/+*	MAR-F947	male	32.5	1.1
		MAR-F990		32.1	1.2
		MAR-G049		32.6	1.9
		MAR-G511		31.1	1.4
		MAR-G513		32.6	1.4
	PARP-1 -/-	MAR-F997	male	36.3	1.6
		MAR-G003		26.9	1.3
		MAR-G048		35.3	1.8
		MAR-G060		31.3	1.7
		MAR-G507		32.3	1.3
Kras/Tp53	*PARP-1 +/+*	MAR-G032	male	26.5	2.7
		MAR-G149		26.0	2.4
		MAR-G419		30.1	2.6
		MAR-G457*		27.4	2.7
		MAR-G500		28.8	3.4
	PARP-1 -/-	MAR-G100	male	27.9	6.9
		MAR-G101		29.8	6.2
		MAR-G180		30.3	5.9
		MAR-G336		30.3	6.2
		MAR-G458		29.0	5.5
		MAR-G459		30.7	5.9
Akt/Nicd	*PARP-1 +/+*	MAR-F944	male	36.7	8.7
		MAR-F991		30.0	6.0
		MAR-G012		31.7	6.7
		MAR-G080		34.0	5.1
		MAR-G133		30.5	5.1
	PARP-1 -/-	MAR-G036	male	32.2	6.0
		MAR-G063		29.1	5.1
		MAR-G066		31.9	6.1
		MAR-G139		29.4	4.7
		MAR-G140		27.2	4.1

Figure S8

A



B

plasmid	N	genotype	tissue	classification	grading	foci	size	hematogenous spread
Empty vector (HSB2)	5	*PARP-1 +/+*	**normal liver**	No tumor	-	-	-	-
	5	*PARP-1 -/-*	**normal liver**	No tumor	-	-	-	-
Kras/Tp53	5	*PARP-1 +/+*	**tumor**	4x iCCA, 1x iCCA-HCC	G3-4	>3	3 mm – 1 cm	-
			dysplastic foci in normal liver	5x dysplastic foci	n.A.	80-100	<1 mm	V1
	6	*PARP-1 -/-*	**dysplastic foci in normal liver**	6x dysplastic foci, 1x HCC	n.A.	20-100	1-4 mm	V1
Akt/Nicd	5	*PARP-1 +/+*	**tumor in normal liver**	Multiple iCCA	G1-2	~100	1-4 mm	-
	5	*PARP-1 -/-*		Multiple iCCA	G1-2	~100	1-4 mm	-

Figure S9

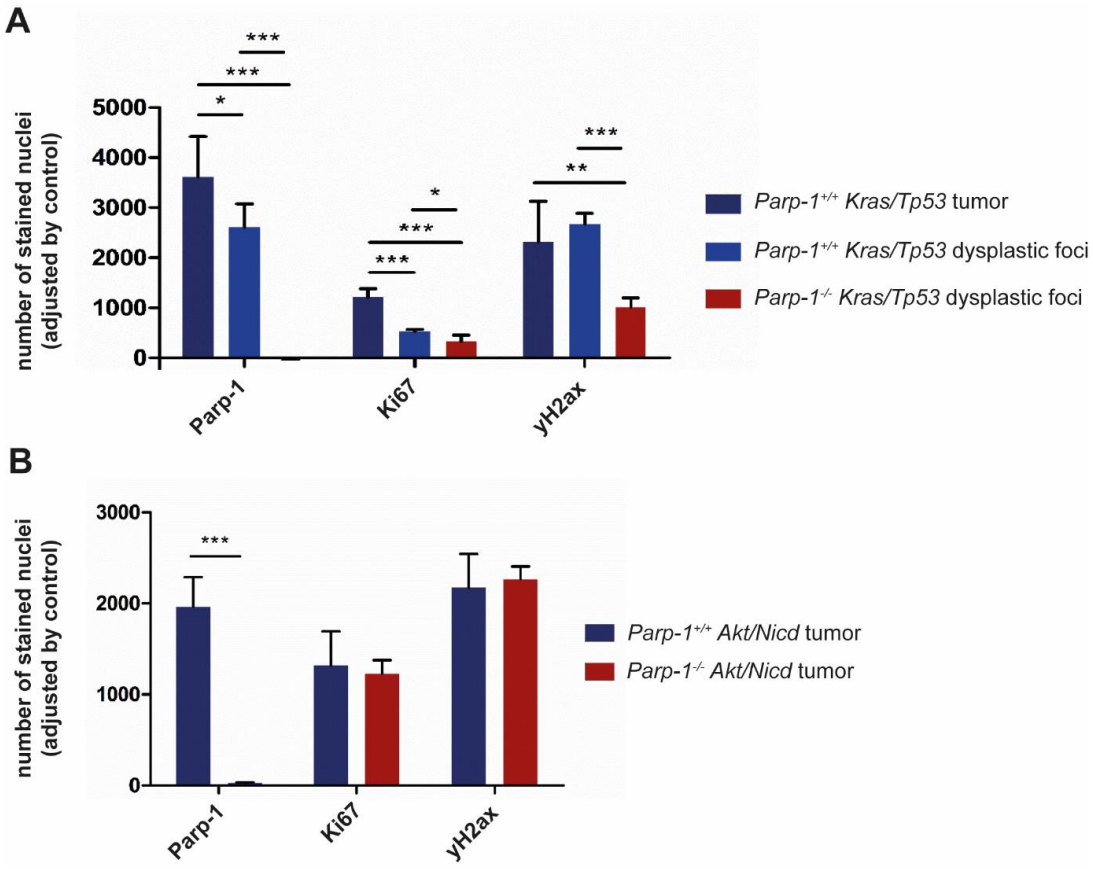

A
number of stained nuclei (adjusted by control)
5000
4000
3000
2000
1000
0
***
***
*
***
***
*
***
**
Parp-1
Ki67
γH2ax
Parp-1+/+ Kras/Tp53 tumor
Parp-1+/+ Kras/Tp53 dysplastic foci
Parp-1-/- Kras/Tp53 dysplastic foci
B
number of stained nuclei (adjusted by control)
3000
2000
1000
0
***
Parp-1
Ki67
γH2ax
Parp-1+/+ Akt/Nicd tumor
Parp-1-/- Akt/Nicd tumor

Figure S10

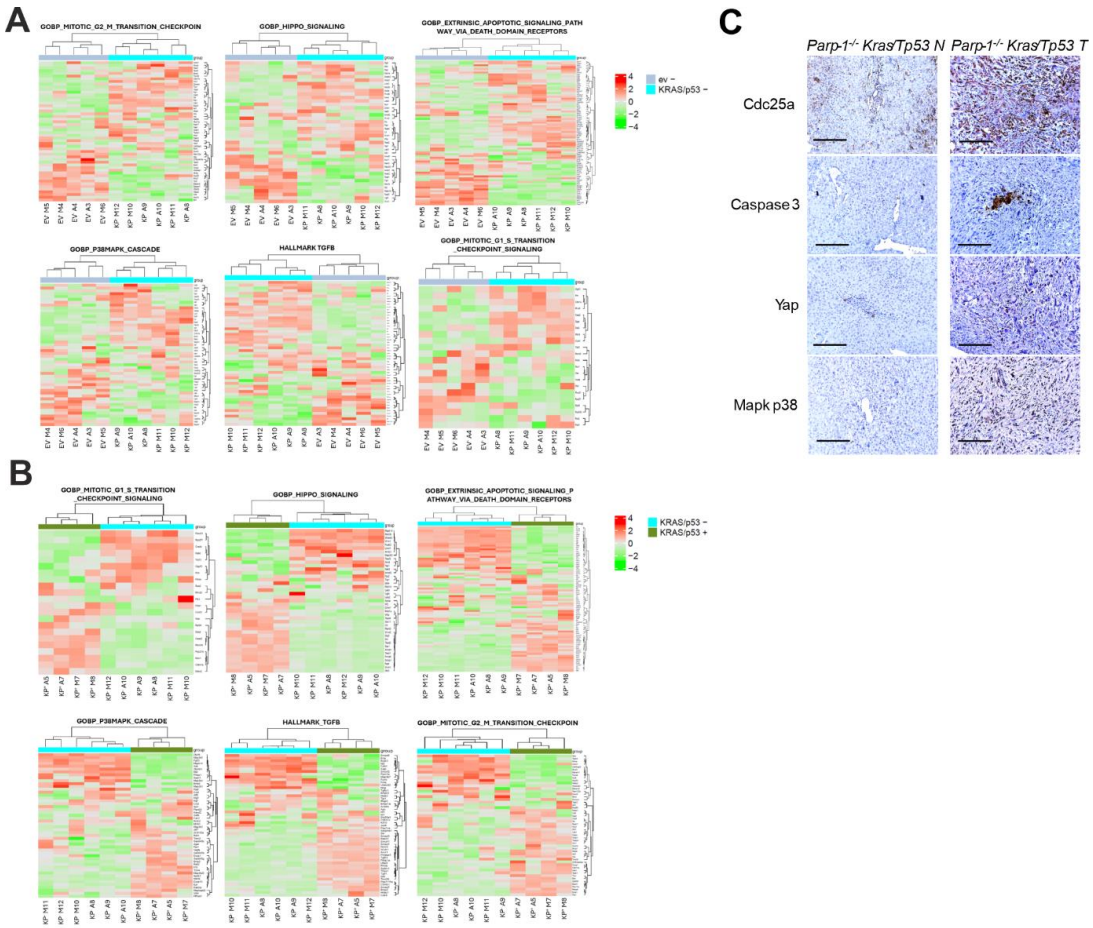

A
GOBP_MITOTIC_G2_M_TRANSITION_CHECKPOIN
GOBP_HIPPO_SIGNALING
GOBP_EXTRINSIC_APOPTOTIC_SIGNALING_PATH WAY_VIA_DEATH_DOMAIN_RECEPTORS
GOBP_P38MAPK_CASCADE
HALLMARK_TGFB
GOBP_MITOTIC_G1_S_TRANSITION _CHECKPOINT_SIGNALING
4
2
0
−2
−4
ev −
KRAS/p53 −
B
GOBP_MITOTIC_G1_S_TRANSITION _CHECKPOINT_SIGNALING
GOBP_HIPPO_SIGNALING
GOBP_EXTRINSIC_APOPTOTIC_SIGNALING_P ATHWAY_VIA_DEATH_DOMAIN_RECEPTORS
GOBP_P38MAPK_CASCADE
HALLMARK_TGFB
GOBP_MITOTIC_G2_M_TRANSITION_CHECKPOIN
4
2
0
−2
−4
KRAS/p53 −
KRAS/p53 +
C
Parp-1-/- KrasTp53 N
Parp-1-/- KrasTp53 T
Cdc25a
Caspase 3
Yap
Mapk p38

Figure S11

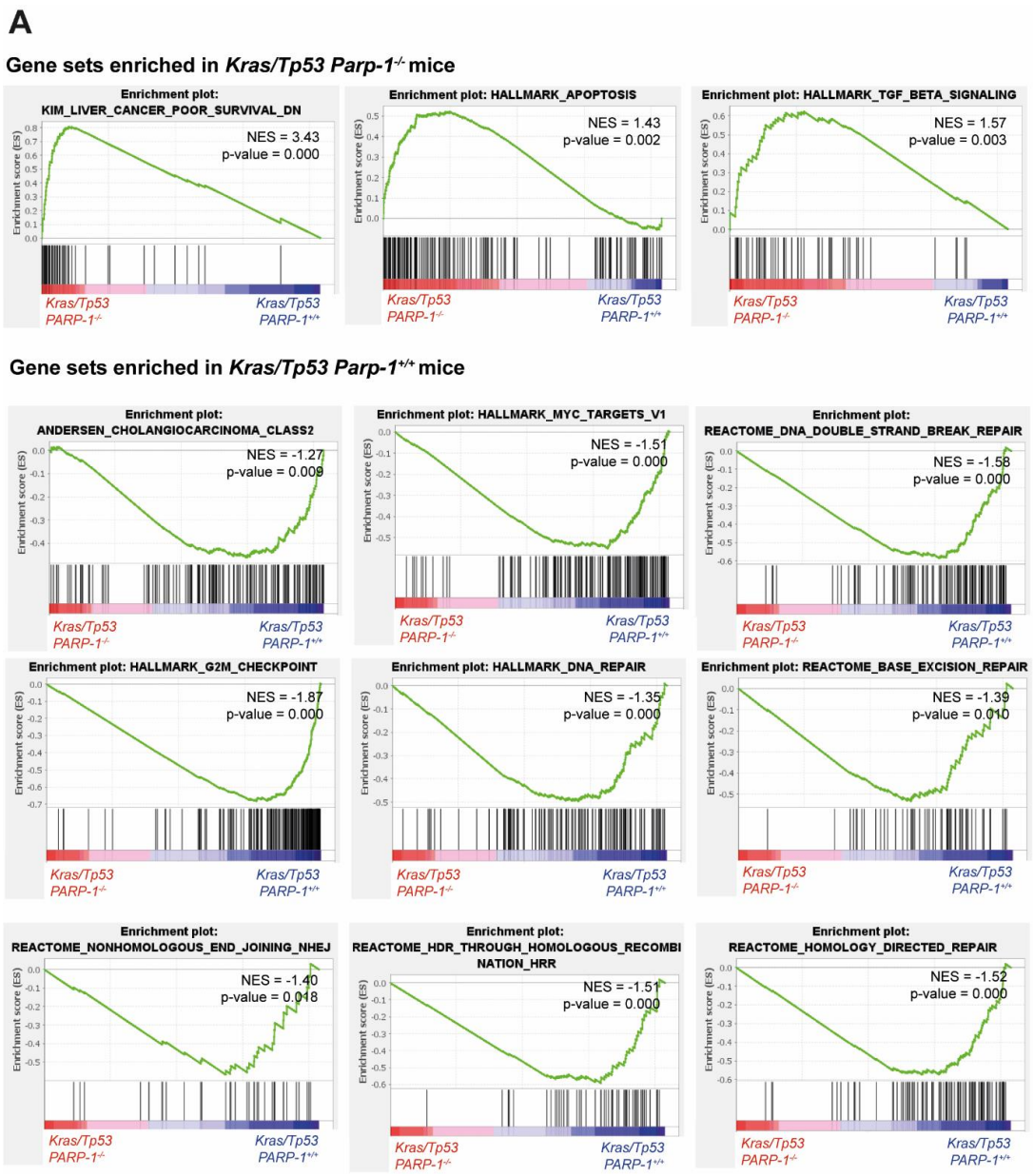

A
Gene sets enriched in Kras/Tp53 Parp-1-/- mice
Enrichment plot: KIM_LIVER_CANCER_POOR_SURVIVAL_DN
NES = 3.43
p-value = 0.000
Enrichment plot: HALLMARK_APOPTOSIS
NES = 1.43
p-value = 0.002
Enrichment plot: HALLMARK_TGF_BETA_SIGNALING
NES = 1.57
p-value = 0.003
Gene sets enriched in Kras/Tp53 Parp-1+/+ mice
Enrichment plot: ANDERSEN_CHOLANGIOCARCINOMA_CLASS2
NES = -1.27
p-value = 0.009
Enrichment plot: HALLMARK_MYC_TARGETS_V1
NES = -1.51
p-value = 0.000
Enrichment plot: REACTOME_DNA_DOUBLE_STRAND_BREAK_REPAIR
NES = -1.58
p-value = 0.000
Enrichment plot: HALLMARK_G2M_CHECKPOINT
NES = -1.87
p-value = 0.000
Enrichment plot: HALLMARK_DNA_REPAIR
NES = -1.35
p-value = 0.000
Enrichment plot: REACTOME_BASE_EXCISION_REPAIR
NES = -1.39
p-value = 0.010
Enrichment plot: REACTOME_NONHOMOLOGOUS_END_JOINING_NHEJ
NES = -1.40
p-value = 0.018
Enrichment plot: REACTOME_HDR_THROUGH_HOMOLOGOUS_RECOMBINATION_HRR
NES = -1.51
p-value = 0.000
Enrichment plot: REACTOME_HOMOLOGY_DIRECTED_REPAIR
NES = -1.52
p-value = 0.000
Enrichment score (ES)
Kras/Tp53 PARP-1-/-
Kras/Tp53 PARP-1+/+

Figure S12

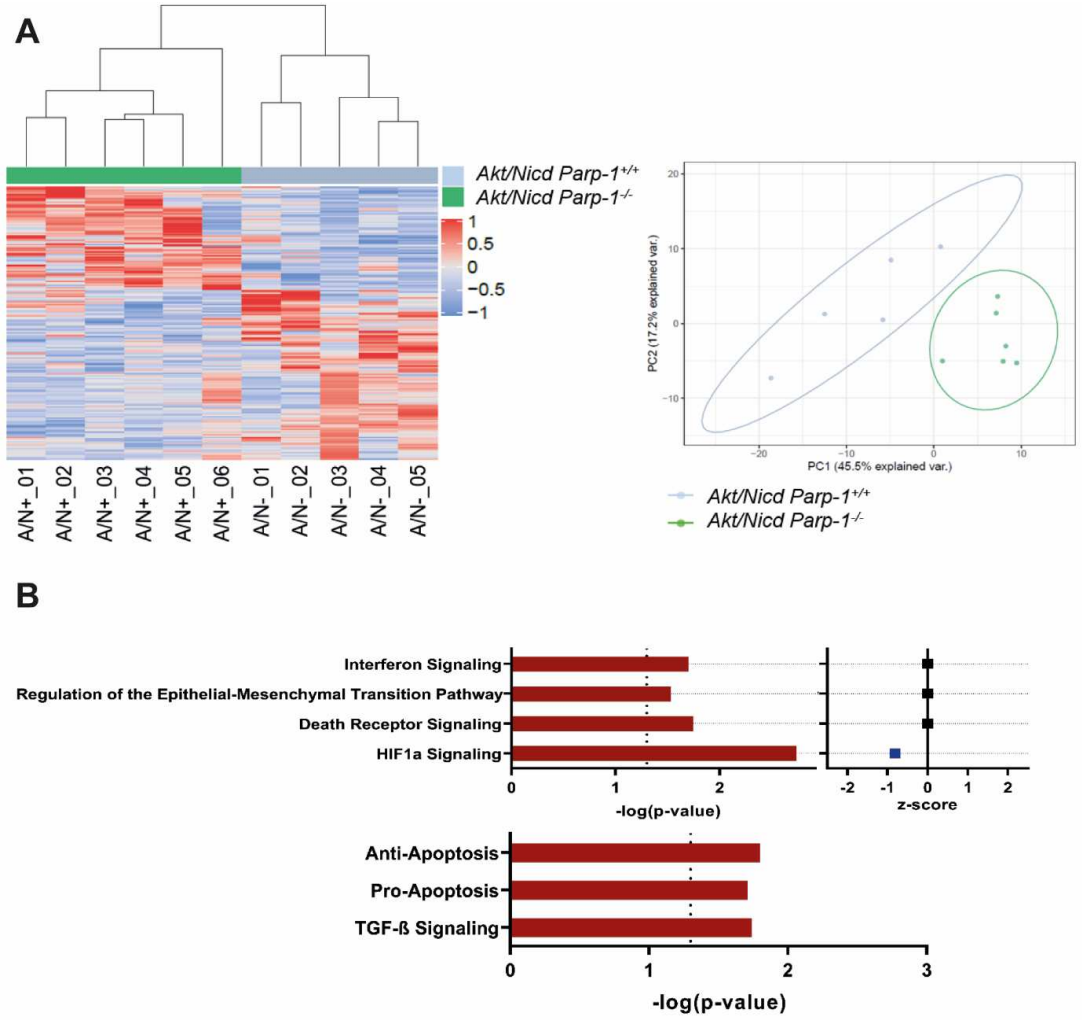

A
Akt/Nicd Parp-1+/+
Akt/Nicd Parp-1-/-
1
0.5
0
−0.5
−1
A/N+_01
A/N+_02
A/N+_03
A/N+_04
A/N+_05
A/N+_06
A/N-_01
A/N-_02
A/N-_03
A/N-_04
A/N-_05
PC2 (17.2% explained var.)
PC1 (45.5% explained var.)
Akt/Nicd Parp-1+/+
Akt/Nicd Parp-1-/-
B
Interferon Signaling
Regulation of the Epithelial-Mesenchymal Transition Pathway
Death Receptor Signaling
HIF1a Signaling
-log(p-value)
z-score
Anti-Apoptosis
Pro-Apoptosis
TGF-ß Signaling
-log(p-value)

Figure S13

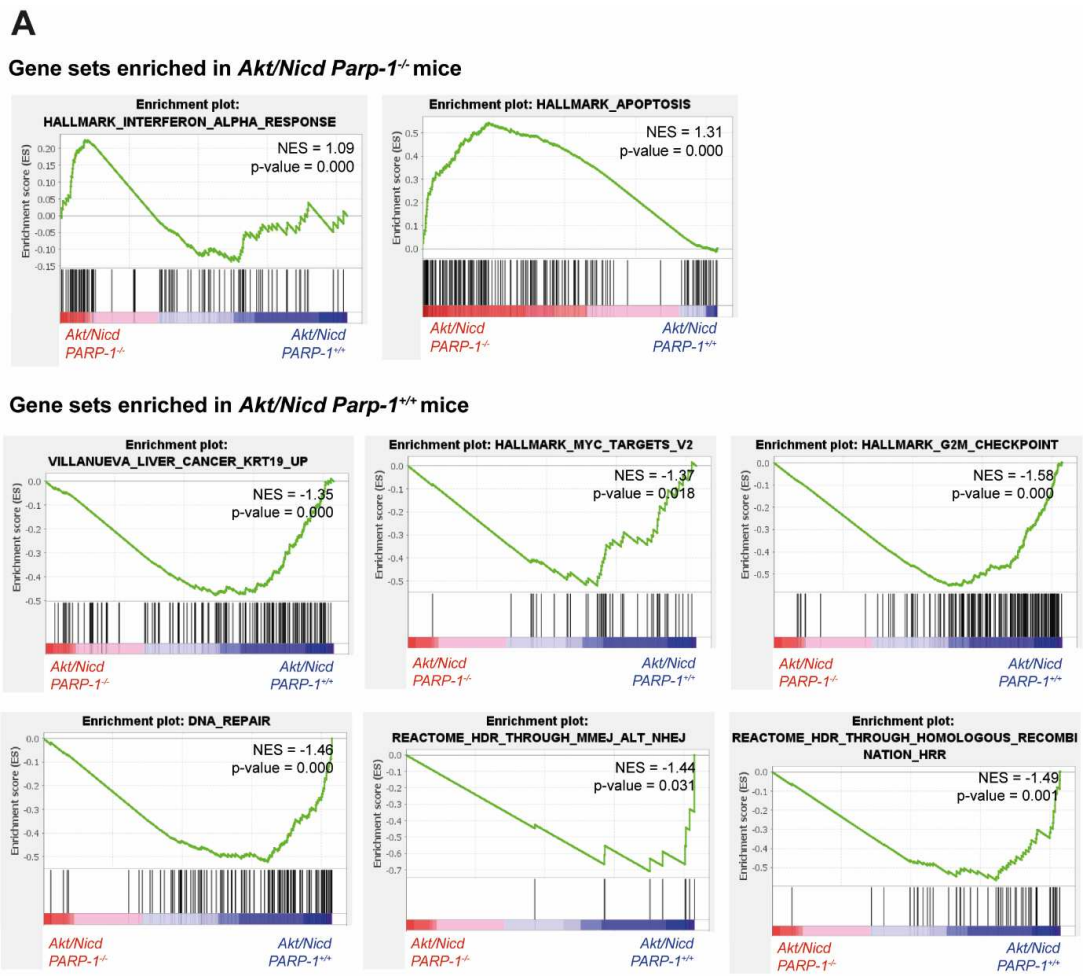
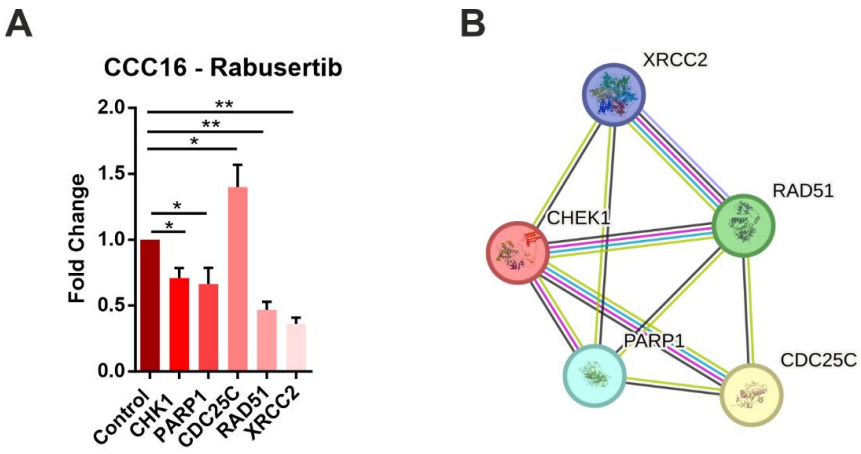

A
Gene sets enriched in Akt/Nicd Parp-1-/- mice
Enrichment plot: HALLMARK_INTERFERON_ALPHA_RESPONSE
NES = 1.09
p-value = 0.000
Enrichment plot: HALLMARK_APOPTOSIS
NES = 1.31
p-value = 0.000
Gene sets enriched in Akt/Nicd Parp-1+/+ mice
Enrichment plot: VILLANUEVA_LIVER_CANCER_KRT19_UP
NES = -1.35
p-value = 0.000
Enrichment plot: HALLMARK_MYC_TARGETS_V2
NES = -1.37
p-value = 0.018
Enrichment plot: HALLMARK_G2M_CHECKPOINT
NES = -1.58
p-value = 0.000
Enrichment plot: DNA_REPAIR
NES = -1.46
p-value = 0.000
Enrichment plot: REACTOME_HDR_THROUGH_MMEJ_ALT_NHEJ
NES = -1.44
p-value = 0.031
Enrichment plot: REACTOME_HDR_THROUGH_HOMOLOGOUS_RECOMBINATION_HRR
NES = -1.49
p-value = 0.001
Enrichment score (ES)
Akt/Nicd PARP-1-/-
Akt/Nicd PARP-1+/+

Figure S14


A
CCC16 - Rabusertib
Fold Change
2.0
1.5
1.0
0.5
0.0
**
**
*
*
*
Control
CHK1
PARP1
CDC25C
RAD51
XRCC2
B
XRCC2
RAD51
CHEK1
PARP1
CDC25C

References:

1 Castven D, Becker D, Czauderna C, *et al.* Application of patient-derived liver cancer cells for phenotypic characterization and therapeutic target identification. *Int J Cancer*. 2019;144:2782–94.
2 Andersen JB, Spee B, Blechacz BR, *et al.* Genomic and genetic characterization of cholangiocarcinoma identifies therapeutic targets for tyrosine kinase inhibitors. *Gastroenterology*. 2012;142:1021-1031.e15.
3 Castven D, Fischer M, Becker D, *et al.* Adverse genomic alterations and stemness features are induced by field cancerization in the microenvironment of hepatocellular carcinomas. *Oncotarget*. 2017;8:48688–700.
4 Massa A, Varamo C, Vita F, *et al.* Evolution of the Experimental Models of Cholangiocarcinoma. *Cancers*. 2020;12:2308.
5 Gu Z, Eils R, Schlesner M. Complex heatmaps reveal patterns and correlations in multidimensional genomic data. *Bioinforma Oxf Engl*. 2016;32:2847–9.
6 Krämer A, Green J, Pollard J, *et al.* Causal analysis approaches in Ingenuity Pathway Analysis. *Bioinforma Oxf Engl*. 2014;30:523–30.
7 Subramanian A, Tamayo P, Mootha VK, *et al.* Gene set enrichment analysis: a knowledge-based approach for interpreting genome-wide expression profiles. *Proc Natl Acad Sci U S A*. 2005;102:15545–50.
8 Tang Z, Kang B, Li C, *et al.* GEPIA2: an enhanced web server for large-scale expression profiling and interactive analysis. *Nucleic Acids Res*. 2019;47:W556–60.
9 O'Dell MR, Huang JL, Whitney-Miller CL, *et al.* Kras(G12D) and p53 mutation cause primary intrahepatic cholangiocarcinoma. *Cancer Res*. 2012;72:1557–67.
10 de Murcia JM, Niedergang C, Trucco C, *et al.* Requirement of poly(ADP-ribose) polymerase in recovery from DNA damage in mice and in cells. *Proc Natl Acad Sci U S A*. 1997;94:7303–7.
11 Matter MS, Marquardt JU, Andersen JB, *et al.* Oncogenic driver genes and the inflammatory microenvironment dictate liver tumor phenotype. *Hepatol Baltim Md*. 2016;63:1888–99.
12 Chen X, Calvisi DF. Hydrodynamic transfection for generation of novel mouse models for liver cancer research. *Am J Pathol*. 2014;184:912–23.
13 Saborowski A, Saborowski M, Davare MA, *et al.* Mouse model of intrahepatic cholangiocarcinoma validates FIG-ROS as a potent fusion oncogene and therapeutic target. *Proc Natl Acad Sci U S A*. 2013;110:19513–8.
14 Remmele W, Stegner HE. [Recommendation for uniform definition of an immunoreactive score (IRS) for immunohistochemical estrogen receptor detection (ER-ICA) in breast cancer tissue]. *Pathol*. 1987;8:138–40.
15 Szklarczyk D, Kirsch R, Koutrouli M, *et al.* The STRING database in 2023: protein-protein association networks and functional enrichment analyses for any sequenced genome of interest. *Nucleic Acids Res*. 2023;51:D638–46.

geneid_human	symbol_human	*KRAS*-mutant *PARP-1* KO_vs_control_log2fc	*KRAS*-mutant *PARP-1* KO_vs_control_pvalue
ENSG00000136045	PWP1	0,460180014	0
ENSG00000164002	EXO5	-3,290999889	0
ENSG00000167333	TRIM68	0,489639997	0
ENSG00000104361	NIPAL2	-0,876420021	0
ENSG00000124783	SSR1	0,656780005	0
ENSG00000136159	NUDT15	-0,59266001	0
ENSG00000143799	PARP1	-2,713370085	0
ENSG00000167074	TEF	-1,062059999	0
ENSG00000198900	TOP1	0,620440006	0
ENSG00000002549	LAP3	0,689549983	0
ENSG00000136869	TLR4	-4,733809948	0
ENSG00000179776	CDH5	-17,38200951	0
ENSG00000100003	SEC14L2	-0,665260017	0
ENSG00000013375	PGM3	0,681770027	0
ENSG00000197771	MCMBP	0,247240007	0
ENSG00000118816	CCNI	-0,507700026	0
ENSG00000115504	EHBP1	-0,590110004	0
ENSG00000122026	RPL21	-0,489259988	0
ENSG00000079332	SAR1A	0,267690003	0
ENSG00000141664	ZCCHC2	0,546389997	0
ENSG00000186184	POLR1D	-0,700079978	0
ENSG00000094661	OR1I1	14,62584972	0
ENSG00000138641	HERC3	-0,750199974	0
ENSG00000182827	ACBD3	0,287559986	0
ENSG00000244462	RBM12	0,328110009	0
ENSG00000164161	HHIP	-2,210939884	0
ENSG00000175792	RUVBL1	0,438820004	0
ENSG00000177096	PHETA2	-3,373600006	0
ENSG00000169744	LDB2	2,646199942	0
ENSG00000168439	STIP1	0,501139998	0
ENSG00000188921	HACD4	-4,588419914	0
ENSG00000214357	NEURL1B	-1,686759949	0
ENSG00000198018	ENTPD7	0,874430001	0
ENSG00000001461	NIPAL3	-0,31626001	0
ENSG00000138095	LRPPRC	0,311760008	0
ENSG00000169174	PCSK9	-2,006789923	0
ENSG00000244754	N4BP2L2	-0,562269986	0
ENSG00000141452	RMC1	0,48635	0
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ENSG00000169398	PTK2	-0,31279999	0
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ENSG00000173040	EVC2	-6,503220081	0,00001
ENSG00000136156	ITM2B	-0,576479971	0,00001
ENSG00000169410	PTPN9	-0,513750017	0,00001
ENSG00000134884	ARGLU1	-0,668099999	0,00001
ENSG00000108342	CSF3	5,127679825	0,00001
ENSG00000164300	SERINC5	-0,736310005	0,00001
ENSG00000155438	NIFK	0,671000004	0,00001
ENSG00000117395	EBNA1BP2	0,444499999	0,00001
ENSG00000013392	RWDD2A	0,812709987	0,00001
ENSG00000108819	PPP1R9B	0,369780004	0,00002
ENSG00000174840	PDE12	0,588680029	0,00002
ENSG00000129654	FOXJ1	-3,187489986	0,00002
ENSG00000114374	USP9Y	-7,678070068	0,00002
ENSG00000183580	FBXL7	6,1738801	0,00002
ENSG00000117528	ABCD3	-0,244420007	0,00002
ENSG00000179242	CDH4	2,508450031	0,00002
ENSG00000185262	UBALD2	-0,884159982	0,00002
ENSG00000146376	ARHGAP18	3,297950029	0,00002
ENSG00000271447	MMP28	-3,765059948	0,00002
ENSG00000137713	PPP2R1B	0,472930014	0,00002
ENSG00000225921	NOL7	0,393180013	0,00002
ENSG00000198331	HYLS1	-0,517639995	0,00002
ENSG00000171295	ZNF440	-0,476350009	0,00002
ENSG00000106028	SSBP1	0,408100009	0,00003
ENSG00000166197	NOLC1	0,507210016	0,00003
ENSG00000102524	TNFSF13B	-1,86006999	0,00003
ENSG00000101166	PRELID3B	0,474519998	0,00003
ENSG00000158856	DMTN	-0,770780027	0,00003
ENSG00000105131	EPHX3	-4,704909801	0,00003
ENSG00000125999	BPIFB1	14,17156029	0,00003
ENSG00000168497	CAVIN2	-2,10571003	0,00003
ENSG00000204713	TRIM27	0,554459989	0,00003
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ENSG00000169919	GUSB	-0,383980006	0,00004
ENSG00000072134	EPN2	0,44382	0,00004
ENSG00000251258	RFPL4B	-5,205910206	0,00004
ENSG00000152795	HNRNPDL	0,278109998	0,00004
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ENSG00000099958	DERL3	1,859410048	0,00006
ENSG00000165475	CRYL1	-0,60503	0,00006
ENSG00000163683	SMIM14	-0,800109982	0,00006
ENSG00000106823	ECM2	2,925519943	0,00007
ENSG00000196199	MPHOSPH8	-0,872409999	0,00007
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ENSG00000135314	KHDC1	-1,252629995	0,00009
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ENSG00000148110	MFSD14B	-0,28994	0,00011
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ENSG00000012817	KDM5D	-6,358960152	0,00012
ENSG00000162733	DDR2	-2,699909925	0,00013
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ENSG00000101280	ANGPT4	3,951839924	0,00013
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ENSG00000165125	TRPV6	2,40651989	0,00015
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ENSG00000137868	STRA6	-2,970000029	0,00017
ENSG00000166228	PCBD1	0,213249996	0,00017
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ENSG00000128228	SDF2L1	1,446799994	0,0002
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ENSG00000108651	UTP6	0,320919991	0,00023
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ENSG00000185917	SETD4	0,350760013	0,00029
ENSG00000198246	SLC29A3	-1,210420012	0,0003
ENSG00000115053	NCL	0,380409986	0,00032
ENSG00000171865	RNASEH1	0,291280001	0,00032
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ENSG00000107263	RAPGEF1	-0,412440002	0,00034
ENSG00000105323	HNRNPUL1	-0,336219996	0,00034
ENSG00000114654	EFCC1	4,341760159	0,00037

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ENSG00000138796	HADH	-0,193169996	0,00037
ENSG00000168447	SCNN1B	3,605969906	0,00037
ENSG00000065325	GLP2R	-1,893939972	0,0004
ENSG00000165959	CLMN	-1,004840016	0,00041
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ENSG00000150401	DCUN1D2	-0,662389994	0,00047
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ENSG00000107796	ACTA2	-1,385139942	0,00052
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ENSG00000265354	TIMM23	0,370189995	0,00055
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ENSG00000115946	PNO1	0,799700022	0,00056
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ENSG00000120800	UTP20	0,519860029	0,0006
ENSG00000114503	NCBP2	0,464020014	0,00061
ENSG00000136143	SUCLA2	-0,500590026	0,00062
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ENSG00000186187	ZNRF1	-0,272419989	0,00075
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ENSG00000123739	PLA2G12A	-0,345660001	0,00084
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ENSG00000166473	PKD1L2	-1,973799944	0,0009
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ENSG00000154188	ANGPT1	-1,569409966	0,00092
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ENSG00000144591	GMPPA	0,610610008	0,00143
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ENSG00000124383	MPHOSPH10	0,456149995	0,00155
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ENSG00000147854	UHRF2	-0,369870007	0,00176
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ENSG00000129009	ISLR	-3,665999889	0,00178
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ENSG00000112624	BICRAL	-0,496230006	0,00229
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ENSG00000130988	RGN	-5,189360142	0,00234
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ENSG00000163218	PGLYRP4	6,371250153	0,00244
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ENSG00000197110	IFNL3	3,094189882	0,00248
ENSG00000188124	OR2AG2	0,93096	0,00249
ENSG00000130159	ECSIT	-0,550930023	0,0025
ENSG00000118515	SGK1	2,274310112	0,00253
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ENSG00000007062	PROM1	3,363820076	0,00397
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ENSG00000136122	BORA	-0,506879985	0,00433
ENSG00000163170	BOLA3	0,320650011	0,00437
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ENSG00000182177	ASB18	-1,273900032	0,00502
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ENSG00000141668	CBLN2	4,179279804	0,00546
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ENSG00000205129	C4orf47	-1,258620024	0,00553
ENSG00000182150	ERCC6L2	-0,375699997	0,00554
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ENSG00000173575	CHD2	-0,655939996	0,00577
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ENSG00000113240	CLK4	-0,465079993	0,00634
ENSG00000101109	STK4	0,465570003	0,00634
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ENSG00000124207	CSE1L	0,371939987	0,00642
ENSG00000133138	TBC1D8B	-0,491560012	0,00643
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ENSG00000117152	RGS4	-1,513560057	0,00653
ENSG00000116459	ATP5PB	0,142539993	0,00661
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ENSG00000167522	ANKRD11	-0,643450022	0,00663
ENSG00000151014	NOCT	1,16821003	0,00669
ENSG00000144057	ST6GAL2	3,693959951	0,00669
ENSG00000162139	NEU3	0,37026	0,00678

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ENSG00000129038	LOXL1	-1,72052002	0,0069
ENSG00000277925	RF00024	-2,706419945	0,00694
ENSG00000182957	SPATA13	-1,06329	0,00694
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ENSG00000179598	PLD6	0,745000005	0,00698
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ENSG00000101413	RPRD1B	0,227750003	0,00759
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ENSG00000167977	KCTD5	0,595529974	0,00772
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ENSG00000115539	PDCL3	0,58039999	0,00792
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ENSG00000173141	MRPL57	-0,556800008	0,00804
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ENSG00000196378	ZNF34	-0,566619992	0,00888
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ENSG00000124217	MOCS3	0,324889988	0,00899
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ENSG00000099797	TECR	-0,471929997	0,00935
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ENSMUSG00000031485	Plpbp	0,633639991	0
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ENSMUSG00000072946	Ptgr2	0,855570018	0
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ENSMUSG00000001829	Clpb	0,954680026	0
ENSMUSG00000005225	Plekha8	0,96085	0
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ENSMUSG00000022711	Pmm2	0,986509979	0
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ENSMUSG00000017781	Pitpna	-0,97961998	0,00001
ENSMUSG00000018372	Cep95	-0,870369971	0,00001
ENSMUSG00000015176	Nolc1	-0,868929982	0,00001
ENSMUSG00000021540	Smad5	-0,867739975	0,00001
ENSMUSG00000007411	Mark3	-0,793640018	0,00001
ENSMUSG00000020923	Ubtf	-0,545729995	0,00001
ENSMUSG00000030082	Sec61a1	0,684440017	0,00001
ENSMUSG00000037370	Enpp1	0,888300002	0,00001
ENSMUSG00000025702	March8	0,989369988	0,00001
ENSMUSG00000028992	Nmnat1	1,018550038	0,00001
ENSMUSG00000021286	Zfyve21	1,083209991	0,00001
ENSMUSG00000050312	Nsun3	1,235319972	0,00001
ENSMUSG00000024507	Hsd17b4	1,273100019	0,00001
ENSMUSG00000028565	Nfia	1,300029993	0,00001
ENSMUSG00000031641	Cbr4	1,326009989	0,00001
ENSMUSG00000029455	Aldh2	1,340600014	0,00001
ENSMUSG00000032609	Klhdc8b	1,377210021	0,00001
ENSMUSG00000027984	Hadh	1,413730025	0,00001
ENSMUSG00000003762	Coq8b	1,446589947	0,00001
ENSMUSG00000034245	Hdac11	1,492449999	0,00001
ENSMUSG00000032359	Ctsh	1,507380009	0,00001
ENSMUSG00000039763	Dnajc28	1,54697001	0,00001
ENSMUSG00000039246	Lyplal1	1,602730036	0,00001
ENSMUSG00000000326	Comt	1,692880034	0,00001
ENSMUSG00000042289	Hsd3b7	1,772310019	0,00001
ENSMUSG00000045316	Fahd1	1,874940038	0,00001
ENSMUSG00000090150	Acad11	1,88259995	0,00001
ENSMUSG00000002108	Nr1h3	1,972740054	0,00001

ENSMUSG00000024430	Cabyr	2,015589952	0,00001
ENSMUSG00000032380	Dapk2	2,047610044	0,00001
ENSMUSG00000030747	Dgat2	2,104120016	0,00001
ENSMUSG00000038527	C1rl	2,230149984	0,00001
ENSMUSG00000031980	Agt	2,389849901	0,00001
ENSMUSG00000001155	Ftcd	2,490089893	0,00001
ENSMUSG00000034456	Uroc1	2,620460033	0,00001
ENSMUSG00000042010	Acacb	2,639529943	0,00001
ENSMUSG00000025197	Cyp2c23	2,812550068	0,00001
ENSMUSG00000021364	Elovl2	2,881079912	0,00001
ENSMUSG00000060807	Serpina6	3,279190063	0,00001
ENSMUSG00000054034	Tceal5	3,740740061	0,00001
ENSMUSG00000090175	Ugt1a9	4,080619812	0,00001
ENSMUSG00000040583	Cyp2b13	5,558650017	0,00001
ENSMUSG00000048387	Osr1	-8,240690231	0,00001
ENSMUSG00000030518	Fam189a1	-6,129799843	0,00001
ENSMUSG00000006221	Hspb7	-5,529190063	0,00001
ENSMUSG00000027661	Slc2a10	-5,053639889	0,00001
ENSMUSG00000046694	Tent5b	-4,663000107	0,00001
ENSMUSG00000071656	Lrrn4cl	-4,333380222	0,00001
ENSMUSG00000041592	Sdk2	-3,931169987	0,00001
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ENSMUSG00000049556	Lingo1	-3,715579987	0,00001
ENSMUSG00000007039	Ddah2	-2,497060061	0,00001
ENSMUSG00000035640	Cbarp	-1,879119992	0,00001
ENSMUSG00000022994	Adcy6	-1,561849952	0,00001
ENSMUSG00000018199	Trove2	-1,515939951	0,00001
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ENSMUSG00000031107	Rbmx2	-1,467980027	0,00001
ENSMUSG00000062115	Rai1	-1,323619962	0,00001
ENSMUSG00000031939	Taf1d	-1,175359964	0,00001
ENSMUSG00000022159	Rab2b	-1,167969942	0,00001
ENSMUSG00000005481	Ddx39	-1,121299982	0,00001
ENSMUSG00000020400	Tnip1	-1,021929979	0,00001
ENSMUSG00000021910	Nisch	-1,018730044	0,00001
ENSMUSG00000024772	Ehd1	-0,942070007	0,00001
ENSMUSG00000020739	Nup85	-0,870419979	0,00001
ENSMUSG00000024942	Capn1	-0,74217999	0,00001
ENSMUSG00000015291	Gdi1	-0,741349995	0,00001
ENSMUSG00000003166	Dgcr2	0,587490022	0,00001
ENSMUSG00000055991	Zkscan5	0,679220021	0,00001
ENSMUSG00000024645	Timm21	0,705389977	0,00001
ENSMUSG00000020664	Dld	0,731750011	0,00001
ENSMUSG00000023938	Aars2	0,740750015	0,00001
ENSMUSG00000032328	Tmem30a	0,758880019	0,00001
ENSMUSG00000020128	Vps54	0,817569971	0,00001
ENSMUSG00000038160	Atg5	0,834039986	0,00001

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ENSMUSG00000021044	Adck1	0,872060001	0,00001
ENSMUSG00000038312	Edem2	0,957949996	0,00001
ENSMUSG00000003746	Man1a	1,017590046	0,00001
ENSMUSG00000022827	Rabl3	1,022950053	0,00001
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ENSMUSG00000059447	Hadhb	1,215530038	0,00001
ENSMUSG00000025076	Casp7	1,366549969	0,00001
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ENSMUSG00000030064	Frmd4b	1,728320003	0,00001
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ENSMUSG00000024070	Prkd3	1,844509959	0,00001
ENSMUSG00000019944	Rhobtb1	1,942630053	0,00001
ENSMUSG00000074071	Fam169b	2,070169926	0,00001
ENSMUSG00000022546	Gpt	2,225769997	0,00001
ENSMUSG00000031196	F8	2,242460012	0,00001
ENSMUSG00000028185	Dnase2b	2,245690107	0,00001
ENSMUSG00000004748	Mtfp1	2,405989885	0,00001
ENSMUSG00000026664	Phyh	2,414619923	0,00001
ENSMUSG00000054932	Afp	2,499010086	0,00001
ENSMUSG00000021702	Thbs4	-7,22424984	0,00001
ENSMUSG00000038486	Sv2a	-5,39233017	0,00001
ENSMUSG00000069763	Tmem100	-4,940100193	0,00001
ENSMUSG00000042097	Zfp239	-4,550839901	0,00001
ENSMUSG00000026175	Vil1	-4,27105999	0,00001
ENSMUSG00000030041	M1ap	-3,099849939	0,00001
ENSMUSG00000047766	Lrrc49	-3,051609993	0,00001
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ENSMUSG00000035863	Palm	-2,544709921	0,00001
ENSMUSG00000032060	Cryab	-2,527909994	0,00001
ENSMUSG00000022623	Shank3	-2,188549995	0,00001
ENSMUSG00000037594	Clba1	-2,17069006	0,00001
ENSMUSG00000048279	Sacs	-2,165790081	0,00001
ENSMUSG00000049225	Pdp1	-1,855819941	0,00001
ENSMUSG00000055707	Klhl26	-1,790420055	0,00001
ENSMUSG00000017667	Zfp334	-1,76602006	0,00001
ENSMUSG00000028931	Kcnab2	-1,63744998	0,00001
ENSMUSG00000022377	Asap1	-1,609609962	0,00001
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ENSMUSG00000033530	Ttc7b	-1,518079996	0,00001
ENSMUSG00000034330	Plcg2	-1,383980036	0,00001
ENSMUSG00000031585	Gtf2e2	-1,322829962	0,00001
ENSMUSG00000024754	Cemip2	-1,310340047	0,00001
ENSMUSG00000038872	Zfhx3	-1,28599	0,00001
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ENSMUSG00000056962	Jmjd6	-1,151929975	0,00001
ENSMUSG00000038437	Mllt6	-1,092560053	0,00001
ENSMUSG00000079036	Alkbh1	-1,082180023	0,00001
ENSMUSG00000053950	Adnp2	-1,018599987	0,00001
ENSMUSG00000027394	Ttl	-0,935329974	0,00001
ENSMUSG00000031691	Tnpo2	-0,909919977	0,00001
ENSMUSG00000025034	Trim8	-0,883300006	0,00001
ENSMUSG00000027968	Larp7	-0,744300008	0,00001
ENSMUSG00000024831	Ighmbp2	-0,67019999	0,00001
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ENSMUSG00000032869	Psmf1	0,570959985	0,00001
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ENSMUSG00000021785	Ngly1	0,898459971	0,00001
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ENSMUSG00000022514	Il1rap	1,615170002	0,00001
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ENSMUSG00000053329	D10Jhu81e	1,683390021	0,00001
ENSMUSG00000048772	Tmem53	1,791000009	0,00001
ENSMUSG00000015966	Il17rb	1,903040051	0,00001
ENSMUSG00000068587	Mgam	1,966480017	0,00001
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ENSMUSG00000040855	Reps2	2,114099979	0,00001
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ENSMUSG00000051041	Olfml1	2,407919884	0,00001
ENSMUSG00000030244	Gys2	2,733180046	0,00001
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ENSMUSG00000045573	Penk	-5,165890217	0,00001
ENSMUSG00000047910	Pcdhb16	-4,607930183	0,00001
ENSMUSG00000026068	Il18rap	-3,335809946	0,00001
ENSMUSG00000064264	Zfp428	-2,587990046	0,00001
ENSMUSG00000056888	Glipr1	-2,448719978	0,00001
ENSMUSG00000027356	Fermt1	-2,206899881	0,00001
ENSMUSG00000041859	Mcm3	-1,377020001	0,00001
ENSMUSG00000019433	Gipc1	-1,347339988	0,00001
ENSMUSG00000022442	Ttll1	-1,343539953	0,00001
ENSMUSG00000027660	Skil	-1,310600042	0,00001
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ENSMUSG00000017376	Nlk	-0,948939979	0,00001
ENSMUSG00000024603	Dctn4	-0,824109972	0,00001
ENSMUSG00000022558	Mroh1	-0,802850008	0,00001
ENSMUSG00000038302	Afg1l	0,754310012	0,00001
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ENSMUSG00000033720	Sfxn5	0,99138999	0,00001

ENSMUSG00000026781	Acbd5	1,467839956	0,00001
ENSMUSG00000010663	Fads1	1,841330051	0,00001
ENSMUSG00000028150	Rorc	2,138659954	0,00001
ENSMUSG00000047797	Gjb1	2,392110109	0,00001
ENSMUSG00000057346	Apol9a	2,554749966	0,00001
ENSMUSG00000020159	Gabrp	-5,964240074	0,00002
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ENSMUSG00000029518	Rab35	-0,691429973	0,00002
ENSMUSG00000031399	Fam3a	0,614859998	0,00002
ENSMUSG00000025825	Iscu	1,264520049	0,00002
ENSMUSG00000028756	Pink1	1,353449941	0,00002
ENSMUSG00000021868	Ppif	1,412719965	0,00002
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ENSMUSG00000004633	Chn2	1,73100996	0,00002
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ENSMUSG00000053030	Spink2	-8,696669579	0,00002
ENSMUSG00000021047	Nova1	-7,937759876	0,00002
ENSMUSG00000028487	Bnc2	-7,530789852	0,00002
ENSMUSG00000034551	Hdx	-4,222469807	0,00002
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ENSMUSG00000038732	Mboat1	-3,204969883	0,00002
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ENSMUSG00000057098	Ebf1	-2,584429979	0,00002
ENSMUSG00000028111	Ctsk	-2,439429998	0,00002
ENSMUSG00000065226	Gm25791	-2,349129915	0,00002
ENSMUSG00000047712	Ust	-2,340830088	0,00002
ENSMUSG00000051335	Gfod1	-2,338279963	0,00002
ENSMUSG00000049130	C5ar1	-2,254839897	0,00002
ENSMUSG00000024660	Incenp	-1,747650027	0,00002
ENSMUSG00000092730	Snora24	-1,631389976	0,00002
ENSMUSG00000096472	Cdkn2d	-1,553239942	0,00002
ENSMUSG00000011158	Brf1	-0,827970028	0,00002
ENSMUSG00000003808	Farsa	-0,779190004	0,00002
ENSMUSG00000040006	Ginm1	0,927150011	0,00002
ENSMUSG00000031245	Hmgn5	1,004299998	0,00002
ENSMUSG00000037706	Cd81	1,033290029	0,00002
ENSMUSG00000008348	Ubc	1,185760021	0,00002
ENSMUSG00000042903	Foxo4	1,190969944	0,00002
ENSMUSG00000062908	Acadm	1,385239959	0,00002
ENSMUSG00000029173	Sepsecs	1,502519965	0,00002
ENSMUSG00000035936	Aldh5a1	1,594470024	0,00002
ENSMUSG00000022742	Cpox	1,625609994	0,00002

ENSMUSG00000028479	Gne	1,713150024	0,00002
ENSMUSG00000034177	Rnf43	1,728180051	0,00002
ENSMUSG00000049115	Agtr1a	2,04479003	0,00002
ENSMUSG00000039628	Hs3st6	2,128350019	0,00002
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ENSMUSG00000022686	B3gnt5	-3,362499952	0,00002
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ENSMUSG00000049775	Tmsb4x	-2,686049938	0,00002
ENSMUSG00000022199	Slc22a17	-2,461009979	0,00002
ENSMUSG00000025001	Hells	-2,415940046	0,00002
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ENSMUSG00000026972	Arrdc1	-1,846480012	0,00002
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ENSMUSG00000030499	Kctd15	-1,677780032	0,00002
ENSMUSG00000026496	Parp1	-1,322630048	0,00002
ENSMUSG00000030471	Zdhhc13	-1,316020012	0,00002
ENSMUSG00000033166	Dis3	-1,202550054	0,00002
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ENSMUSG00000007815	Rhoa	-0,642159998	0,00002
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ENSMUSG00000001445	Mrpl10	0,539279997	0,00002
ENSMUSG00000040746	Rnf167	0,576489985	0,00002
ENSMUSG00000028550	Atg4c	0,803839982	0,00002
ENSMUSG00000031402	Mpp1	0,988439977	0,00002
ENSMUSG00000027180	Fbxo3	0,997380018	0,00002
ENSMUSG00000013997	Nit1	1,295330048	0,00002
ENSMUSG00000028085	Gatb	1,30606997	0,00002
ENSMUSG00000049858	Suox	1,454409957	0,00002
ENSMUSG00000053460	Ggcx	1,606789947	0,00002
ENSMUSG00000020644	Id2	1,676399946	0,00002
ENSMUSG00000053886	Sh2d4a	1,813500047	0,00002
ENSMUSG00000004035	Gstm7	2,096260071	0,00002
ENSMUSG00000030237	Slco1a4	2,455319881	0,00002
ENSMUSG00000039323	Igfbp2	2,877360106	0,00002
ENSMUSG00000030364	Clec2h	3,999279976	0,00002
ENSMUSG00000072244	Trim6	-2,530440092	0,00002
ENSMUSG00000042784	Muc1	-2,48390007	0,00002
ENSMUSG00000032717	Mdfi	-2,41753006	0,00002
ENSMUSG00000036390	Gadd45a	-2,038460016	0,00002
ENSMUSG00000031728	Zfp821	-1,595309973	0,00002
ENSMUSG00000040747	Cd53	-1,573510051	0,00002
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ENSMUSG00000032583	Mon1a	0,77601999	0,00002
ENSMUSG00000033126	Ybey	1,005800009	0,00002
ENSMUSG00000073609	D2hgdh	1,130820036	0,00002
ENSMUSG00000024247	Pkdcc	1,418830037	0,00002
ENSMUSG00000020733	Slc9a3r1	1,429829955	0,00002
ENSMUSG00000030739	Myh14	1,606050014	0,00002
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ENSMUSG00000026787	Gad2	-9,668499947	0,00002
ENSMUSG00000029576	Radil	-5,730750084	0,00002
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ENSMUSG00000033491	Prss35	-3,510519981	0,00002
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ENSMUSG00000047434	Xxylt1	-1,769889951	0,00002
ENSMUSG00000039081	Zfp503	-1,768919945	0,00002
ENSMUSG00000057406	Nsd2	-1,432629943	0,00002
ENSMUSG00000020184	Mdm2	-1,173879981	0,00002
ENSMUSG00000046441	Cmtr2	-1,055529952	0,00002
ENSMUSG00000020211	Sf3a2	-0,969860017	0,00002
ENSMUSG00000038497	Tmco3	-0,908460021	0,00002
ENSMUSG00000027433	Xrn2	-0,873260021	0,00002
ENSMUSG00000032590	Apeh	0,738460004	0,00002
ENSMUSG00000004798	Ulk2	0,934589982	0,00002
ENSMUSG00000041957	Pkp2	1,04350996	0,00002
ENSMUSG00000073838	Tufm	1,063509941	0,00002
ENSMUSG00000035759	Bbs10	1,103440046	0,00002
ENSMUSG00000024818	Slc25a45	1,128260016	0,00002
ENSMUSG00000032064	Dixdc1	1,233150005	0,00002
ENSMUSG00000066442	Mthfs	1,275329947	0,00002
ENSMUSG00000030275	Etnk1	1,319169998	0,00002
ENSMUSG00000028527	Ak4	1,321539998	0,00002
ENSMUSG00000040820	Hlcs	1,532799959	0,00002
ENSMUSG00000032092	Mpzl2	1,567620039	0,00002
ENSMUSG00000021794	Glud1	1,671120048	0,00002
ENSMUSG00000022847	Thpo	1,790400028	0,00002
ENSMUSG00000045636	Mtus1	1,799649954	0,00002
ENSMUSG00000030670	Cyp2r1	1,889610052	0,00002
ENSMUSG00000024899	Papss2	2,081520081	0,00002

ENSMUSG00000031443	F7	2,131649971	0,00002
ENSMUSG00000023963	Cyp39a1	2,306809902	0,00002
ENSMUSG00000027227	Sord	2,350090027	0,00002
ENSMUSG00000000049	Apoh	2,558559895	0,00002
ENSMUSG00000062410	Hsd3b3	2,65060997	0,00002
ENSMUSG00000026295	Spp2	2,661870003	0,00002
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ENSMUSG00000056679	Gpr173	-5,655529976	0,00002
ENSMUSG00000028463	Car9	-3,716660023	0,00002
ENSMUSG00000057092	Fxyd3	-3,505929947	0,00002
ENSMUSG00000001020	S100a4	-3,254159927	0,00002
ENSMUSG00000069920	B3gnt9	-3,078000069	0,00002
ENSMUSG00000024855	Pacs1	-2,479020119	0,00002
ENSMUSG00000045328	Cenpe	-2,473170042	0,00002
ENSMUSG00000022661	Cd200	-2,196160078	0,00002
ENSMUSG00000025140	Pycr1	-2,152050018	0,00002
ENSMUSG00000040389	Wdr47	-1,963379979	0,00002
ENSMUSG00000036718	Micall2	-1,819390059	0,00002
ENSMUSG00000015143	Actn1	-1,797309995	0,00002
ENSMUSG00000073987	Ggh	-1,791560054	0,00002
ENSMUSG00000050379	Sept6	-1,560670018	0,00002
ENSMUSG00000032939	Nup93	-1,058159947	0,00002
ENSMUSG00000040652	Oaz2	-0,929939985	0,00002
ENSMUSG00000038544	Inip	-0,900439978	0,00002
ENSMUSG00000029267	Mtf2	-0,84641999	0,00002
ENSMUSG00000000776	Polr3d	-0,738179982	0,00002
ENSMUSG00000021116	Eif2s1	-0,737190008	0,00002
ENSMUSG00000033285	Wdr3	-0,608340025	0,00002
ENSMUSG00000027575	Arfgap1	-0,578170002	0,00002
ENSMUSG00000061244	Exoc5	-0,49368	0,00002
ENSMUSG00000003099	Ppp5c	0,495759994	0,00002
ENSMUSG00000047694	Yipf6	0,759019971	0,00002
ENSMUSG00000036552	Ermard	0,881280005	0,00002
ENSMUSG00000001482	Def8	0,888750017	0,00002
ENSMUSG00000025453	Nnt	1,173900008	0,00002
ENSMUSG00000033684	Qsox1	1,217880011	0,00002
ENSMUSG00000016319	Slc25a5	1,274600029	0,00002
ENSMUSG00000022885	St6gal1	1,361580014	0,00002
ENSMUSG00000039062	Anpep	1,369400024	0,00002
ENSMUSG00000022214	Dcaf11	1,539530039	0,00002
ENSMUSG00000050323	Ndufaf6	1,668230057	0,00002
ENSMUSG00000036880	Acaa2	1,847460032	0,00002
ENSMUSG00000035112	Wnk4	2,001379967	0,00002
ENSMUSG00000032204	Aqp9	2,068429947	0,00002
ENSMUSG00000017453	Pipox	2,352570057	0,00002
ENSMUSG00000041794	Myrip	4,219649792	0,00002
ENSMUSG00000034164	Emid1	-3,680809975	0,00003

ENSMUSG00000013415	Igf2bp1	-10,69085979	0,00003
ENSMUSG00000096140	Ankrd66	-7,353079796	0,00003
ENSMUSG00000026387	Sctr	-5,070859909	0,00003
ENSMUSG00000053475	Tnfaip6	-4,323770046	0,00003
ENSMUSG00000016458	Wt1	-4,102220058	0,00003
ENSMUSG00000070526	Peg12	-3,706099987	0,00003
ENSMUSG00000022494	Shisa9	-3,652220011	0,00003
ENSMUSG00000042116	Vwa1	-2,763220072	0,00003
ENSMUSG00000027469	Tpx2	-2,450099945	0,00003
ENSMUSG00000027555	Car13	-2,329169989	0,00003
ENSMUSG00000019539	Rcn3	-2,1057899	0,00003
ENSMUSG00000042099	Kank3	-1,234459996	0,00003
ENSMUSG00000025666	Tmem47	-1,216519952	0,00003
ENSMUSG00000034889	Cactin	-0,954479992	0,00003
ENSMUSG00000004677	Myo9b	-0,886150002	0,00003
ENSMUSG00000024515	Smad4	-0,815930009	0,00003
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ENSMUSG00000066441	Rdh11	1,396860003	0,00003
ENSMUSG00000040964	Arhgef10l	1,47428	0,00003
ENSMUSG00000055027	Smyd1	1,621549964	0,00003
ENSMUSG00000048368	Omd	1,701769948	0,00003
ENSMUSG00000071711	Mpst	1,830189943	0,00003
ENSMUSG00000037710	Cisd1	2,029769897	0,00003
ENSMUSG00000002032	Tmem25	2,343369961	0,00003
ENSMUSG00000054385	Ceacam2	2,573970079	0,00003
ENSMUSG00000032773	Chrm1	3,687289953	0,00003
ENSMUSG00000040420	Cdh18	3,948060036	0,00003
ENSMUSG00000034648	Lrrn1	-5,317550182	0,00003
ENSMUSG00000030428	Ttyh1	-2,932590008	0,00003
ENSMUSG00000079560	Hoxa3	-2,641940117	0,00003
ENSMUSG00000052105	Mtcl1	-2,43166995	0,00003
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ENSMUSG00000001120	Pcbp3	-2,222490072	0,00003
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ENSMUSG00000020573	Pik3cg	-1,62480998	0,00003
ENSMUSG00000039108	Lsm14b	-0,851849973	0,00003
ENSMUSG00000019087	Atp6ap1	-0,812269986	0,00003
ENSMUSG00000036693	Nop14	-0,683189988	0,00003
ENSMUSG00000026192	Atic	-0,681299984	0,00003
ENSMUSG00000079334	Naa80	0,720489979	0,00003
ENSMUSG00000020130	Tbc1d15	0,967419982	0,00003
ENSMUSG00000028673	Fuca1	1,18208003	0,00003
ENSMUSG00000001467	Cyp51	1,452309966	0,00003
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ENSMUSG00000038521	C1s1	1,931210041	0,00003
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ENSMUSG00000041567	Serpina12	3,081500053	0,00003
ENSMUSG00000011751	Sptbn4	-5,585350037	0,00003
ENSMUSG00000028246	Faxc	-5,338339806	0,00003
ENSMUSG00000034161	Scx	-3,598700047	0,00003
ENSMUSG00000037362	Nov	-3,48616004	0,00003
ENSMUSG00000049670	Morn4	-3,239279985	0,00003
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ENSMUSG00000024349	Tmem173	-1,436290026	0,00003
ENSMUSG00000032712	Resf1	-1,331050038	0,00003
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ENSMUSG00000019920	Lims1	-0,887489974	0,00003
ENSMUSG00000028990	Lzic	-0,743740022	0,00003
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ENSMUSG00000031754	Nudt21	-0,642780006	0,00003
ENSMUSG00000022503	Nubp1	0,632619977	0,00003
ENSMUSG00000029571	Tmem106b	0,852689981	0,00003
ENSMUSG00000026307	Scly	1,37124002	0,00003
ENSMUSG00000037542	Aldh8a1	2,389290094	0,00003
ENSMUSG00000025396	Hsd17b6	2,788150072	0,00003
ENSMUSG00000036027	1810046K07Rik	4,2355299	0,00003
ENSMUSG00000045027	Prss22	-8,418669701	0,00003
ENSMUSG00000029838	Ptn	-5,023310184	0,00003
ENSMUSG00000041078	Grid1	-3,784729958	0,00003
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ENSMUSG00000037995	Igsf9	-2,970989943	0,00003
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ENSMUSG00000020901	Pik3r5	-1,806710005	0,00003
ENSMUSG00000022610	Mapk12	-1,548560023	0,00003
ENSMUSG00000004100	Ppan	-1,152690053	0,00003
ENSMUSG00000024974	Smc3	-0,898299992	0,00003
ENSMUSG00000029710	Ephb4	-0,861180007	0,00003
ENSMUSG00000002803	Btbd6	0,586380005	0,00003
ENSMUSG00000056216	Cebpg	0,846350014	0,00003
ENSMUSG00000003184	Irf3	0,902890027	0,00003
ENSMUSG00000038880	Mrps34	1,149960041	0,00003
ENSMUSG00000048706	Lurap1l	1,591539979	0,00003
ENSMUSG00000028420	Tmem38b	1,662070036	0,00003
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ENSMUSG00000022766	Serpind1	2,346410036	0,00003
ENSMUSG00000054757	Akr1c20	2,394380093	0,00003
ENSMUSG00000038745	Nlrp6	2,517240047	0,00003
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ENSMUSG00000025401	Myo1a	-5,423900127	0,00003
ENSMUSG00000014158	Trpv4	-2,742199898	0,00003
ENSMUSG00000019564	Arid3a	-2,359889984	0,00003
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ENSMUSG00000026305	Lrrfip1	-1,312899947	0,00003
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ENSMUSG00000020432	Tcn2	0,47093001	0,00003
ENSMUSG00000031828	Klhl36	0,821699977	0,00003
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ENSMUSG00000020919	Stat5b	1,167600036	0,00003
ENSMUSG00000022763	Aifm3	1,888100028	0,00003
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ENSMUSG00000023828	Slc22a3	2,047230005	0,00003
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ENSMUSG00000027559	Car3	2,76970005	0,00003
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ENSMUSG00000020334	Slc22a4	-2,029690027	0,00004
ENSMUSG00000002732	Fkbp7	-1,770069957	0,00004
ENSMUSG00000031872	Bean1	-4,729320049	0,00004
ENSMUSG00000028841	Cnksr1	-4,023910046	0,00004
ENSMUSG00000028587	Orc1	-2,825500011	0,00004
ENSMUSG00000042842	Serpinb6b	-1,792000055	0,00004
ENSMUSG00000045679	Pqlc3	-1,727370024	0,00004
ENSMUSG00000020277	Pfkl	-1,684239984	0,00004
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ENSMUSG00000002844	Adprh	-1,451719999	0,00004
ENSMUSG00000022791	Tnk2	-1,141109943	0,00004
ENSMUSG00000021557	Agtpbp1	-1,101959944	0,00004
ENSMUSG00000027722	Spata5	-0,975189984	0,00004
ENSMUSG00000014859	E2f4	-0,596660018	0,00004
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ENSMUSG00000029664	Tfpi2	1,758409977	0,00004
ENSMUSG00000025498	Irf7	1,759729981	0,00004
ENSMUSG00000068246	Apol9b	2,071229935	0,00004
ENSMUSG00000022877	Hrg	2,218219995	0,00004
ENSMUSG00000035878	Hykk	2,475110054	0,00004
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ENSMUSG00000029656	C8b	2,586849928	0,00004
ENSMUSG00000024863	Mbl2	2,777240038	0,00004
ENSMUSG00000054191	Klf1	2,971790075	0,00004
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ENSMUSG00000027330	Cdc25b	-1,68769002	0,00004
ENSMUSG00000090100	Ttbk2	-1,557010055	0,00004
ENSMUSG00000042115	Klhdc8a	-1,399260044	0,00004
ENSMUSG00000025171	Ubtd1	-1,196069956	0,00004
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ENSMUSG00000052593	Adam17	-0,729300022	0,00004
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ENSMUSG00000006021	Kptn	0,934469998	0,00004
ENSMUSG00000015247	Nipsnap3b	1,112079978	0,00004
ENSMUSG00000003528	Slc25a1	1,216910005	0,00004
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ENSMUSG00000078607	1810010H24Rik	2,480560064	0,00004
ENSMUSG00000027977	Ndst3	-8,969550133	0,00004
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ENSMUSG00000031925	Maml2	-1,574970007	0,00004
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ENSMUSG00000022614	Lmf2	-0,62519002	0,00004
ENSMUSG00000002981	Clptm1	0,417109996	0,00004
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ENSMUSG00000037720	Tmem33	0,661849976	0,00004
ENSMUSG00000021906	Oxnad1	0,89538002	0,00004
ENSMUSG00000002846	Timmdc1	0,990419984	0,00004
ENSMUSG00000032370	Lactb	1,459169984	0,00004
ENSMUSG00000028138	Adh5	1,478809953	0,00004
ENSMUSG00000018796	Acsl1	2,266370058	0,00004
ENSMUSG00000039109	F13a1	-3,816800117	0,00004
ENSMUSG00000024727	Trpm6	-3,622920036	0,00004
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ENSMUSG00000097487	Ptges3l	-3,042249918	0,00004
ENSMUSG00000001403	Ube2c	-2,492180109	0,00004
ENSMUSG00000050192	Eif5a2	-1,844599962	0,00004
ENSMUSG00000004099	Dnmt1	-1,404500008	0,00004
ENSMUSG00000079260	Tmppe	-1,09750998	0,00004
ENSMUSG00000042197	Zfp451	-0,839349985	0,00004
ENSMUSG00000028149	Rap1gds1	-0,773710012	0,00004
ENSMUSG00000031533	Mrps31	0,953289986	0,00004
ENSMUSG00000021094	Dhrs7	1,589560032	0,00004
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ENSMUSG00000041202	Pla2g2d	-6,268189907	0,00004
ENSMUSG00000034813	Grip1	-2,296060085	0,00004
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ENSMUSG00000006373	Pgrmc1	1,793400049	0,00004
ENSMUSG00000020604	Arsg	1,955549955	0,00004
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ENSMUSG00000046058	Eid2	-2,70468998	0,00005
ENSMUSG00000041199	Rpusd1	-1,136180043	0,00005
ENSMUSG00000033545	Znrf1	-0,890910029	0,00005
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ENSMUSG00000031963	Bmper	-3,627360106	0,00005
ENSMUSG00000057751	Megf6	-2,095119953	0,00005
ENSMUSG00000028678	Kif2c	-1,976549983	0,00005
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ENSMUSG00000006585	Cdt1	-1,437430024	0,00005
ENSMUSG00000022637	Cblb	-1,413779974	0,00005
ENSMUSG00000024525	Impa2	-1,390939951	0,00005
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ENSMUSG00000036989	Trim3	-1,210540056	0,00005
ENSMUSG00000040552	C3ar1	-1,14756	0,00005
ENSMUSG00000033075	Senp1	-1,015669942	0,00005
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ENSMUSG00000039294	Cybc1	-0,896640003	0,00005
ENSMUSG00000052997	Uba2	-0,73190999	0,00005
ENSMUSG00000016477	E2f3	-0,668850005	0,00005
ENSMUSG00000030435	U2af2	-0,465310007	0,00005
ENSMUSG00000002847	Pla1a	1,260470033	0,00005
ENSMUSG00000016942	Tmprss6	2,039510012	0,00005
ENSMUSG00000030849	Fgfr2	2,045259953	0,00005
ENSMUSG00000033427	Upb1	2,357929945	0,00005
ENSMUSG00000027690	Slc2a2	2,444999933	0,00005
ENSMUSG00000015083	C8g	2,627549887	0,00005
ENSMUSG00000037466	Tedc1	-2,296159983	0,00005
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ENSMUSG00000027959	Sass6	-1,535279989	0,00005
ENSMUSG00000021668	Polk	-1,378640056	0,00005
ENSMUSG00000029547	Ints1	-0,827859998	0,00005
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ENSMUSG00000020946	Gosr2	0,630100012	0,00005
ENSMUSG00000026767	Mindy3	0,630439997	0,00005
ENSMUSG00000026179	Pnkd	1,117759943	0,00005
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ENSMUSG00000030555	Ttc23	1,566959977	0,00005

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ENSMUSG00000026542	Apcs	2,448169947	0,00005
ENSMUSG00000024131	Slc3a1	2,637520075	0,00005
ENSMUSG00000030116	Mfap5	-6,748030186	0,00005
ENSMUSG00000043613	Mmp3	-4,869160175	0,00005
ENSMUSG00000056832	Ttc26	-2,529809952	0,00005
ENSMUSG00000022103	Gfra2	-1,955500007	0,00005
ENSMUSG00000044674	Fzd1	-1,348309994	0,00005
ENSMUSG00000038644	Pold1	-1,089179993	0,00005
ENSMUSG00000017774	Myo1c	-1,025279999	0,00005
ENSMUSG00000028413	B4galt1	-1,015939951	0,00005
ENSMUSG00000026504	Sdccag8	-0,972639978	0,00005
ENSMUSG00000037608	Bclaf1	-0,875370026	0,00005
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ENSMUSG00000042133	Ppig	-0,677339971	0,00005
ENSMUSG00000025027	Xpnpep1	-0,667689979	0,00005
ENSMUSG00000014349	Ube2z	-0,579569995	0,00005
ENSMUSG00000061455	Stx17	0,804669976	0,00005
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ENSMUSG00000024120	Lrpprc	1,104709983	0,00005
ENSMUSG00000044252	Osbpl1a	1,670220017	0,00005
ENSMUSG00000063428	Ddo	1,837440014	0,00005
ENSMUSG00000031138	F9	2,130650043	0,00005
ENSMUSG00000010476	Ebf3	-6,314479828	0,00005
ENSMUSG00000030167	Klrc1	-4,092549801	0,00005
ENSMUSG00000031327	Chic1	-2,354439974	0,00005
ENSMUSG00000026347	Tmem163	-1,588340044	0,00005
ENSMUSG00000030729	Pgm2l1	-1,503299952	0,00005
ENSMUSG00000017747	Ghdc	0,745630026	0,00005
ENSMUSG00000037523	Mavs	1,134770036	0,00005
ENSMUSG00000032314	Etfa	1,401870012	0,00005
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ENSMUSG00000075702	Selenom	-2,674469948	0,00006
ENSMUSG00000049687	Pheta2	-2,167020082	0,00006
ENSMUSG00000026833	Olfm1	-2,166889906	0,00006
ENSMUSG00000020108	Ddit4	-2,157530069	0,00006
ENSMUSG00000024679	Ms4a6d	-1,653599977	0,00006

ENSMUSG00000051344	Plekhm3	-1,593919992	0,00006
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ENSMUSG00000045248	Med26	-0,697669983	0,00006
ENSMUSG00000055531	Cpsf6	-0,69423002	0,00006
ENSMUSG00000029545	Acads	1,440029979	0,00006
ENSMUSG00000031842	Pde4c	2,055330038	0,00006
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ENSMUSG00000048450	Msx1	-3,521090031	0,00006
ENSMUSG00000026458	Ppfia4	-1,809270024	0,00006
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ENSMUSG00000028101	Pias3	-1,193109989	0,00006
ENSMUSG00000004896	Rrnad1	-0,935360014	0,00006
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ENSMUSG00000024576	Csnk1a1	-0,575370014	0,00006
ENSMUSG00000027411	Vps16	-0,447869986	0,00006
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ENSMUSG00000051285	Pcmtd1	0,980560005	0,00006
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ENSMUSG00000040740	Slc25a34	1,486960053	0,00006
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ENSMUSG00000020823	Sec14l1	-0,95739001	0,00006
ENSMUSG00000031715	Smarca5	-0,769389987	0,00006
ENSMUSG00000075000	Nrbf2	0,587360024	0,00006
ENSMUSG00000029672	Fam3c	0,94423002	0,00006
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ENSMUSG00000036006	Ripor2	-1,567600012	0,00006
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ENSMUSG00000019906	Lin7a	2,203969955	0,00006
ENSMUSG00000047150	1700001C19Rik	2,210050106	0,00006
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ENSMUSG00000001930	Vwf	-1,825680017	0,00007
ENSMUSG00000001288	Rarg	-1,355780005	0,00007
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ENSMUSG00000020387	Jade2	-1,288930058	0,00008
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ENSMUSG00000030965	Abraxas2	0,58081001	0,00008
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ENSMUSG00000027367	Stard7	1,003190041	0,00009
ENSMUSG00000029470	P2rx4	1,222720027	0,00009
ENSMUSG00000038188	Scarf1	1,259639978	0,00009
ENSMUSG00000038963	Slco4a1	-3,563879967	0,00009
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ENSMUSG00000063146	Clip2	-1,153159976	0,00009

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ENSMUSG00000029119	Man2b2	1,121739984	0,00009
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ENSMUSG00000056708	Ier5	-1,510820031	0,0001
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ENSMUSG00000004460	Dnajb11	0,905449986	0,0001
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ENSMUSG00000030134	Rasgef1a	-3,924690008	0,0001
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ENSMUSG00000027010	Slc25a12	0,707520008	0,0001
ENSMUSG00000015363	Trabd	1,029049993	0,0001
ENSMUSG00000037966	Ninj1	1,078390002	0,0001
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ENSMUSG00000031645	F11	2,279829979	0,0001
ENSMUSG00000025139	Tollip	0,387620002	0,0001
ENSMUSG00000004070	Hmox2	0,880840003	0,0001
ENSMUSG00000069045	Ddx3y	0,904420018	0,0001
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ENSMUSG00000020621	Rdh14	1,092190027	0,00011
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ENSMUSG00000042303	Sgsm3	-1,224760056	0,00011
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ENSMUSG00000049339	Retreg2	1,094529986	0,00011
ENSMUSG00000038323	1700066M21Rik	1,327649951	0,00011
ENSMUSG00000050541	Adra1b	2,383869886	0,00011
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ENSMUSG00000074207	Adh1	2,404900074	0,00011
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ENSMUSG00000038976	Ppp1r9b	-1,262330055	0,00012
ENSMUSG00000064061	Dzip3	-1,221750021	0,00012
ENSMUSG00000024137	E4f1	-0,790380001	0,00012
ENSMUSG00000032265	Tent5a	1,189669967	0,00012
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ENSMUSG00000022996	Wnt10b	-5,865009785	0,00012
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ENSMUSG00000028102	Pex11b	0,521040022	0,00012
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ENSMUSG00000056648	Hoxb8	-4,108389854	0,00012
ENSMUSG00000037411	Serpine1	-3,359740019	0,00012
ENSMUSG00000095677	Dynlt1f	-2,157510042	0,00012
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ENSMUSG00000024811	Tnks2	-0,799809992	0,00012
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ENSMUSG00000035678	Tnfsf9	-3,376620054	0,00026
ENSMUSG00000002012	Pnck	-3,190540075	0,00026
ENSMUSG00000022240	Ctnnd2	-2,745630026	0,00026
ENSMUSG00000041703	Zic5	-5,152669907	0,00026
ENSMUSG00000039275	Foxk2	-0,86609	0,00026
ENSMUSG00000011148	Adssl1	-1,159360051	0,00026
ENSMUSG00000004936	Map2k1	-0,72845	0,00026
ENSMUSG00000037236	Matr3	-0,485110015	0,00026
ENSMUSG00000029513	Prkab1	0,668820024	0,00026
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ENSMUSG00000049555	Tmie	2,128609896	0,00026
ENSMUSG00000037852	Cpe	-2,014790058	0,00026
ENSMUSG00000028634	Hivep3	-1,194560051	0,00026
ENSMUSG00000021830	Txndc16	-1,108989954	0,00026
ENSMUSG00000025159	Mms19	-0,530700028	0,00026
ENSMUSG00000020952	Scfd1	0,679239988	0,00026
ENSMUSG00000039349	C130074G19Rik	1,641589999	0,00026
ENSMUSG00000023176	Cpn2	2,084549904	0,00026
ENSMUSG00000030862	Cpxm2	-3,117719889	0,00027
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ENSMUSG00000056055	Sag	-4,560860157	0,00027
ENSMUSG00000020186	Csrp2	-1,934960008	0,00027
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ENSMUSG00000038936	Sccpdh	-1,321480036	0,00027
ENSMUSG00000035351	Nup37	-0,874979973	0,00027
ENSMUSG00000027936	Crtc2	-0,716669977	0,00027
ENSMUSG00000026889	Rbm18	-0,644110024	0,00027
ENSMUSG00000022814	Umps	0,782440007	0,00027
ENSMUSG00000038080	Kdm1b	1,191589952	0,00027
ENSMUSG00000018659	Pnpo	1,62390995	0,00027
ENSMUSG00000045930	Clec14a	1,690680027	0,00027
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ENSMUSG00000010154	Spire2	-1,959480047	0,00027
ENSMUSG00000001802	Lrp3	1,51414001	0,00027

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ENSMUSG00000010048	Ifrd2	1,153890014	0,00028
ENSMUSG00000023243	Kcnk5	1,608399987	0,00028
ENSMUSG00000038528	Mfsd4b5	3,095969915	0,00028
ENSMUSG00000019873	Reep3	0,595049977	0,00028
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ENSMUSG00000035181	Heatr5a	-1,484509945	0,00028
ENSMUSG00000032178	Ilf3	-0,984089971	0,00028
ENSMUSG00000026854	Usp20	-0,768819988	0,00028
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ENSMUSG00000031935	Med17	-0,631959975	0,00028
ENSMUSG00000047141	Zfp654	0,673479974	0,00028
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ENSMUSG00000014686	Ceacam16	-2,790590048	0,00029
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ENSMUSG00000022270	Retreg1	1,462980032	0,0003
ENSMUSG00000040809	Chil3	-3,877789974	0,0003
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ENSMUSG00000017868	Sgk2	2,093470097	0,0003
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ENSMUSG00000056973	Ces1d	2,152019978	0,0003
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ENSMUSG00000027861	Casq2	-3,854360104	0,0003
ENSMUSG00000054203	Ifi205	-1,966510057	0,0003
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ENSMUSG00000004929	Thop1	-1,059659958	0,00031
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ENSMUSG00000032496	Ltf	-3,969099998	0,00031
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ENSMUSG00000029851	Tcaf2	-1,417129993	0,00032
ENSMUSG00000028312	Smc2	-1,405709982	0,00032
ENSMUSG00000036533	Cdc42ep3	-1,215860009	0,00032
ENSMUSG00000002870	Mcm2	-1,140190005	0,00032
ENSMUSG00000019818	Cd164	0,518769979	0,00032
ENSMUSG00000059772	Slx1b	0,705739975	0,00032
ENSMUSG00000014245	Pigl	0,827470005	0,00032
ENSMUSG00000028383	Hsdl2	1,037559986	0,00032
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ENSMUSG00000048489	Depp1	2,382339954	0,00032
ENSMUSG00000024056	Ndc80	-2,004689932	0,00032
ENSMUSG00000061758	Akr1b10	-1,198909998	0,00032
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ENSMUSG00000034424	Gcsh	1,143270016	0,00032
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ENSMUSG00000033429	Mcee	1,692880034	0,00032
ENSMUSG00000024410	Rmc1	-0,998279989	0,00033
ENSMUSG00000029199	Lias	0,565800011	0,00033
ENSMUSG00000035757	Selenoo	1,456580043	0,00033
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ENSMUSG00000035184	Fam124a	1,767379999	0,00033
ENSMUSG00000062444	Ap3b2	-7,698140144	0,00033
ENSMUSG00000027996	Sfrp2	-5,768400192	0,00033
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ENSMUSG00000056116	H2-T22	1,368049979	0,00033
ENSMUSG00000021903	Galnt15	1,628409982	0,00033
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ENSMUSG00000030800	Prss8	1,74751997	0,00033
ENSMUSG00000018012	Rac3	-2,061949968	0,00033
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ENSMUSG00000037337	Map4k1	-1,182620049	0,00034
ENSMUSG00000020100	Slc29a3	-0,982190013	0,00034
ENSMUSG00000023353	Agap3	-0,759370029	0,00034
ENSMUSG00000057649	Brd9	-0,639569998	0,00034
ENSMUSG00000036782	Klhl13	1,39944005	0,00034
ENSMUSG00000035504	Reep6	1,892140031	0,00034
ENSMUSG00000055561	Spink5	3,07088995	0,00034
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ENSMUSG00000097789	Gm2115	-3,775540113	0,00035
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ENSMUSG00000033931	Rbm34	-0,463079989	0,00035
ENSMUSG00000037872	Ackr1	1,938050032	0,00035
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ENSMUSG00000027618	Nfs1	0,700699985	0,00036
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ENSMUSG00000021929	Kpna3	-0,386720002	0,00036
ENSMUSG00000014905	Dnajb9	1,03094995	0,00036
ENSMUSG00000079652	Fam71f2	-3,522540092	0,00036
ENSMUSG00000029389	Ddx55	-0,577820003	0,00037
ENSMUSG00000022351	Sqle	1,053449988	0,00037
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ENSMUSG00000026271	Gpr35	-1,685269952	0,0004
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ENSMUSG00000042250	Pglyrp4	-3,615020037	0,00041
ENSMUSG00000038020	Rapgefl1	-2,76583004	0,00041
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ENSMUSG00000037787	Apopt1	1,016450047	0,00049
ENSMUSG00000027371	Fahd2a	1,341220021	0,00049
ENSMUSG00000001313	Rnd2	1,481520057	0,00049

ENSMUSG00000009575	Cbx5	-0,895070016	0,00049
ENSMUSG00000022889	Mrpl39	0,51779002	0,00049
ENSMUSG00000034118	Tpst1	1,036339998	0,00049
ENSMUSG00000031951	Tmem231	-2,789720058	0,00049
ENSMUSG00000026240	Cops7b	-0,419030011	0,00049
ENSMUSG00000040669	Phc1	-1,426370025	0,0005
ENSMUSG00000037797	Adh4	2,170680046	0,0005
ENSMUSG00000029059	Fam213b	1,729969978	0,0005
ENSMUSG00000018572	Phf23	-1,069059968	0,0005
ENSMUSG00000062380	Tubb3	-2,703680038	0,0005
ENSMUSG00000052889	Prkcb	-1,220110059	0,0005
ENSMUSG00000034601	2700049A03Rik	-1,17031002	0,0005
ENSMUSG00000027540	Ptpn1	-0,734120011	0,0005
ENSMUSG00000007029	Vars	-0,636219978	0,0005
ENSMUSG00000022110	Sucla2	0,932770014	0,0005
ENSMUSG00000009566	Fpgs	1,112419963	0,0005
ENSMUSG00000048856	Slc25a47	1,842759967	0,0005
ENSMUSG00000022181	C6	1,974740028	0,0005
ENSMUSG00000040828	Catsperd	1,80230999	0,00051
ENSMUSG00000034457	Eda2r	-1,82573998	0,00051
ENSMUSG00000030061	Uba3	-0,465000004	0,00051
ENSMUSG00000067279	Ppp1r3c	2,429090023	0,00051
ENSMUSG00000026674	Ddr2	-1,27342999	0,00051
ENSMUSG00000037103	Dcaf15	-1,08465004	0,00051
ENSMUSG00000028076	Cd1d1	1,59612	0,00051
ENSMUSG00000021876	Rnase4	1,613160014	0,00051
ENSMUSG00000026669	Mcm10	1,840540051	0,00051
ENSMUSG00000014782	Plekhg4	-5,888050079	0,00052
ENSMUSG00000036466	Megf11	-2,12161994	0,00052
ENSMUSG00000085793	Lin52	0,643230021	0,00052
ENSMUSG00000021786	Oxsm	1,266559958	0,00052
ENSMUSG00000007035	Msh5	-1,717219949	0,00052
ENSMUSG00000036339	Tmem260	0,889370024	0,00052
ENSMUSG00000028607	Cpt2	1,235520005	0,00052
ENSMUSG00000023094	Msrb2	1,368630052	0,00052
ENSMUSG00000030762	Aqp8	1,993139982	0,00052
ENSMUSG00000023000	Dhh	-2,843770027	0,00053
ENSMUSG00000026546	Cfap45	-2,521359921	0,00053
ENSMUSG00000028291	Akirin2	-0,671239972	0,00053
ENSMUSG00000021264	Yy1	-0,58069998	0,00053
ENSMUSG00000046598	Bdh1	2,08585	0,00053
ENSMUSG00000071226	Cecr2	2,251790047	0,00053
ENSMUSG00000031189	Aff2	-7,75770998	0,00053
ENSMUSG00000041552	Ptchd1	-6,022510052	0,00053
ENSMUSG00000032968	Inha	-4,39343977	0,00053
ENSMUSG00000021270	Hsp90aa1	-1,224949956	0,00053
ENSMUSG00000037013	Ss18	-0,636520028	0,00053

ENSMUSG00000028914	Casp9	0,727869987	0,00053
ENSMUSG00000026176	Ctdsp1	0,902220011	0,00053
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ENSMUSG00000020904	Cfap52	-2,83246994	0,00053
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ENSMUSG00000003847	Nfat5	-1,721359968	0,00054
ENSMUSG00000029387	Gtf2h3	0,480960011	0,00054
ENSMUSG00000038298	Pdzk1	2,148139954	0,00054
ENSMUSG00000033039	Micall1	-1,746979952	0,00054
ENSMUSG00000058440	Nrf1	-0,60115999	0,00054
ENSMUSG00000029103	Lrpap1	0,391990006	0,00054
ENSMUSG00000079563	Pglyrp2	1,934249997	0,00054
ENSMUSG00000045136	Tubb2b	-2,275779963	0,00054
ENSMUSG00000032815	Fanca	-1,884430051	0,00055
ENSMUSG00000022771	Ppil2	0,361380011	0,00055
ENSMUSG00000029073	Cptp	0,571519971	0,00055
ENSMUSG00000033809	Alg3	0,768710017	0,00055
ENSMUSG00000028684	Urod	1,249680042	0,00055
ENSMUSG00000034738	Nostrin	1,297119975	0,00055
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ENSMUSG00000001627	Ifrd1	-1,298529983	0,00055
ENSMUSG00000047648	Fbxo30	-0,887090027	0,00055
ENSMUSG00000025145	Lrrc45	-0,736769974	0,00055
ENSMUSG00000030990	Pgap2	0,64477998	0,00055
ENSMUSG00000027993	Trim2	1,373010039	0,00055
ENSMUSG00000017688	Hnf4g	2,605750084	0,00055
ENSMUSG00000035109	Shc4	-2,850029945	0,00055
ENSMUSG00000020740	Gga3	-1,070459962	0,00055
ENSMUSG00000027963	Extl2	-0,422619998	0,00055
ENSMUSG00000038793	Lefty1	-2,090600014	0,00055
ENSMUSG00000020973	Dnaaf2	-1,149260044	0,00055
ENSMUSG00000027746	Ufm1	0,61917001	0,00055
ENSMUSG00000029319	Coq2	0,916939974	0,00055
ENSMUSG00000062074	Wisp3	2,695610046	0,00055
ENSMUSG00000028862	Map3k6	-2,229720116	0,00056
ENSMUSG00000049504	Proser1	-1,06348002	0,00056
ENSMUSG00000029596	Sdsl	2,034919977	0,00056
ENSMUSG00000036106	Prr5	-0,886160016	0,00056
ENSMUSG00000035142	Nubpl	1,253530025	0,00056
ENSMUSG00000023903	Mmp25	-5,312779903	0,00056
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ENSMUSG00000063253	Scoc	-0,826730013	0,00056
ENSMUSG00000029610	Aimp2	-0,739239991	0,00056
ENSMUSG00000015189	Casd1	0,530040026	0,00056
ENSMUSG00000026207	Speg	-1,692000031	0,00056
ENSMUSG00000038092	Hsd3b5	3,225680113	0,00056
ENSMUSG00000068264	Ap5s1	1,174299955	0,00057

ENSMUSG00000041431	Ccnb1	-1,939990044	0,00057
ENSMUSG00000025821	Zfp282	-0,874819994	0,00057
ENSMUSG00000030302	Atp2b2	2,510839939	0,00057
ENSMUSG00000020037	Rfx4	2,561419964	0,00057
ENSMUSG00000032221	Mns1	-2,201910019	0,00057
ENSMUSG00000028156	Eif4e	-0,450309992	0,00057
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ENSMUSG00000002475	Abhd3	1,802440047	0,00057
ENSMUSG00000018486	Wnt9b	2,335580111	0,00057
ENSMUSG00000028933	Xrcc2	-1,061910033	0,00058
ENSMUSG00000025937	Lactb2	1,453160048	0,00058
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ENSMUSG00000037940	Inpp4b	-3,304879904	0,00058
ENSMUSG00000022105	Rb1	-0,701219976	0,00058
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ENSMUSG00000024875	Yif1a	0,718410015	0,00059
ENSMUSG00000027208	Fgf7	-6,752349854	0,00059
ENSMUSG00000033595	Lgi3	-3,248189926	0,00059
ENSMUSG00000050373	Snx21	-1,041129947	0,00059
ENSMUSG00000058546	Rpl23a	-0,69599998	0,00059
ENSMUSG00000036223	Ska1	-2,333470106	0,00059
ENSMUSG00000027932	Slc27a3	-1,632369995	0,00059
ENSMUSG00000029328	Hnrnpdl	-0,612730026	0,00059
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ENSMUSG00000073725	Lmbrd1	0,78162998	0,0006
ENSMUSG00000008690	Ncaph2	-0,525449991	0,0006
ENSMUSG00000019368	Sec14l4	2,254729986	0,0006
ENSMUSG00000094103	1700047I17Rik2	-3,128489971	0,0006
ENSMUSG00000067370	B3galt4	-1,523010015	0,0006
ENSMUSG00000069743	Zfp820	-0,971099973	0,0006
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ENSMUSG00000003282	Plag1	-6,187590122	0,00061
ENSMUSG00000044250	Pced1b	-1,24732995	0,00061
ENSMUSG00000029338	Antxr2	-0,90030998	0,00061
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ENSMUSG00000071369	Map3k5	0,85345	0,00061
ENSMUSG00000038253	Hoxa5	-1,913419962	0,00061
ENSMUSG00000028163	Nfkb1	-0,706260026	0,00061
ENSMUSG00000038055	Dexi	0,993560016	0,00061
ENSMUSG00000033735	Spr	1,511719942	0,00061
ENSMUSG00000055653	Gpc3	2,506710052	0,00061
ENSMUSG00000032965	Ift57	-1,742789984	0,00062

ENSMUSG00000028018	Gstcd	-1,173560023	0,00062
ENSMUSG00000032386	Trip4	0,775829971	0,00062
ENSMUSG00000039795	Zfand1	0,810790002	0,00062
ENSMUSG00000026922	Agpat2	1,260040045	0,00062
ENSMUSG00000035283	Adrb1	1,453189969	0,00062
ENSMUSG00000042918	Mamstr	-2,605859995	0,00062
ENSMUSG00000045382	Cxcr4	-1,493239999	0,00062
ENSMUSG00000074825	Itpripl1	-0,719659984	0,00062
ENSMUSG00000028713	Cyp4b1	1,974939942	0,00062
ENSMUSG00000040543	Pitpnm3	-3,512639999	0,00062
ENSMUSG00000025347	Mettl7b	2,110090017	0,00062
ENSMUSG00000051906	Cd209f	4,908070087	0,00062
ENSMUSG00000000197	Nalcn	-8,710590363	0,00063
ENSMUSG00000022096	Hr	-2,354310036	0,00063
ENSMUSG00000032737	Inppl1	-0,895340025	0,00063
ENSMUSG00000028454	Pigo	0,695900023	0,00063
ENSMUSG00000028412	Slc44a1	0,800660014	0,00063
ENSMUSG00000030225	Dera	0,926180005	0,00063
ENSMUSG00000024799	Tm7sf2	1,66711998	0,00063
ENSMUSG00000027210	Meis2	-1,239439964	0,00063
ENSMUSG00000030271	Ogg1	-0,83871001	0,00063
ENSMUSG00000062054	Iah1	1,587960005	0,00063
ENSMUSG00000058022	Adtrp	1,981209993	0,00063
ENSMUSG00000024827	Gldc	2,151410103	0,00063
ENSMUSG00000027333	Smox	-1,202290058	0,00063
ENSMUSG00000021765	Fst	1,702900052	0,00063
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ENSMUSG00000014773	Dll1	-1,061570048	0,00065
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ENSMUSG00000038462	Uqcrfs1	1,16700995	0,00066
ENSMUSG00000024997	Prdx3	1,174000025	0,00066
ENSMUSG00000032946	Rasgrp2	1,954130054	0,00066
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ENSMUSG00000043943	Naalad2	-1,355909944	0,00066
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ENSMUSG00000022568	Scrib	-0,67651999	0,00066

ENSMUSG00000025134	Alyref	-1,193609953	0,00066
ENSMUSG00000061559	Wdr61	0,687619984	0,00066
ENSMUSG00000016481	Cr1l	0,822809994	0,00067
ENSMUSG00000094156	Sult2a7	2,443099976	0,00067
ENSMUSG00000021266	Wars	-0,619570017	0,00067
ENSMUSG00000018820	Zfyve27	-0,733990014	0,00067
ENSMUSG00000046909	Tefm	0,770219982	0,00067
ENSMUSG00000004843	Chmp2b	0,868089974	0,00067
ENSMUSG00000028654	Mycl	1,423089981	0,00067
ENSMUSG00000070469	Adamtsl3	-2,79185009	0,00068
ENSMUSG00000036698	Ago2	-1,484920025	0,00068
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ENSMUSG00000034333	Zbed4	-0,965759993	0,00068
ENSMUSG00000057363	Uxs1	-0,768239975	0,00068
ENSMUSG00000044364	Tmem74b	-4,470950127	0,00068
ENSMUSG00000060962	Dmkn	-4,250020027	0,00068
ENSMUSG00000023018	Smarcd1	-1,231719971	0,00068
ENSMUSG00000024425	Ndfip1	-1,00593996	0,00068
ENSMUSG00000028359	Orm3	2,62658	0,00068
ENSMUSG00000092680	Snord55	-2,1426301	0,00069
ENSMUSG00000018470	Kcnab3	-1,729820013	0,00069
ENSMUSG00000053617	Sh3pxd2a	-1,565369964	0,00069
ENSMUSG00000026429	Ube2t	-1,681030035	0,00069
ENSMUSG00000029528	Pxn	-0,988059998	0,00069
ENSMUSG00000030612	Mrpl46	1,035069942	0,00069
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ENSMUSG00000040424	Hipk4	-5,864290237	0,0007
ENSMUSG00000031309	Rps6ka3	-1,092679977	0,0007
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ENSMUSG00000044792	Isca1	0,689599991	0,0007
ENSMUSG00000026172	Bcs1l	0,803650022	0,0007
ENSMUSG00000007867	Ift43	-1,509060025	0,00071
ENSMUSG00000040749	Siah1b	-0,986899972	0,00071
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ENSMUSG00000025609	Mkln1	0,382550001	0,00071
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ENSMUSG00000034473	Sec22a	0,88756001	0,00071
ENSMUSG00000046861	Hectd3	0,941160023	0,00071
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ENSMUSG00000024941	Scyl1	-0,248370007	0,00071
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ENSMUSG00000027679	Dnajc19	1,407420039	0,00072
ENSMUSG00000059327	Eda	-1,277140021	0,00072
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ENSMUSG00000094483	Purb	-0,525390029	0,00072
ENSMUSG00000037410	Tbc1d2b	1,292770028	0,00072
ENSMUSG00000039438	Ttc36	2,540149927	0,00072
ENSMUSG00000073856	Iqck	-3,162450075	0,00073
ENSMUSG00000025405	Inhbc	2,082940102	0,00073
ENSMUSG00000022034	Esco2	-2,361510038	0,00073
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ENSMUSG00000040918	Slc19a2	0,973839998	0,00073
ENSMUSG00000021258	Ccnk	-0,473320007	0,00073
ENSMUSG00000027589	Pcmtd2	0,594980001	0,00073
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ENSMUSG00000033460	Armcx1	-1,22258997	0,00074
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ENSMUSG00000008226	Scrn3	1,174769998	0,00074
ENSMUSG00000029641	Rasl11a	-2,30005002	0,00075
ENSMUSG00000070476	Fam217b	-1,442890048	0,00075
ENSMUSG00000020817	Rabep1	0,667020023	0,00075
ENSMUSG00000015224	Cyp2j9	1,477910042	0,00075
ENSMUSG00000098470	C1rb	2,62300992	0,00075
ENSMUSG00000022286	Grhl2	-2,855249882	0,00075
ENSMUSG00000024500	Ppp2r2b	-2,563220024	0,00076
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ENSMUSG00000028664	Ephb2	-2,07772994	0,00076
ENSMUSG00000020009	Ifngr1	0,753889978	0,00076
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ENSMUSG00000069910	Spdl1	-1,621659994	0,00078
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ENSMUSG00000028247	Coq3	0,979489982	0,00079
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ENSMUSG00000019303	Psmc3ip	-1,882169962	0,0008
ENSMUSG00000032839	Trpc1	-3,708400011	0,0008
ENSMUSG00000005371	Fbxo11	-0,699060023	0,0008
ENSMUSG00000029998	Pcyox1	1,015149951	0,0008
ENSMUSG00000051483	Cbr1	1,711390018	0,0008
ENSMUSG00000032602	Slc25a20	0,956200004	0,00081
ENSMUSG00000033031	Cip2a	-1,394279957	0,00082
ENSMUSG00000004263	Atn1	-0,987360001	0,00082
ENSMUSG00000027349	Fam98b	-0,502629995	0,00082
ENSMUSG00000058454	Dhcr7	1,389590025	0,00082
ENSMUSG00000031637	Lrp2bp	1,693490028	0,00082
ENSMUSG00000029082	Bst1	-2,021859884	0,00082
ENSMUSG00000038524	Fchsd1	-1,84473002	0,00082
ENSMUSG00000063275	Hacd1	-1,324920058	0,00082
ENSMUSG00000070056	Mfhas1	-0,906029999	0,00082
ENSMUSG00000094651	Gal3st2	-4,745880127	0,00083
ENSMUSG00000001416	Cct3	-0,686269999	0,00083
ENSMUSG00000068290	Ddrgk1	1,254959941	0,00083
ENSMUSG00000035769	Xylb	1,587479949	0,00083

ENSMUSG00000067071	Hes6	1,813429952	0,00083
ENSMUSG00000026368	F13b	1,943719983	0,00083
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ENSMUSG00000025155	Dus1l	0,872460008	0,00083
ENSMUSG00000025105	Bnc1	-4,403709888	0,00083
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ENSMUSG00000039043	Arpin	-0,677789986	0,00084
ENSMUSG00000039065	Fam173b	0,758880019	0,00084
ENSMUSG00000045672	Col27a1	-1,743049979	0,00084
ENSMUSG00000038213	Tapbpl	1,069599986	0,00084
ENSMUSG00000024313	Mep1b	3,415920019	0,00084
ENSMUSG00000028923	Necap2	-1,117040038	0,00084
ENSMUSG00000006732	Mettl1	0,966709971	0,00084
ENSMUSG00000024858	Grk2	-0,529240012	0,00085
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ENSMUSG00000025930	Msc	-2,391220093	0,00085
ENSMUSG00000027573	Gid8	0,68434	0,00085
ENSMUSG00000045854	Lyrm2	0,729900002	0,00085
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ENSMUSG00000028124	Gclm	1,088850021	0,00085
ENSMUSG00000020638	Cmpk2	1,626449943	0,00086
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ENSMUSG00000026715	Serpinc1	1,951570034	0,00087
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ENSMUSG00000024037	Wdr4	-0,390560001	0,00088
ENSMUSG00000033147	Slc22a15	1,043529987	0,00088
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ENSMUSG00000052031	Tagap1	-0,862489998	0,0009
ENSMUSG00000027670	Ocstamp	1,686849952	0,0009
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ENSMUSG00000066952	Myo1h	-4,836289883	0,00091
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ENSMUSG00000036928	Stag3	-3,545059919	0,00092
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ENSMUSG00000060275	Nrg2	-4,570310116	0,00092
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ENSMUSG00000074748	Atxn7l3b	0,599629998	0,00096
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ENSMUSG00000036216	Leap2	2,280499935	0,00109
ENSMUSG00000027752	Exosc8	-1,044090033	0,00109
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ENSMUSG00000060459	Kng2	1,78125	0,0011
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ENSMUSG00000001911	Nfix	1,015750051	0,00112
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ENSMUSG00000038859	Baiap2l1	-0,967490017	0,00113
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ENSMUSG00000049755	Zfp672	0,592980027	0,00113
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ENSMUSG00000033768	Nrxn2	-1,976140022	0,00114
ENSMUSG00000037375	Hhat	-1,346109986	0,00114
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ENSMUSG00000022009	Nufip1	-0,658779979	0,00117
ENSMUSG00000028944	Prkag2	0,736570001	0,00118
ENSMUSG00000018707	Dync1h1	-0,820829988	0,00118
ENSMUSG00000036052	Dnajb5	-0,65267998	0,00118
ENSMUSG00000027406	Idh3b	0,621770024	0,00118
ENSMUSG00000020493	Prr11	-2,526859999	0,00118
ENSMUSG00000033965	Slc16a2	1,55448997	0,00118
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ENSMUSG00000031779	Ccl22	-3,156919956	0,00125
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ENSMUSG00000018326	Ywhab	-0,27895999	0,00125
ENSMUSG00000073411	H2-D1	1,113890052	0,00125
ENSMUSG00000035227	Spcs2	0,950269997	0,00125
ENSMUSG00000018669	Cdk5rap3	0,99673003	0,00125
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ENSMUSG00000059456	Ptk2b	-0,82457	0,00127
ENSMUSG00000033597	Caskin1	-3,679199934	0,00127
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ENSMUSG00000008734	Gprc5b	-1,784929991	0,0021
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ENSMUSG00000001127	Araf	0,357749999	0,00211
ENSMUSG00000037916	Ndufv1	1,011649966	0,00212
ENSMUSG00000040105	Plpp6	0,750899971	0,00212
ENSMUSG00000013622	Atraid	1,021919966	0,00212
ENSMUSG00000014444	Piezo1	-3,156080008	0,00212
ENSMUSG00000009079	Ewsr1	-0,522549987	0,00212
ENSMUSG00000030754	Copb1	0,530409992	0,00212
ENSMUSG00000034780	B3galt1	1,643169999	0,00212
ENSMUSG00000030339	Ltbr	1,003280044	0,00213
ENSMUSG00000002346	Slc25a42	1,328070045	0,00213
ENSMUSG00000025764	Jade1	0,945900023	0,00214
ENSMUSG00000056296	Synpr	-9,879210472	0,00214
ENSMUSG00000043004	Gng2	-1,116050005	0,00214
ENSMUSG00000003555	Cyp17a1	2,710860014	0,00214
ENSMUSG00000029101	Rgs12	-1,086009979	0,00215
ENSMUSG00000060373	Hnrnpc	-0,49386999	0,00215
ENSMUSG00000027715	Ccna2	-1,471969962	0,00216
ENSMUSG00000059481	Plg	1,888249993	0,00216
ENSMUSG00000049598	Vsig8	-3,153599977	0,00216
ENSMUSG00000059401	Mamld1	-1,305439949	0,00216
ENSMUSG00000007836	Hnrnpa0	-0,956420004	0,00216
ENSMUSG00000030407	Qpctl	0,457199991	0,00217
ENSMUSG00000023307	March5	0,722710013	0,00217
ENSMUSG00000026260	Ndufa10	0,766690016	0,00217
ENSMUSG00000036775	Decr2	1,21528995	0,00217
ENSMUSG00000022551	Cyc1	0,579330027	0,00217
ENSMUSG00000024378	Stard4	1,11548996	0,00218
ENSMUSG00000035642	Aamdc	1,438570023	0,00218
ENSMUSG00000038980	Rbbp8nl	-3,890280008	0,00219
ENSMUSG00000038602	Slc35f1	-2,71984005	0,00219
ENSMUSG00000029366	Dck	-0,675949991	0,00219
ENSMUSG00000068328	Aup1	0,815400004	0,00219
ENSMUSG00000024177	Nme4	-1,232720017	0,00219
ENSMUSG00000031104	Rab33a	-3,915669918	0,0022
ENSMUSG00000059895	Ptp4a3	-1,070639968	0,0022
ENSMUSG00000057778	Cyb5d2	0,575420022	0,0022
ENSMUSG00000026603	Smyd2	-0,600189984	0,0022
ENSMUSG00000075700	Selenot	0,355309993	0,0022
ENSMUSG00000040280	Ndufa4l2	-1,977679968	0,00221
ENSMUSG00000050022	Amz1	-1,220700026	0,00221
ENSMUSG00000015605	Srf	-0,54152	0,00221
ENSMUSG00000040009	Gnaz	-2,840800047	0,00222
ENSMUSG00000026580	Selp	-1,857499957	0,00222
ENSMUSG00000032586	Traip	-1,529129982	0,00222
ENSMUSG00000031832	Taf1c	-1,209509969	0,00223
ENSMUSG00000002771	Grin2d	-2,606529951	0,00223
ENSMUSG00000037944	Ccr7	-2,002660036	0,00223

ENSMUSG00000064563	Snora7a	-1,869619966	0,00224
ENSMUSG00000022476	Polr3h	-0,728519976	0,00224
ENSMUSG00000044328	Trp53i13	-1,457460046	0,00225
ENSMUSG00000050428	Fbxo46	-0,723249972	0,00225
ENSMUSG00000047867	Gimap6	0,964720011	0,00225
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ENSMUSG00000025512	Chid1	0,805779994	0,00226
ENSMUSG00000029053	Prkcz	1,129799962	0,00226
ENSMUSG00000049439	Cyp20a1	-0,559279978	0,00226
ENSMUSG00000042265	Trem1	-3,188780069	0,00227
ENSMUSG00000041301	Cftr	-2,680540085	0,00227
ENSMUSG00000062526	Mppe1	0,994520009	0,00227
ENSMUSG00000042213	Zfand4	1,159770012	0,00227
ENSMUSG00000021928	Ebpl	1,703889966	0,00227
ENSMUSG00000038656	Cyp3a16	2,722440004	0,00227
ENSMUSG00000037428	Vgf	-6,001450062	0,00228
ENSMUSG00000034911	Ushbp1	0,862839997	0,00228
ENSMUSG00000010080	Epn3	-1,82525003	0,00228
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ENSMUSG00000058729	Lin9	-0,793250024	0,00229
ENSMUSG00000032077	Bud13	-0,521799982	0,00229
ENSMUSG00000061950	Ppp4r1	-0,51752001	0,00229
ENSMUSG00000035513	Ntng2	-1,675629973	0,0023
ENSMUSG00000032177	Pde4a	-1,336910009	0,0023
ENSMUSG00000036528	Ppfibp2	1,348659992	0,0023
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ENSMUSG00000003309	Ap1m2	-2,463469982	0,00231
ENSMUSG00000026047	Kdelc1	-0,558780015	0,00231
ENSMUSG00000002227	Mov10	0,897849977	0,00231
ENSMUSG00000040229	Gpr34	-2,510250092	0,00231
ENSMUSG00000021214	Akr1c18	2,059390068	0,00232
ENSMUSG00000070737	Tmem35b	0,956160009	0,00232
ENSMUSG00000059816	Shisal2a	-6,775629997	0,00232
ENSMUSG00000022555	Dgat1	-0,47183001	0,00233
ENSMUSG00000003235	Eif2b5	0,466540009	0,00233
ENSMUSG00000030945	Acsm2	1,811169982	0,00233
ENSMUSG00000006390	Elovl1	0,44047001	0,00233
ENSMUSG00000031232	Magt1	0,714919984	0,00233
ENSMUSG00000017390	Aldoc	0,886089981	0,00233
ENSMUSG00000040028	Elavl1	-0,754329979	0,00234
ENSMUSG00000006736	Tspan31	1,086670041	0,00234
ENSMUSG00000022131	Gpr180	0,566340029	0,00235
ENSMUSG00000063931	Pepd	1,049430013	0,00235
ENSMUSG00000066233	Tmem42	1,152199984	0,00235
ENSMUSG00000052584	Serp2	-2,657330036	0,00235
ENSMUSG00000025104	Hdgfl3	-1,106739998	0,00235

ENSMUSG00000032313	Tmem266	1,722839952	0,00235
ENSMUSG00000040706	Agmat	1,91336	0,00235
ENSMUSG00000047109	Cldn14	2,061589956	0,00235
ENSMUSG00000084897	Gm14226	-4,738359928	0,00236
ENSMUSG00000022613	Miox	2,559520006	0,00236
ENSMUSG00000073413	Ly6g6d	2,601249933	0,00236
ENSMUSG00000078768	Zfp566	-1,457380056	0,00237
ENSMUSG00000029632	Ndufa4	1,648589969	0,00237
ENSMUSG00000030067	Foxp1	-0,918429971	0,00237
ENSMUSG00000029647	Pan3	-0,784500003	0,00238
ENSMUSG00000028910	Mecr	0,919070005	0,00238
ENSMUSG00000021403	Serpinb9b	-4,764349937	0,00238
ENSMUSG00000020682	Mmp28	-2,901489973	0,00238
ENSMUSG00000027544	Nfatc2	-1,894180059	0,00238
ENSMUSG00000002820	Atg4d	0,641860008	0,00238
ENSMUSG00000073096	Lrrc61	1,015239954	0,00238
ENSMUSG00000024335	Brd2	-0,443969995	0,0024
ENSMUSG00000027952	Pmvk	1,367190003	0,0024
ENSMUSG00000025383	Il23a	-2,023740053	0,0024
ENSMUSG00000034681	Rnps1	-1,090849996	0,0024
ENSMUSG00000024085	Man2a1	0,795430005	0,0024
ENSMUSG00000028064	Sema4a	1,429499984	0,0024
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ENSMUSG00000032024	Clmp	0,99229002	0,00241
ENSMUSG00000052428	Tmco1	0,912609994	0,00242
ENSMUSG00000025089	Gfra1	1,41940999	0,00243
ENSMUSG00000060703	Cd302	1,733770013	0,00243
ENSMUSG00000045775	Slc16a5	2,012870073	0,00243
ENSMUSG00000024353	Mzb1	2,036679983	0,00243
ENSMUSG00000021591	Glrx	0,947629988	0,00244
ENSMUSG00000037171	Nodal	2,104870081	0,00244
ENSMUSG00000022678	Nde1	-0,468650013	0,00245
ENSMUSG00000039033	Tasp1	0,627110004	0,00245
ENSMUSG00000014846	Tppp3	-1,863479972	0,00246
ENSMUSG00000036737	Oxsr1	-0,529649973	0,00246
ENSMUSG00000031539	Ap3m2	-1,143229961	0,00247
ENSMUSG00000033287	Kctd17	-0,962539971	0,00247
ENSMUSG00000043998	Mgat2	0,49267	0,00247
ENSMUSG00000004069	Dnaja3	0,702040017	0,00247
ENSMUSG00000020075	Ddx21	-0,670669973	0,00248
ENSMUSG00000029458	Brap	0,748130023	0,00249
ENSMUSG00000054582	Pabpc1l	-2,722609997	0,00249
ENSMUSG00000030347	D6Wsu163e	0,593900025	0,00251
ENSMUSG00000052430	Bmpr1b	-6,312449932	0,00251
ENSMUSG00000026834	Acvr1c	-5,597819805	0,00251
ENSMUSG00000004341	Gpx6	2,334959984	0,00251
ENSMUSG00000089929	Bcl2a1b	-2,100699902	0,00252

ENSMUSG00000021892	Sh3bp5	1,251049995	0,00252
ENSMUSG00000053111	Fank1	-3,383899927	0,00253
ENSMUSG00000031865	Dctn1	-0,783219993	0,00253
ENSMUSG00000002825	Qtrt1	-0,928960025	0,00254
ENSMUSG00000018574	Acadvl	1,213690042	0,00254
ENSMUSG00000035638	Muc20	-3,718310118	0,00254
ENSMUSG00000055978	Fut2	-3,564140081	0,00254
ENSMUSG00000079450	Cldn34c1	-2,257390022	0,00254
ENSMUSG00000025007	Aldh18a1	-1,348359942	0,00254
ENSMUSG00000038005	Hpf1	-1,057209969	0,00254
ENSMUSG00000028953	Abcf2	-0,454430014	0,00255
ENSMUSG00000047517	Dmbt1	-4,883870125	0,00256
ENSMUSG00000000223	Drp2	-3,1338799	0,00256
ENSMUSG00000031916	Cog8	0,488090008	0,00256
ENSMUSG00000039474	Wfs1	-1,185220003	0,00257
ENSMUSG00000026883	Dab2ip	-0,878709972	0,00257
ENSMUSG00000027428	Rbbp9	0,510299981	0,00257
ENSMUSG00000035139	Secisbp2	0,461100012	0,00258
ENSMUSG00000059900	Tmem40	-3,727839947	0,00259
ENSMUSG00000033014	Trim33	-0,923479974	0,00259
ENSMUSG00000021597	Slf1	-0,759949982	0,00259
ENSMUSG00000001847	Rac1	-0,650030017	0,00259
ENSMUSG00000078676	Casc3	-0,531449974	0,00259
ENSMUSG00000002799	Jag2	-2,335380077	0,0026
ENSMUSG00000042182	Bend6	-2,988369942	0,0026
ENSMUSG00000064267	Hvcn1	-1,083019972	0,0026
ENSMUSG00000041459	Tardbp	-0,550530016	0,0026
ENSMUSG00000027305	Ndufaf1	0,930329978	0,0026
ENSMUSG00000020988	L2hgdh	1,053910017	0,00261
ENSMUSG00000062960	Kdr	1,211269975	0,00261
ENSMUSG00000033276	Stk36	-1,891450047	0,00261
ENSMUSG00000021177	Tdp1	-0,780809999	0,00261
ENSMUSG00000026213	Stk11ip	-0,680899978	0,00261
ENSMUSG00000001334	Fndc5	-1,870419979	0,00262
ENSMUSG00000015354	Pcolce2	-1,748870015	0,00262
ENSMUSG00000030110	Ret	-8,514399529	0,00263
ENSMUSG00000030327	Necap1	0,547800004	0,00264
ENSMUSG00000068876	Cgn	1,612149954	0,00264
ENSMUSG00000041417	Pik3r1	0,50395	0,00265
ENSMUSG00000035969	Rusc2	-1,109050035	0,00266
ENSMUSG00000000568	Hnrnpd	-0,654150009	0,00266
ENSMUSG00000032382	Snx1	-0,62984997	0,00266
ENSMUSG00000030278	Cidec	1,930410028	0,00266
ENSMUSG00000029708	Gcc1	0,471740007	0,00266
ENSMUSG00000002332	Dhrs1	0,939939976	0,00266
ENSMUSG00000029599	Ddx54	-0,509090006	0,00267
ENSMUSG00000029254	Stap1	2,173079967	0,00267

ENSMUSG00000009470	Tnpo1	-0,738049984	0,00268
ENSMUSG00000022035	Ccdc25	0,617709994	0,00268
ENSMUSG00000023942	Slc29a1	0,829249978	0,00269
ENSMUSG00000047281	Sfn	-1,56558001	0,0027
ENSMUSG00000049928	Glp2r	3,065720081	0,0027
ENSMUSG00000028597	Gpx7	-1,450500011	0,0027
ENSMUSG00000032419	Tbx18	-9,841810226	0,00271
ENSMUSG00000026480	Ncf2	-1,220729947	0,00272
ENSMUSG00000002014	Ssr4	0,891340017	0,00272
ENSMUSG00000045659	Plekha7	1,322399974	0,00272
ENSMUSG00000038009	Dnajc22	1,448580027	0,00272
ENSMUSG00000025958	Creb1	-0,649269998	0,00272
ENSMUSG00000048429	Timm29	0,382470012	0,00273
ENSMUSG00000048728	Zfp454	1,777999997	0,00273
ENSMUSG00000058173	Smco4	1,349449992	0,00273
ENSMUSG00000054764	Mtnr1a	2,304440022	0,00273
ENSMUSG00000045273	Cenph	-2,022190094	0,00274
ENSMUSG00000051246	Msantd1	-1,90407002	0,00274
ENSMUSG00000019791	Hint3	1,41418004	0,00274
ENSMUSG00000066705	Fxyd6	-2,192169905	0,00274
ENSMUSG00000020801	Med31	-1,25988996	0,00274
ENSMUSG00000031864	Ints10	-0,714160025	0,00274
ENSMUSG00000033610	Pank1	1,559559941	0,00274
ENSMUSG00000063354	Slc39a4	1,593000054	0,00274
ENSMUSG00000025993	Slc40a1	1,207129955	0,00275
ENSMUSG00000037034	Pax1	-5,169690132	0,00276
ENSMUSG00000019806	Aig1	-1,060969949	0,00276
ENSMUSG00000092920	Mirt2	2,093139887	0,00276
ENSMUSG00000032407	U2surp	-0,529999971	0,00276
ENSMUSG00000026589	Sec16b	1,794870019	0,00276
ENSMUSG00000031626	Sorbs2	1,321730018	0,00277
ENSMUSG00000024866	Acy3	1,745470047	0,00277
ENSMUSG00000031622	Sin3b	-1,343240023	0,00277
ENSMUSG00000038615	Nfe2l1	-0,499370009	0,00277
ENSMUSG00000028789	Azin2	-1,741639972	0,00278
ENSMUSG00000038618	Rassf7	0,961070001	0,00278
ENSMUSG00000019831	Wasf1	-1,162539959	0,00279
ENSMUSG00000039005	Tlr4	-0,931360006	0,00279
ENSMUSG00000028693	Nasp	-0,833530009	0,00279
ENSMUSG00000040653	Ppp1r14c	-10,13564014	0,0028
ENSMUSG00000063590	Slc22a28	2,42888999	0,0028
ENSMUSG00000034486	Gbx2	-7,135749817	0,0028
ENSMUSG00000039942	Ptger4	-1,461490035	0,0028
ENSMUSG00000028618	Tmem59	0,580879986	0,0028
ENSMUSG00000079494	Nat8f5	2,812510014	0,00281
ENSMUSG00000021287	Xrcc3	-1,368950009	0,00282
ENSMUSG00000005442	Cic	-0,95431	0,00282

ENSMUSG00000006740	Kif5b	-0,915830016	0,00282
ENSMUSG00000028292	Rars2	0,506799996	0,00282
ENSMUSG00000042055	Wdr11	0,571759999	0,00283
ENSMUSG00000034341	Wbp2	0,291999996	0,00283
ENSMUSG00000030780	BC017158	1,047170043	0,00283
ENSMUSG00000041144	Dnah7b	-3,42711997	0,00284
ENSMUSG00000029127	Zbtb49	-0,964049995	0,00284
ENSMUSG00000031505	Naxd	0,811689973	0,00285
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ENSMUSG00000022219	Cideb	1,782179952	0,0029
ENSMUSG00000030144	Clec4d	-2,641669989	0,0029
ENSMUSG00000071042	Rasgrp3	-1,040799975	0,0029
ENSMUSG00000039989	Cbx4	0,591250002	0,0029
ENSMUSG00000092416	Zfp141	0,534240007	0,00291
ENSMUSG00000036966	Spryd3	-0,573920012	0,00291
ENSMUSG00000078798	Sult2a1	3,83513999	0,00291
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ENSMUSG00000000869	Il4	-1,976709962	0,00292
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ENSMUSG00000022223	Sdr39u1	0,477050006	0,00292
ENSMUSG00000026304	Rab17	1,643820047	0,00292
ENSMUSG00000092035	Peg10	-1,711699963	0,00294
ENSMUSG00000024258	Polr2d	-1,303529978	0,00294
ENSMUSG00000074259	Gramd2	-3,764489889	0,00295
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ENSMUSG00000078570	1110065P20Rik	1,006469965	0,00296
ENSMUSG00000052296	Ppp6r1	0,644819975	0,00296
ENSMUSG00000037353	Letmd1	0,404029995	0,00297
ENSMUSG00000025151	Maged1	-0,390709996	0,00297
ENSMUSG00000051910	Sox6	1,648200035	0,00298
ENSMUSG00000015133	Lrrk1	-0,897790015	0,00298
ENSMUSG00000030621	Me3	-2,838089943	0,00299
ENSMUSG00000027245	Hypk	-1,408980012	0,00299
ENSMUSG00000022696	Sidt1	2,300829887	0,00299
ENSMUSG00000044338	Aplnr	-2,88973999	0,003
ENSMUSG00000028337	Coro2a	-1,465790033	0,003
ENSMUSG00000038357	Camp	-5,22533989	0,00301
ENSMUSG00000027763	Mbnl1	0,430920005	0,00301
ENSMUSG00000029376	Mthfd2l	-1,123039961	0,00302

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ENSMUSG00000008575	Nfib	0,929650009	0,00302
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ENSMUSG00000031145	Prickle3	-1,053869963	0,00303
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ENSMUSG00000038354	Ankrd35	-3,216779947	0,00303
ENSMUSG00000034607	Pof1b	-2,814280033	0,00304
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ENSMUSG00000030074	Gxylt2	-3,203949928	0,00305
ENSMUSG00000037025	Foxa2	1,149420023	0,00306
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ENSMUSG00000005823	Gpr108	-0,420870006	0,00307
ENSMUSG00000069049	Eif2s3y	0,62331003	0,00307
ENSMUSG00000042207	Kdm5b	-0,915120006	0,00308
ENSMUSG00000047879	Usp14	-0,459340006	0,00308
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ENSMUSG00000025785	Exosc7	0,875540018	0,00309
ENSMUSG00000043415	Otud1	-0,649800003	0,0031
ENSMUSG00000046269	Usp27x	-1,308840036	0,0031
ENSMUSG00000038375	Trp53inp2	0,634259999	0,0031
ENSMUSG00000030200	Bcl2l14	1,75838995	0,00311
ENSMUSG00000020873	Slc35b1	0,751339972	0,00311
ENSMUSG00000020692	Nle1	-0,713549972	0,00312
ENSMUSG00000028919	Arhgef19	0,763029993	0,00312
ENSMUSG00000027489	Necab3	-3,132509947	0,00312
ENSMUSG00000021010	Npas3	-3,359440088	0,00313
ENSMUSG00000004054	Map3k11	0,220300004	0,00313
ENSMUSG00000025790	Slco3a1	-1,037999988	0,00313
ENSMUSG00000005534	Insr	1,021379948	0,00313
ENSMUSG00000022949	Clic6	-3,68640995	0,00314
ENSMUSG00000013787	Ehmt2	-0,444840014	0,00314
ENSMUSG00000005547	Cyp2a5	2,56994009	0,00314
ENSMUSG00000000690	Hoxb6	-3,192100048	0,00314
ENSMUSG00000049295	Zfp219	-0,592149973	0,00315
ENSMUSG00000041237	Pklr	2,214080095	0,00316
ENSMUSG00000024491	Rbm27	-0,743629992	0,00317
ENSMUSG00000031974	Abcb10	0,783810019	0,00317

ENSMUSG00000057329	Bcl2	-1,473770022	0,00318
ENSMUSG00000068742	Cry2	0,779280007	0,00319
ENSMUSG00000022829	Stxbp5l	4,295199871	0,00319
ENSMUSG00000041891	Lman1	0,968230009	0,00319
ENSMUSG00000050930	Map10	-1,327559948	0,0032
ENSMUSG00000049001	Ndnf	-7,498209953	0,00321
ENSMUSG00000057880	Abat	1,930330038	0,00321
ENSMUSG00000002372	Ranbp3	-0,523419976	0,00322
ENSMUSG00000019854	Reps1	-0,722750008	0,00323
ENSMUSG00000014767	Tbp	-0,45273	0,00323
ENSMUSG00000020594	Pum2	-0,625739992	0,00324
ENSMUSG00000003452	Bicd1	-2,147259951	0,00324
ENSMUSG00000042787	Exog	-0,943099976	0,00325
ENSMUSG00000024747	Aldh1a7	1,597409964	0,00326
ENSMUSG00000087141	Plcxd2	1,613250017	0,00326
ENSMUSG00000026816	Gtf3c5	-0,656050026	0,00326
ENSMUSG00000029063	Nadk	0,568560004	0,00327
ENSMUSG00000026269	Rnpepl1	0,514159977	0,00328
ENSMUSG00000027316	Gfra4	-3,026410103	0,00329
ENSMUSG00000026687	Aldh9a1	1,279270053	0,00329
ENSMUSG00000028718	Stil	-2,14267993	0,0033
ENSMUSG00000020994	Pnn	-1,030140042	0,00331
ENSMUSG00000026791	Slc2a8	0,562349975	0,00332
ENSMUSG00000079508	Apoo	0,966960013	0,00332
ENSMUSG00000073234	Gm8773	-4,695940018	0,00333
ENSMUSG00000040536	Necab1	2,017659903	0,00333
ENSMUSG00000022758	P2rx6	-2,170969963	0,00334
ENSMUSG00000025791	Pgm1	0,623510003	0,00334
ENSMUSG00000022184	Fbxo4	0,659420013	0,00334
ENSMUSG00000057967	Fgf18	-5,281690121	0,00334
ENSMUSG00000039629	Strip2	-2,185230017	0,00334
ENSMUSG00000001964	Emd	-0,604770005	0,00334
ENSMUSG00000074030	Exoc8	-0,379970014	0,00334
ENSMUSG00000026723	Trdmt1	0,791220009	0,00334
ENSMUSG00000041143	Tmco4	0,845619977	0,00334
ENSMUSG00000022236	Ropn1l	1,756330013	0,00334
ENSMUSG00000023951	Vegfa	-1,115630031	0,00335
ENSMUSG00000039206	Daglb	0,804069996	0,00335
ENSMUSG00000063480	Snu13	-0,865199983	0,00335
ENSMUSG00000045555	Mettl24	-3,802580118	0,00336
ENSMUSG00000031833	Mast3	-1,195490003	0,00337
ENSMUSG00000037149	Ddx1	0,286680013	0,00337
ENSMUSG00000073481	Marc2	1,601819992	0,00337
ENSMUSG00000001103	Sebox	2,209719896	0,00337
ENSMUSG00000073409	H2-Q6	1,373749971	0,00338
ENSMUSG00000041617	Ccdc74a	-2,206680059	0,00338
ENSMUSG00000069495	Epc2	-0,687070012	0,00339

ENSMUSG00000018459	Slc13a3	1,509729981	0,00339
ENSMUSG00000028341	Nr4a3	-2,745369911	0,0034
ENSMUSG00000022353	Mtss1	0,796010017	0,0034
ENSMUSG00000021464	Ror2	-5,659969807	0,00341
ENSMUSG00000041556	Fbxo2	-2,070729971	0,00341
ENSMUSG00000025759	Mfsd8	0,594389975	0,00341
ENSMUSG00000029524	Sirt4	0,640990019	0,00342
ENSMUSG00000052915	Msl1	-0,366820008	0,00342
ENSMUSG00000002204	Napsa	-1,815840006	0,00343
ENSMUSG00000028962	Slc4a2	-0,703320026	0,00343
ENSMUSG00000053119	Chmp3	0,369120002	0,00343
ENSMUSG00000079427	Mthfsl	0,980449975	0,00345
ENSMUSG00000008461	Fut1	2,063250065	0,00347
ENSMUSG00000035773	Kiss1r	-1,271620035	0,00347
ENSMUSG00000012819	Cdh23	-2,704590082	0,00348
ENSMUSG00000030159	Clec1b	1,690009952	0,00348
ENSMUSG00000029208	Guf1	0,318610013	0,00349
ENSMUSG00000038128	Camk4	-1,735409975	0,0035
ENSMUSG00000027634	Ndrg3	-0,609440029	0,00352
ENSMUSG00000027765	P2ry1	0,934520006	0,00353
ENSMUSG00000050052	Tdrp	1,236879945	0,00353
ENSMUSG00000038696	Mapkap1	0,43520999	0,00354
ENSMUSG00000002763	Pex6	1,034070015	0,00354
ENSMUSG00000017499	Cdc6	-1,75443995	0,00355
ENSMUSG00000029110	Rnf4	-0,326020002	0,00356
ENSMUSG00000034801	Sos2	-0,73180002	0,00357
ENSMUSG00000000811	Txnrd3	-0,787129998	0,00357
ENSMUSG00000039018	Mtg1	0,883040011	0,00357
ENSMUSG00000023829	Slc22a1	1,803079963	0,00357
ENSMUSG00000045751	Mms22l	-0,959169984	0,00358
ENSMUSG00000036504	Phpt1	-1,515439987	0,0036
ENSMUSG00000027599	Armc1	0,386059999	0,0036
ENSMUSG00000058761	Rnf169	0,711880028	0,0036
ENSMUSG00000061132	Blnk	1,257730007	0,0036
ENSMUSG00000029587	Zfp12	-0,690100014	0,0036
ENSMUSG00000045064	Zc2hc1c	0,769320011	0,0036
ENSMUSG00000022015	Tnfsf11	-4,959799767	0,00361
ENSMUSG00000027203	Dut	-1,297970057	0,00361
ENSMUSG00000024843	Chka	1,698899984	0,00362
ENSMUSG00000024045	Akap8	-0,612399995	0,00362
ENSMUSG00000026116	Tmem131	-0,92031002	0,00363
ENSMUSG00000028273	Pdlim5	-0,831019998	0,00364
ENSMUSG00000027086	Fastkd1	0,673810005	0,00364
ENSMUSG00000032604	Qars	-0,356770009	0,00365
ENSMUSG00000044788	Fads6	1,717290044	0,00366
ENSMUSG00000069255	Dusp22	0,939400017	0,00367
ENSMUSG00000040432	Ltb4r2	1,771039963	0,00367

ENSMUSG00000043789	Vwce	1,673410058	0,00368
ENSMUSG00000036432	Siah2	0,693170011	0,00369
ENSMUSG00000047822	Angptl8	2,298180103	0,00369
ENSMUSG00000035062	Zc4h2	-1,180230021	0,0037
ENSMUSG00000020844	Nxn	-1,018260002	0,0037
ENSMUSG00000035273	Hpse	-0,865260005	0,0037
ENSMUSG00000074676	Foxs1	-1,779189944	0,00371
ENSMUSG00000069844	Sco1	0,517939985	0,00371
ENSMUSG00000029060	Mib2	0,327650011	0,00371
ENSMUSG00000025350	Rdh5	1,266589999	0,00371
ENSMUSG00000055538	Zcchc24	0,769739985	0,00372
ENSMUSG00000014907	Naf1	-0,678499997	0,00373
ENSMUSG00000027668	Mfn1	0,393559992	0,00373
ENSMUSG00000026659	Dusp12	0,832220018	0,00373
ENSMUSG00000027901	Dennd2d	1,132629991	0,00373
ENSMUSG00000045822	Zswim3	-0,975120008	0,00374
ENSMUSG00000022026	Olfm4	-3,972009897	0,00374
ENSMUSG00000031285	Dcx	3,495399952	0,00374
ENSMUSG00000030643	Rab30	1,122689962	0,00375
ENSMUSG00000025950	Idh1	1,126979947	0,00375
ENSMUSG00000036687	Tmem184a	1,297719955	0,00377
ENSMUSG00000059436	Max	-0,756079972	0,00377
ENSMUSG00000060152	Pop5	1,320520043	0,00377
ENSMUSG00000044244	Il20rb	-1,514449954	0,00378
ENSMUSG00000027620	Rbm39	-0,38440001	0,00378
ENSMUSG00000057858	Fam204a	-0,776650012	0,00379
ENSMUSG00000030966	Trim21	0,934499979	0,00379
ENSMUSG00000040170	Fmo2	2,008719921	0,00379
ENSMUSG00000030483	Cyp2b10	2,446010113	0,00379
ENSMUSG00000022325	Pop1	-0,812259972	0,0038
ENSMUSG00000024526	Cidea	-2,271100044	0,0038
ENSMUSG00000044807	Zfp354c	-1,897469997	0,00382
ENSMUSG00000033502	Cdc14a	-1,166450024	0,00382
ENSMUSG00000025982	Sf3b1	-0,553489983	0,00382
ENSMUSG00000073792	Alg6	0,53648001	0,00382
ENSMUSG00000048330	Ric3	-1,549579978	0,00383
ENSMUSG00000071662	Polr2g	-1,249969959	0,00384
ENSMUSG00000058186	Zfp980	3,711980104	0,00384
ENSMUSG00000030127	Cops7a	0,319460005	0,00385
ENSMUSG00000074570	Cass4	-2,693660021	0,00386
ENSMUSG00000028393	Alad	1,584540009	0,00386
ENSMUSG00000026568	Mpc2	1,886849999	0,00386
ENSMUSG00000076617	Ighm	1,591609955	0,00387
ENSMUSG00000030431	Tmem238	1,736170053	0,00387
ENSMUSG00000038214	Bend3	-0,574750006	0,00389
ENSMUSG00000062593	Gm49339	-0,869759977	0,0039
ENSMUSG00000048347	Pcdhb18	-3,416610003	0,00391

ENSMUSG00000026617	Bpnt1	0,631410003	0,00391
ENSMUSG00000038084	Opa1	0,703589976	0,00391
ENSMUSG00000057074	Ces1g	1,757869959	0,00391
ENSMUSG00000031481	Tpte	2,358959913	0,00391
ENSMUSG00000096546	Smlr1	1,950369954	0,00392
ENSMUSG00000020435	Osbp2	-2,260740042	0,00393
ENSMUSG00000030824	Nucb1	0,497460008	0,00393
ENSMUSG00000035270	Impg2	1,698799968	0,00393
ENSMUSG00000041660	Bbox1	1,799119949	0,00394
ENSMUSG00000062949	Atp11c	1,34363997	0,00395
ENSMUSG00000015776	Med22	-0,557389975	0,00395
ENSMUSG00000020884	Asgr1	1,804370046	0,00396
ENSMUSG00000030528	Blm	-1,00909996	0,00396
ENSMUSG00000050122	Vwa3b	1,689579964	0,00397
ENSMUSG00000025260	Hsd17b10	1,207149982	0,00397
ENSMUSG00000062937	Mtap	-0,461080015	0,00397
ENSMUSG00000038403	Hfe2	1,675559998	0,00397
ENSMUSG00000039117	Taf4	-0,441689998	0,00398
ENSMUSG00000068747	Sort1	1,247949958	0,00398
ENSMUSG00000022365	Derl1	0,656470001	0,00398
ENSMUSG00000063704	Mapk15	1,404539943	0,00398
ENSMUSG00000078651	Aoc2	-1,52252996	0,00399
ENSMUSG00000028161	Ppp3ca	-0,839850008	0,004
ENSMUSG00000035561	Aldh1b1	1,764660001	0,004
ENSMUSG00000029032	Arhgef16	1,112040043	0,00401
ENSMUSG00000034724	Cnot6l	0,66049999	0,00401
ENSMUSG00000022849	Hspbap1	0,711629987	0,00402
ENSMUSG00000053774	Ubxn7	-0,546530008	0,00403
ENSMUSG00000048058	Ldlrad3	0,888080001	0,00403
ENSMUSG00000021388	Aspn	-4,283400059	0,00404
ENSMUSG00000068686	Cd59b	1,269279957	0,00404
ENSMUSG00000060560	Ces4a	2,714139938	0,00405
ENSMUSG00000038943	Prc1	-1,620489955	0,00405
ENSMUSG00000023367	Tmem176a	1,358260036	0,00406
ENSMUSG00000032068	Plet1	-1,42335999	0,00407
ENSMUSG00000032123	Dpagt1	0,563530028	0,00409
ENSMUSG00000037049	Smpd1	0,630599976	0,00409
ENSMUSG00000026944	Abca2	1,136669993	0,00409
ENSMUSG00000049422	Chchd10	1,71528995	0,0041
ENSMUSG00000036676	Tmtc3	-1,202859998	0,00411
ENSMUSG00000034997	Htr2a	-7,91091013	0,00412
ENSMUSG00000038024	Dennd4c	1,162299991	0,00413
ENSMUSG00000028576	Ift74	-0,884679973	0,00414
ENSMUSG00000033065	Pfkm	-0,601429999	0,00414
ENSMUSG00000025732	Mcrip2	1,50988996	0,00415
ENSMUSG00000028629	Exo5	-0,754559994	0,00417
ENSMUSG00000014601	Strip1	-0,617739975	0,00418

ENSMUSG00000078765	U2af1l4	0,407440007	0,00418
ENSMUSG00000033948	Zswim5	1,185559988	0,00418
ENSMUSG00000096370	Gm21992	-3,002599955	0,00419
ENSMUSG00000050017	Pitpnb	0,345459998	0,00419
ENSMUSG00000022372	Sla	-1,194460034	0,00419
ENSMUSG00000049092	Gpr137c	-2,884180069	0,0042
ENSMUSG00000031723	Txnl4b	0,943639994	0,0042
ENSMUSG00000035486	Plk5	1,599519968	0,0042
ENSMUSG00000001105	Ift20	0,795210004	0,00422
ENSMUSG00000031604	Msmo1	1,060230017	0,00422
ENSMUSG00000064741	Snord14a	-3,703380108	0,00423
ENSMUSG00000070371	Prss36	0,852289975	0,00424
ENSMUSG00000006235	Epor	1,273200035	0,00424
ENSMUSG00000027107	Chrna1	-12,24732018	0,00424
ENSMUSG00000060860	Ube2s	-1,207700014	0,00425
ENSMUSG00000046718	Bst2	1,703850031	0,00425
ENSMUSG00000038721	Hoxb7	-3,138390064	0,00425
ENSMUSG00000050321	Neto1	3,139209986	0,00427
ENSMUSG00000022092	Ppp3cc	-1,01225996	0,00427
ENSMUSG00000031441	Atp11a	-1,501189947	0,00428
ENSMUSG00000021127	Zfp36l1	1,093999982	0,00428
ENSMUSG00000022032	Scara5	-1,789610028	0,00429
ENSMUSG00000021367	Edn1	-1,468840003	0,00429
ENSMUSG00000025781	Atp5c1	0,703199983	0,0043
ENSMUSG00000016619	Nup50	-0,459060013	0,00431
ENSMUSG00000032579	Hemk1	1,041749954	0,00432
ENSMUSG00000003070	Efna2	-2,371629953	0,00432
ENSMUSG00000066861	Oas1g	1,516639948	0,00432
ENSMUSG00000060188	Cxcl17	1,97160995	0,00433
ENSMUSG00000020366	Mapk9	0,620079994	0,00434
ENSMUSG00000033730	Egr3	-5,824920177	0,00435
ENSMUSG00000031592	Pcm1	-1,001610041	0,00435
ENSMUSG00000029152	Ociad1	0,389530003	0,00435
ENSMUSG00000014177	Tvp23b	0,590160012	0,00435
ENSMUSG00000018387	Shroom1	1,102699995	0,00435
ENSMUSG00000057147	Dph6	-0,999719977	0,00435
ENSMUSG00000028845	Tekt2	-2,526560068	0,00436
ENSMUSG00000022587	Ly6e	1,217309952	0,00436
ENSMUSG00000039783	Kmo	1,641690016	0,00437
ENSMUSG00000000934	Top1mt	0,591400027	0,00437
ENSMUSG00000046679	C87436	0,394829988	0,00438
ENSMUSG00000036611	Eepd1	1,114109993	0,00438
ENSMUSG00000003934	Efnb3	-3,958529949	0,00439
ENSMUSG00000037316	Bag4	0,521539986	0,00439
ENSMUSG00000013663	Pten	0,60532999	0,0044
ENSMUSG00000025525	Apool	0,873870015	0,0044
ENSMUSG00000020954	Strn3	-0,449070007	0,0044

ENSMUSG00000063450	Syne2	-1,275650024	0,00441
ENSMUSG00000025532	Crcp	0,527249992	0,00441
ENSMUSG00000061859	Patj	1,15328002	0,00441
ENSMUSG00000025983	Ccdc150	-4,418550014	0,00441
ENSMUSG00000027935	Rab13	-0,879320025	0,00442
ENSMUSG00000048707	Tprn	-1,128280044	0,00443
ENSMUSG00000048109	Rbm15	-0,657509983	0,00443
ENSMUSG00000066191	Anks6	-1,481480002	0,00445
ENSMUSG00000010914	Pdhx	0,665279984	0,00445
ENSMUSG00000075229	Ccdc58	1,096480012	0,00445
ENSMUSG00000049728	Zfp668	-0,787090003	0,00446
ENSMUSG00000035864	Syt1	1,454419971	0,00447
ENSMUSG00000040498	Igsf23	1,773900032	0,00447
ENSMUSG00000027487	Cdk5rap1	0,79539001	0,00447
ENSMUSG00000065265	Gm23455	-1,281509995	0,00448
ENSMUSG00000024600	Slc27a6	-2,764800072	0,00449
ENSMUSG00000018849	Wwc1	0,884679973	0,00449
ENSMUSG00000031480	Thsd1	-0,675320029	0,0045
ENSMUSG00000070811	Sult2a2	3,184580088	0,0045
ENSMUSG00000024350	Dnajc18	-0,511900008	0,0045
ENSMUSG00000033356	Pus7l	-0,842570007	0,00451
ENSMUSG00000032109	Nlrx1	0,548879981	0,00451
ENSMUSG00000010609	Psen2	1,576290011	0,00451
ENSMUSG00000048307	Ankrd46	0,708790004	0,00452
ENSMUSG00000019302	Atp6v0a1	0,642560005	0,00452
ENSMUSG00000038074	Fkbp14	-0,709510028	0,00453
ENSMUSG00000084497	Gm22107	-1,940709949	0,00453
ENSMUSG00000017009	Sdc4	0,815559983	0,00453
ENSMUSG00000004056	Akt2	0,461199999	0,00454
ENSMUSG00000054604	Cggbp1	0,245529994	0,00455
ENSMUSG00000074749	Kiz	0,548189998	0,00455
ENSMUSG00000015214	Mtmr1	0,879939973	0,00455
ENSMUSG00000003273	Car11	-2,110029936	0,00456
ENSMUSG00000025496	Drd4	-4,94382	0,00457
ENSMUSG00000052942	Glis3	-1,761849999	0,00457
ENSMUSG00000091803	Cox16	0,883840024	0,00458
ENSMUSG00000028796	Phc2	-1,026859999	0,00458
ENSMUSG00000001542	Ell2	0,68434	0,00458
ENSMUSG00000094724	Rnaset2b	1,616700053	0,00459
ENSMUSG00000047875	Gpr157	0,988900006	0,0046
ENSMUSG00000030987	Stim1	1,530719995	0,0046
ENSMUSG00000038533	Cbfa2t2	-0,696449995	0,00461
ENSMUSG00000044708	Kcnj10	1,781200051	0,00461
ENSMUSG00000028261	Ndufaf4	0,823930025	0,00461
ENSMUSG00000029195	Klb	1,825270057	0,00462
ENSMUSG00000052087	Rgs14	-1,44133997	0,00463
ENSMUSG00000058258	Idi1	1,409150004	0,00463

ENSMUSG00000047649	Cd3eap	-0,680570006	0,00465
ENSMUSG00000032417	Rwdd2a	-1,471840024	0,00466
ENSMUSG00000015342	Xk	1,173930049	0,00467
ENSMUSG00000029062	Cdk11b	-0,431989998	0,00467
ENSMUSG00000061100	Retnla	-6,428100109	0,00468
ENSMUSG00000042436	Mfap4	-1,823609948	0,00471
ENSMUSG00000037730	Mynn	-0,664290011	0,00471
ENSMUSG00000026463	Atp2b4	-1,200970054	0,00472
ENSMUSG00000044390	Tigd3	-2,292949915	0,00472
ENSMUSG00000074582	Arfgef2	0,944660008	0,00472
ENSMUSG00000022982	Sod1	1,513260007	0,00473
ENSMUSG00000025856	Pdgfa	-1,241870046	0,00473
ENSMUSG00000022108	Itm2b	0,774999976	0,00473
ENSMUSG00000021263	Degs2	-1,563830018	0,00474
ENSMUSG00000022978	Mis18a	-1,067819953	0,00474
ENSMUSG00000026283	Ing5	-0,546570003	0,00475
ENSMUSG00000043419	Rnf227	-1,37785995	0,00476
ENSMUSG00000029472	Anapc5	-0,451139987	0,00476
ENSMUSG00000010358	Ifi35	1,037510037	0,00476
ENSMUSG00000028832	Stmn1	-1,456689954	0,00478
ENSMUSG00000036040	Adamtsl2	-1,301800013	0,00478
ENSMUSG00000031971	Ccsap	-1,576990008	0,00479
ENSMUSG00000033634	Nat8f2	1,666509986	0,0048
ENSMUSG00000017299	Dnttip1	-0,432300001	0,00481
ENSMUSG00000035696	Rnf38	-1,02718997	0,00483
ENSMUSG00000067825	Pex26	0,621150017	0,00483
ENSMUSG00000064302	Clasp1	-0,981440008	0,00483
ENSMUSG00000022811	Zfp148	0,580879986	0,00484
ENSMUSG00000014355	Anapc1	-0,856249988	0,00485
ENSMUSG00000030232	Aebp2	-0,516839981	0,00485
ENSMUSG00000026784	Pdss1	-0,621159971	0,00486
ENSMUSG00000026601	Axdnd1	-5,381720066	0,00488
ENSMUSG00000021038	Vipas39	-0,617730021	0,00489
ENSMUSG00000030317	Timp4	-4,596600056	0,00489
ENSMUSG00000004270	Lpcat3	0,889810026	0,00489
ENSMUSG00000026971	Itgb6	-2,682509899	0,00491
ENSMUSG00000015568	Lpl	1,718140006	0,00491
ENSMUSG00000060477	Irak2	0,562579989	0,00492
ENSMUSG00000003299	Mrpl4	0,699469984	0,00492
ENSMUSG00000020010	Vnn3	1,79629004	0,00493
ENSMUSG00000025188	Hps1	-0,49109	0,00494
ENSMUSG00000031246	Sh3bgrl	0,564689994	0,00494
ENSMUSG00000034674	Tdg	-0,834940016	0,00495
ENSMUSG00000028964	Park7	0,930180013	0,00495
ENSMUSG00000052572	Dlg2	-3,245460033	0,00496
ENSMUSG00000027804	Ppid	-0,631190002	0,00496
ENSMUSG00000022781	Pak2	-0,56607002	0,00497

ENSMUSG00000073889	Il11ra1	1,186130047	0,00497
ENSMUSG00000038425	Poli	-0,820630014	0,00499
ENSMUSG00000068394	Cep152	-1,133149981	0,005
ENSMUSG00000022462	Slc38a2	-0,844139993	0,005
ENSMUSG00000035914	Cd276	-0,755959988	0,005
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ENSMUSG00000072662	Mansc4	1,891649961	0,00501
ENSMUSG00000089943	Ugt1a5	2,579849958	0,00501
ENSMUSG00000022178	Ajuba	-0,788869977	0,00501
ENSMUSG00000038777	Sema6c	-1,341619968	0,00502
ENSMUSG00000036959	Bcorl1	-0,860050023	0,00502
ENSMUSG00000070462	Tlnrd1	-0,679350019	0,00503
ENSMUSG00000037999	Arap2	0,845809996	0,00503
ENSMUSG00000025916	Ppp1r42	2,095860004	0,00504
ENSMUSG00000028825	Rhd	-3,106529951	0,00504
ENSMUSG00000041607	Mbp	-1,435160041	0,00504
ENSMUSG00000042121	Ssh1	-0,74713999	0,00504
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ENSMUSG00000022443	Myh9	-1,366440058	0,00506
ENSMUSG00000046096	Mosmo	-0,581449986	0,00507
ENSMUSG00000004661	Arid3b	-0,890299976	0,00509
ENSMUSG00000043418	Lrit2	2,061130047	0,00509
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ENSMUSG00000069300	Hist1h2bj	-2,266619921	0,00513
ENSMUSG00000061898	Rbak	-0,711470008	0,00513
ENSMUSG00000018841	Rad51d	0,633979976	0,00513
ENSMUSG00000047904	Sstr2	1,971439958	0,00513
ENSMUSG00000074182	Znhit6	-0,551400006	0,00515
ENSMUSG00000045103	Dmd	1,101719975	0,00515
ENSMUSG00000016763	Scube1	-1,949470043	0,00517
ENSMUSG00000031504	Rab20	0,861060023	0,00518
ENSMUSG00000033629	Hacd3	0,759019971	0,0052
ENSMUSG00000009563	Tor2a	0,637969971	0,00521
ENSMUSG00000040412	5330417C22Rik	1,916710019	0,00521
ENSMUSG00000068762	Gstm6	1,495679975	0,00522
ENSMUSG00000035021	Baz1a	-0,876739979	0,00523
ENSMUSG00000036622	Atp13a2	0,42513001	0,00524
ENSMUSG00000040061	Plcb2	-0,924589992	0,00524
ENSMUSG00000020694	Tlk2	-0,404339999	0,00525
ENSMUSG00000032841	Prr5l	1,43441999	0,00526
ENSMUSG00000055148	Klf2	-1,543470025	0,00527
ENSMUSG00000024269	Tpgs2	-0,882380009	0,00527
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ENSMUSG00000022142	Nup155	-0,738319993	0,00528

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ENSMUSG00000037434	Slc30a1	0,961709976	0,00529
ENSMUSG00000019732	Calr3	1,14233005	0,00529
ENSMUSG00000037636	Slc25a43	-1,883129954	0,0053
ENSMUSG00000026238	Ptma	-0,698949993	0,00533
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ENSMUSG00000076749	Tcrg-C1	-4,02971983	0,00535
ENSMUSG00000028865	Cd164l2	-3,368330002	0,00537
ENSMUSG00000055652	Klhl25	0,658479989	0,00537
ENSMUSG00000039304	Tnfsf10	1,517259955	0,0054
ENSMUSG00000029279	Brdt	0,821799994	0,0054
ENSMUSG00000052681	Rap1b	-0,730260015	0,00544
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ENSMUSG00000044629	Cnrip1	-1,231189966	0,00546
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ENSMUSG00000075224	Lrrc55	-3,181999922	0,00548
ENSMUSG00000069272	Hist1h2ae	-1,644379973	0,00548
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ENSMUSG00000037833	Sh2d4b	-3,158400059	0,00551
ENSMUSG00000026107	Nabp1	-0,693419993	0,00553
ENSMUSG00000018909	Arrb1	-1,114850044	0,00553
ENSMUSG00000031483	Erlin2	-0,668229997	0,00554
ENSMUSG00000033054	Npat	-0,86372	0,00555
ENSMUSG00000073471	Rsph3a	0,589039981	0,00555
ENSMUSG00000033857	Engase	1,008170009	0,00555
ENSMUSG00000064370	mt-Cytb	0,785300016	0,00556
ENSMUSG00000028792	Ak2	0,928979993	0,00559
ENSMUSG00000040034	Nup43	-0,723330021	0,0056
ENSMUSG00000024969	Mark2	-0,741410017	0,0056
ENSMUSG00000005470	Asf1b	-1,709010005	0,00561
ENSMUSG00000041737	Tmem45b	2,254359961	0,00561
ENSMUSG00000009681	Bcr	-0,645280004	0,00562
ENSMUSG00000028232	Tmem68	-0,424970001	0,00562
ENSMUSG00000048581	E130311K13Rik	0,914200008	0,00562
ENSMUSG00000031295	Phka2	0,711310029	0,00562
ENSMUSG00000034353	Ramp1	-1,519019961	0,00563
ENSMUSG00000034832	Tet3	-0,870540023	0,00563
ENSMUSG00000028255	Clca1	-6,648900032	0,00564
ENSMUSG00000046792	Zfp787	0,645860016	0,00564
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ENSMUSG00000019779	Frk	-0,86996001	0,00567
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ENSMUSG00000031360	Ctps2	0,705070019	0,00568

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ENSMUSG00000052821	Cysltr1	-1,391049981	0,00572
ENSMUSG00000024431	Nr3c1	0,976549983	0,00572
ENSMUSG00000020216	Jsrp1	-5,377359867	0,00573
ENSMUSG00000089694	Nat8f7	3,462949991	0,00573
ENSMUSG00000031371	Haus7	0,749260008	0,00574
ENSMUSG00000041426	Hibch	1,181609988	0,00574
ENSMUSG00000033295	Ptprf	1,084139943	0,00575
ENSMUSG00000047710	Champ1	-0,554019988	0,00575
ENSMUSG00000002233	Rhoc	-1,248180032	0,00577
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ENSMUSG00000024132	Eci1	1,05625999	0,00577
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ENSMUSG00000091648	C2cd4d	1,910599947	0,00578
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ENSMUSG00000041444	Arhgap32	-0,994109988	0,0058
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ENSMUSG00000029204	Rhoh	-1,409340024	0,00581
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ENSMUSG00000046826	Fam187b	1,617939949	0,00583
ENSMUSG00000048677	Tpcn2	-0,742649972	0,00586
ENSMUSG00000091896	Ube2d2a	-0,500699997	0,00587
ENSMUSG00000030306	Tmtc1	-1,577859998	0,00587
ENSMUSG00000021235	Coq6	0,516099989	0,00588
ENSMUSG00000055003	Lrtm2	2,314219952	0,00588
ENSMUSG00000058799	Nap1l1	-0,766229987	0,0059
ENSMUSG00000028626	Col9a2	-3,757329941	0,00591
ENSMUSG00000042589	Cux2	2,908309937	0,00592
ENSMUSG00000089876	Tmem102	1,347990036	0,00593
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ENSMUSG00000029163	Emilin1	-0,72744	0,00594
ENSMUSG00000023806	Rsph3b	0,820659995	0,00594
ENSMUSG00000064901	Snora21	-3,952950001	0,00595
ENSMUSG00000027288	Zfp106	-0,637350023	0,00595
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ENSMUSG00000043155	Hpdl	-2,198940039	0,00597
ENSMUSG00000027015	Cybrd1	-2,629070044	0,00597
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ENSMUSG00000026994	Galnt3	-1,487499952	0,00599
ENSMUSG00000037197	Rbm17	-0,65061003	0,00599
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ENSMUSG00000056211	R3hdm1	-0,602620006	0,00601
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ENSMUSG00000093904	Tomm20	-0,699379981	0,00602
ENSMUSG00000044595	Dnd1	-1,142160058	0,00603
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ENSMUSG00000051730	Mettl5	0,828890026	0,00604
ENSMUSG00000027284	Cdan1	-0,375939995	0,00605
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ENSMUSG00000047371	Zfp768	0,509410024	0,00608
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ENSMUSG00000064326	Siva1	-1,539899945	0,0061
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ENSMUSG00000022102	Dok2	-1,111789942	0,00613
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ENSMUSG00000045917	Tmem268	0,677349985	0,00622
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ENSMUSG00000063077	Kif1b	0,961109996	0,00625
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ENSMUSG00000024097	Srsf7	-0,667990029	0,0063
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ENSMUSG00000055994	Nod2	-1,462520003	0,00631
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ENSMUSG00000022769	Sdf2l1	1,210919976	0,00632
ENSMUSG00000032725	Folr2	1,237190008	0,00633

ENSMUSG00000058498	Rnf207	-5,262660027	0,00636
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ENSMUSG00000054435	Gimap4	0,919650018	0,00645
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ENSMUSG00000073633	Fbxo36	0,870159984	0,00648
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ENSMUSG00000015846	Rxra	1,054919958	0,0065
ENSMUSG00000029428	Stx2	-0,588050008	0,00651
ENSMUSG00000079110	Capn3	1,891139984	0,00651
ENSMUSG00000025544	Tm9sf2	0,418769985	0,00652
ENSMUSG00000021676	Iqgap2	1,57407999	0,00654
ENSMUSG00000051279	Gdf6	-1,660240054	0,00657
ENSMUSG00000045314	Sowahb	1,20886004	0,00657
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ENSMUSG00000079259	Trim71	-3,45182991	0,00661
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ENSMUSG00000020777	Acox1	1,220549941	0,00661
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ENSMUSG00000003269	Cyth2	-0,993049979	0,00662
ENSMUSG00000024191	Bnip1	0,889450014	0,00662
ENSMUSG00000028461	Ccdc107	1,455819964	0,00662
ENSMUSG00000030685	Kctd13	-0,677760005	0,00666
ENSMUSG00000037849	Ifi206	-2,952069998	0,00666
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ENSMUSG00000041632	Mrps27	0,538320005	0,00677
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ENSMUSG00000048458	Inka2	-1,623059988	0,00679
ENSMUSG00000022269	March11	-4,521090031	0,0068
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ENSMUSG00000024687	Osbp	0,58743	0,00683
ENSMUSG00000020926	Adam11	1,463240027	0,00684
ENSMUSG00000032860	P2ry2	0,74962002	0,00684
ENSMUSG00000003721	Insig2	1,452200055	0,00685
ENSMUSG00000040350	Trim7	1,092319965	0,00686
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ENSMUSG00000020064	Herc4	0,467269987	0,00702

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ENSMUSG00000042476	Abcb4	1,513900042	0,00703
ENSMUSG00000024798	Htr7	-3,914400101	0,00707
ENSMUSG00000026078	Pdcl3	-0,902660012	0,00707
ENSMUSG00000024896	Minpp1	0,601710021	0,00707
ENSMUSG00000003355	Fkbp11	1,362210035	0,00707
ENSMUSG00000022817	Itgb5	0,456230015	0,00709
ENSMUSG00000052253	Zfp622	-0,583039999	0,00709
ENSMUSG00000021391	Cenpp	-1,007840037	0,0071
ENSMUSG00000040017	Saa4	1,708799958	0,00711
ENSMUSG00000040722	Scamp5	0,819440007	0,00712
ENSMUSG00000022820	Ndufb4	1,125779986	0,00712
ENSMUSG00000038175	Mylip	0,749289989	0,00714
ENSMUSG00000058638	Zfp110	0,466670007	0,00714
ENSMUSG00000040380	Cbln3	1,709990025	0,00716
ENSMUSG00000032262	Elovl4	-6,638500214	0,00716
ENSMUSG00000026158	Ogfrl1	0,797550023	0,00716
ENSMUSG00000045007	Tubg2	-1,872879982	0,00718
ENSMUSG00000070063	Snora33	-1,856400013	0,00719
ENSMUSG00000030629	Zfand6	0,602110028	0,00719
ENSMUSG00000024617	Camk2a	-2,39312005	0,0072
ENSMUSG00000057530	Ece1	0,600189984	0,0072
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ENSMUSG00000031070	Mrgprf	-2,600810051	0,00723
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ENSMUSG00000033760	Rbm4b	0,426149994	0,00725
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ENSMUSG00000019996	Map7	1,290169954	0,00725
ENSMUSG00000001156	Mxd1	-0,676150024	0,00726
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ENSMUSG00000056260	Lrif1	-0,491270006	0,00735
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ENSMUSG00000021615	Xrcc4	0,808809996	0,00747
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ENSMUSG00000035171	1110059E24Rik	0,674170017	0,00798
ENSMUSG00000035126	Wdr78	-1,985569954	0,00799
ENSMUSG00000052713	Zfp608	-1,359400034	0,00799
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ENSMUSG00000091119	Ccdc152	1,510640025	0,00832
ENSMUSG00000045180	Shroom2	1,002410054	0,00833
ENSMUSG00000036893	Ehmt1	-0,926940024	0,00834
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ENSMUSG00000068039	Tcp1	-0,282799989	0,00839
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ENSMUSG00000021922	Itih4	1,566869974	0,00843
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ENSMUSG00000068663	Clec16a	0,873319983	0,00848
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ENSMUSG00000038500	Prr3	-0,896830022	0,00871
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ENSMUSG00000049588	Ccdc69	1,041350007	0,00876
ENSMUSG00000024400	Wdr33	-0,336510003	0,00876
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ENSMUSG00000028809	Srrm1	-0,678349972	0,00901
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ENSMUSG00000026849	Tor1a	0,645669997	0,00986
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ENSMUSG00000039202	Abhd2	0,766089976	0,01037
ENSMUSG00000030541	Idh2	0,52621001	0,01043
ENSMUSG00000035235	Trim13	-0,633440018	0,01043
ENSMUSG00000051037	Zfp455	0,854799986	0,01043
ENSMUSG00000067889	Sptbn2	1,495390058	0,01044
ENSMUSG00000021552	Gkap1	0,560580015	0,01046
ENSMUSG00000015711	Prune1	-0,439170003	0,01046
ENSMUSG00000020521	Rnft1	0,503719985	0,01047
ENSMUSG00000072664	Ugt3a1	1,925079942	0,01048
ENSMUSG00000022407	Adsl	-0,447210014	0,01048
ENSMUSG00000028830	AU040320	0,583980024	0,01048
ENSMUSG00000051435	Fhad1	1,185490012	0,01049
ENSMUSG00000071176	Arhgef10	-1,149479985	0,01052
ENSMUSG00000049760	2410015M20Rik	0,80892998	0,01052

ENSMUSG00000027474	Ccm2l	0,858169973	0,01052
ENSMUSG00000051378	Kif18b	-2,026760101	0,01054
ENSMUSG00000018761	Mpdu1	1,035529971	0,01054
ENSMUSG00000042520	Ubap2l	-0,947860003	0,01056
ENSMUSG00000023393	Slc17a9	1,085590005	0,01056
ENSMUSG00000028049	Scamp3	-0,282240003	0,01057
ENSMUSG00000058230	Arhgap35	0,965610027	0,01057
ENSMUSG00000015880	Ncapg	-1,886250019	0,01062
ENSMUSG00000037921	Ddx60	1,276360035	0,01063
ENSMUSG00000063524	Eno1	-0,794619977	0,01064
ENSMUSG00000075707	Dio3	-3,024950027	0,01064
ENSMUSG00000039826	Trub2	-0,538600028	0,01064
ENSMUSG00000021573	Tppp	1,383810043	0,01064
ENSMUSG00000025314	Ptprj	0,85631001	0,01065
ENSMUSG00000034206	Polq	-1,740399957	0,01066
ENSMUSG00000019883	Echdc1	1,97634995	0,01067
ENSMUSG00000030703	Gdpd3	-1,389680028	0,01067
ENSMUSG00000022999	Lmbr1l	-0,623589993	0,0107
ENSMUSG00000011832	Evi5l	-0,842939973	0,01072
ENSMUSG00000002633	Shh	3,326740026	0,01072
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ENSMUSG00000006276	Eps15l1	-0,803229988	0,01076
ENSMUSG00000019297	Nop9	-0,275759995	0,01077
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ENSMUSG00000022218	Tgm1	1,150699973	0,01079
ENSMUSG00000028969	Cdk5	-0,762430012	0,01082
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ENSMUSG00000021795	Sftpd	-0,904980004	0,01096
ENSMUSG00000024027	Glp1r	-8,388750076	0,01097
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ENSMUSG00000029446	Psph	0,557730019	0,01099
ENSMUSG00000002129	Sf3a1	-0,64279002	0,01101
ENSMUSG00000023045	Soat2	1,124259949	0,01103
ENSMUSG00000025037	Maoa	-0,71638	0,01104
ENSMUSG00000048280	Zfp738	-0,738409996	0,01104
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ENSMUSG00000029249	Rest	-0,587890029	0,01105
ENSMUSG00000030876	Mettl9	0,593500018	0,01105
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ENSMUSG00000019927	Ube2d1	-0,790009975	0,01109

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ENSMUSG00000032329	Hmg20a	-0,664340019	0,0111
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ENSMUSG00000034795	Ccdc122	0,717159986	0,01111
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ENSMUSG00000015714	Cers2	0,688049972	0,01119
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ENSMUSG00000044296	Zfp879	2,148479939	0,01132
ENSMUSG00000036112	Metap2	-0,507459998	0,01133
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ENSMUSG00000084128	Esrp2	1,438580036	0,01137
ENSMUSG00000054079	Utp18	-0,571219981	0,01137
ENSMUSG00000027671	Actl6a	-0,632830024	0,01139
ENSMUSG00000042211	Fbxo38	-0,450199991	0,01139
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ENSMUSG00000027259	Adal	0,988810003	0,01152
ENSMUSG00000019889	Ptprk	0,499790013	0,01153
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ENSMUSG00000047604	Frat2	-1,021639943	0,01157
ENSMUSG00000028793	Rnf19b	-0,458359987	0,01157
ENSMUSG00000000805	Car4	-6,17553997	0,01158
ENSMUSG00000020530	Ggnbp2	0,321179986	0,01158
ENSMUSG00000034300	Fam53c	-0,905659974	0,01161
ENSMUSG00000005683	Cs	-0,430209994	0,01161
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ENSMUSG00000033590	Myo5c	-2,088670015	0,01162
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ENSMUSG00000064351	mt-Co1	0,900659978	0,01165
ENSMUSG00000032854	Ugt8a	-2,434109926	0,01166

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ENSMUSG00000022299	Slc25a32	0,679400027	0,01171
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ENSMUSG00000000631	Myo18a	0,779500008	0,0118
ENSMUSG00000028333	Anp32b	-0,68246001	0,01182
ENSMUSG00000027966	Col11a1	-10,85375023	0,01184
ENSMUSG00000023781	Hes7	-2,970249891	0,01185
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ENSMUSG00000033961	Zfp446	0,637160003	0,01191
ENSMUSG00000039577	Nphp4	-2,510570049	0,01191
ENSMUSG00000065362	Gm24411	-3,051800013	0,01192
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ENSMUSG00000022389	Tef	1,212389946	0,01195
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ENSMUSG00000024856	Cdk2ap2	0,599799991	0,01199
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ENSMUSG00000034160	Ogt	-0,923609972	0,01203
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ENSMUSG00000003810	Mast2	-0,639940023	0,01226
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ENSMUSG00000028402	Mpdz	0,644649982	0,01232
ENSMUSG00000039461	Tcta	0,521510005	0,01234
ENSMUSG00000054728	Phactr1	-1,249150038	0,01235
ENSMUSG00000034022	Cpsf1	0,348199993	0,01238
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ENSMUSG00000032840	2410131K14Rik	-0,455179989	0,01246
ENSMUSG00000032046	Abhd12	-0,347030014	0,01246
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ENSMUSG00000037649	H2-DMa	-1,213660002	0,01249
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ENSMUSG00000055681	Cope	0,717390001	0,01267
ENSMUSG00000026102	Inpp1	0,871930003	0,01267
ENSMUSG00000063929	Cyp4a32	1,591179967	0,01268
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ENSMUSG00000040703	Cyp2s1	-2,194950104	0,01278
ENSMUSG00000061759	Armt1	0,396479994	0,01279
ENSMUSG00000060716	Plekhh1	-2,556139946	0,0128
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ENSMUSG00000069237	Fam8a1	0,48179999	0,0129
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ENSMUSG00000020368	Canx	0,345869988	0,01291
ENSMUSG00000026167	Wnt10a	-4,525129795	0,01291
ENSMUSG00000038578	Susd1	0,722069979	0,01292
ENSMUSG00000021285	Ppp1r13b	0,573899984	0,01293
ENSMUSG00000039842	Mcph1	-0,719900012	0,01294
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ENSMUSG00000025497	Cdhr5	1,574769974	0,01302
ENSMUSG00000044505	Lingo4	2,029350042	0,01304
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ENSMUSG00000030666	Calcb	-5,443329811	0,01306
ENSMUSG00000032563	Mrpl3	-0,372040004	0,01306
ENSMUSG00000045817	Zfp36l2	-0,994480014	0,01311
ENSMUSG00000027944	Hax1	0,700869977	0,01312
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ENSMUSG00000003484	Cyp4f18	-1,445350051	0,01325
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ENSMUSG00000025816	Sec61a2	-1,841539979	0,01331
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ENSMUSG00000040016	Ptger3	-2,937880039	0,01361
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ENSMUSG00000062981	Mrpl42	0,628970027	0,01374
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ENSMUSG00000034403	Pja1	0,280900002	0,01376
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ENSMUSG00000070883	Ccdc173	-1,076779962	0,01489
ENSMUSG00000023484	Prph	-1,644500017	0,0149
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ENSMUSG00000033342	Plppr5	2,42366004	0,02039
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ENSMUSG00000033208	S100b	-2,815969944	0,02044
ENSMUSG00000033762	Recql4	-1,337560058	0,02045
ENSMUSG00000026197	Zfand2b	0,934930027	0,02045
ENSMUSG00000002908	Kcnn1	0,750500023	0,02048
ENSMUSG00000030720	Cln3	-0,454129994	0,02049
ENSMUSG00000036036	Zfp57	-1,32167995	0,02051
ENSMUSG00000064390	Rnu73b	-2,511420012	0,02055
ENSMUSG00000056487	Mettl7a2	2,734479904	0,02056
ENSMUSG00000031095	Cul4b	-0,334850013	0,02057
ENSMUSG00000073598	1700066B19Rik	-2,04144001	0,02059
ENSMUSG00000035356	Nfkbiz	-0,818880022	0,02062
ENSMUSG00000044881	Coa4	0,667150021	0,02062
ENSMUSG00000028567	Txndc12	0,679889977	0,02062
ENSMUSG00000027326	Knl1	-1,769330025	0,02069
ENSMUSG00000046994	Mars2	-0,813009977	0,02074
ENSMUSG00000092212	Slc22a13b-ps	-1,564599991	0,02081
ENSMUSG00000034488	Edil3	-9,623259544	0,02086
ENSMUSG00000026227	2810459M11Rik	1,376440048	0,02089
ENSMUSG00000030094	Xpc	0,396640003	0,02092
ENSMUSG00000022012	Enox1	-6,198979855	0,02094
ENSMUSG00000025812	Pard3	0,624890029	0,02094
ENSMUSG00000020840	Blmh	0,717480004	0,02095
ENSMUSG00000010307	Tmem86a	0,949509978	0,02106
ENSMUSG00000021749	Oit1	2,352040052	0,02106
ENSMUSG00000041308	Sntb2	-1,190569997	0,02109
ENSMUSG00000029201	Ugdh	0,723240018	0,02111
ENSMUSG00000022296	Baalc	-6,859049797	0,02113
ENSMUSG00000029265	Dr1	-0,263509989	0,02113
ENSMUSG00000070390	Nlrp1b	-1,461689949	0,02114
ENSMUSG00000027171	Prrg4	-2,448029995	0,02118
ENSMUSG00000031521	Aga	0,607949972	0,02121
ENSMUSG00000015093	Clic3	1,841259956	0,02123
ENSMUSG00000061535	C1qtnf7	-1,47755003	0,02128
ENSMUSG00000026773	Pfkfb3	-1,223180056	0,0213
ENSMUSG00000071516	Hist1h2ai	-2,64861989	0,02135
ENSMUSG00000021720	Rnf180	-1,687039971	0,02135
ENSMUSG00000029814	Igf2bp3	-2,783159971	0,02136
ENSMUSG00000068114	Ccdc134	-0,612119973	0,02139
ENSMUSG00000040464	Gtpbp10	0,261810005	0,02141
ENSMUSG00000048967	Yjefn3	-1,393409967	0,02143
ENSMUSG00000050132	Sarm1	-1,563500047	0,02148
ENSMUSG00000032333	Stoml1	-0,775659978	0,02148
ENSMUSG00000041809	Efhc1	-1,561740041	0,0215
ENSMUSG00000033386	Frrs1	-0,443729997	0,0215
ENSMUSG00000051439	Cd14	-1,322299957	0,02151
ENSMUSG00000070284	Gmppb	0,689530015	0,02151
ENSMUSG00000034382	AI661453	1,050989985	0,02151

ENSMUSG00000059811	Atl2	0,720109999	0,02154
ENSMUSG00000045962	Wnk1	-0,661090016	0,02155
ENSMUSG00000029426	Scarb2	0,677380025	0,02155
ENSMUSG00000055150	Zfp78	1,079560041	0,02156
ENSMUSG00000033111	3830406C13Rik	0,516390026	0,02157
ENSMUSG00000032194	Kank2	0,556020021	0,02168
ENSMUSG00000024074	Crim1	-0,445439994	0,02169
ENSMUSG00000020787	P2rx1	-2,178859949	0,0217
ENSMUSG00000071715	Ncf4	-0,885429978	0,0217
ENSMUSG00000025877	Hk3	0,659099996	0,02173
ENSMUSG00000030930	Chst15	-0,602869987	0,02174
ENSMUSG00000056091	St3gal5	0,914929986	0,02174
ENSMUSG00000017548	Suz12	-0,436549991	0,02175
ENSMUSG00000032667	Pon2	0,506150007	0,02175
ENSMUSG00000028236	Sdr16c5	3,656820059	0,02176
ENSMUSG00000027475	Kif3b	-0,524290025	0,02179
ENSMUSG00000062929	Cfl2	-0,401620001	0,02183
ENSMUSG00000039747	Orai2	-0,935140014	0,02187
ENSMUSG00000020549	Elac2	0,363620013	0,02189
ENSMUSG00000028975	Pex14	0,46746999	0,02201
ENSMUSG00000002812	Flii	-0,641520023	0,02203
ENSMUSG00000039285	Azi2	0,333279997	0,02204
ENSMUSG00000079235	Ccdc13	-3,367150068	0,02205
ENSMUSG00000034327	Kctd9	-0,469949991	0,02205
ENSMUSG00000058709	Egln2	0,781729996	0,02205
ENSMUSG00000023087	Noct	-1,421569943	0,02206
ENSMUSG00000006269	Atp6v1b1	-2,675349951	0,02207
ENSMUSG00000020361	Hspa4	-0,298040003	0,02207
ENSMUSG00000028238	Atp6v0d2	1,133069992	0,02207
ENSMUSG00000024487	Yipf5	0,376960009	0,02212
ENSMUSG00000010760	Phlda2	1,199470043	0,02214
ENSMUSG00000029490	Mfsd7a	0,827759981	0,02214
ENSMUSG00000034059	Ypel4	1,108129978	0,02218
ENSMUSG00000019984	Med23	-0,624660015	0,0222
ENSMUSG00000030779	Rbbp6	-0,409480006	0,02221
ENSMUSG00000046352	Gjb2	1,352200031	0,02223
ENSMUSG00000067149	Jchain	1,443040013	0,02223
ENSMUSG00000052212	Cd177	-2,519099951	0,02224
ENSMUSG00000061143	Maml3	-0,965610027	0,02228
ENSMUSG00000096225	Lhx8	-11,79518986	0,0223
ENSMUSG00000051586	Mical3	-0,655369997	0,02236
ENSMUSG00000059409	Ppp2r5d	-0,395480007	0,02236
ENSMUSG00000032215	Rsl24d1	-0,706160009	0,02237
ENSMUSG00000029370	Rassf6	0,733640015	0,02244
ENSMUSG00000016552	Foxred2	-1,383290052	0,02246
ENSMUSG00000055745	Rtl6	-1,510319948	0,02249
ENSMUSG00000077575	Gm24888	-1,524309993	0,02251

ENSMUSG00000036197	Gxylt1	-0,469940007	0,02251
ENSMUSG00000032549	Rab6b	-1,058009982	0,02254
ENSMUSG00000013766	Ly6g6e	1,844370008	0,02254
ENSMUSG00000041548	Hspb8	0,800109982	0,02256
ENSMUSG00000020696	Rffl	0,981679976	0,02259
ENSMUSG00000019577	Pdk4	-1,203979969	0,0226
ENSMUSG00000045671	Spred2	-0,985920012	0,0226
ENSMUSG00000038046	Mrm3	0,70043999	0,02261
ENSMUSG00000025138	Sirt7	0,380510002	0,02262
ENSMUSG00000061601	Pclo	1,342990041	0,02263
ENSMUSG00000034032	Rpap1	-0,581669986	0,02265
ENSMUSG00000032594	Ip6k1	0,232580006	0,02267
ENSMUSG00000006717	Acot13	0,801419973	0,0227
ENSMUSG00000051855	Mest	-1,336740017	0,02273
ENSMUSG00000042251	Pm20d1	1,441990018	0,02274
ENSMUSG00000040771	Oard1	0,844299972	0,02276
ENSMUSG00000006675	P4htm	-1,459100008	0,02278
ENSMUSG00000089417	Gm22009	-1,928660035	0,0228
ENSMUSG00000026799	Med27	-0,380650014	0,0228
ENSMUSG00000029408	Abcb9	-0,738820016	0,02284
ENSMUSG00000030870	Ubfd1	0,456589997	0,02284
ENSMUSG00000006932	Ctnnb1	-0,542580009	0,02285
ENSMUSG00000063687	Pcdhb5	-2,328870058	0,02286
ENSMUSG00000025466	Fuom	1,454169989	0,02286
ENSMUSG00000039741	Bahcc1	-1,20559001	0,0229
ENSMUSG00000038065	Mturn	-1,09078002	0,02294
ENSMUSG00000078622	Ccdc47	0,424380004	0,02297
ENSMUSG00000022750	Klhl22	-0,411430001	0,02305
ENSMUSG00000014776	Nol3	-0,983889997	0,02307
ENSMUSG00000032735	Ablim3	0,922599971	0,02315
ENSMUSG00000039478	Micu3	-0,710640013	0,02317
ENSMUSG00000019802	Sec63	0,489419997	0,02318
ENSMUSG00000040560	Wdr7	0,589820027	0,02318
ENSMUSG00000038705	Gmeb2	-0,526449978	0,02323
ENSMUSG00000063052	Lrrc40	-0,376419991	0,02323
ENSMUSG00000031847	1700030J22Rik	-1,387689948	0,02325
ENSMUSG00000031434	Morc4	-0,768760026	0,0233
ENSMUSG00000005204	Senp3	-0,511799991	0,02331
ENSMUSG00000048478	Spata33	-1,716539979	0,02336
ENSMUSG00000062761	Zfp512	-0,510800004	0,02336
ENSMUSG00000026576	Atp1b1	1,358150005	0,02336
ENSMUSG00000032238	Rora	1,097219944	0,02338
ENSMUSG00000020894	Vamp2	-0,655589998	0,02344
ENSMUSG00000028037	Ifi44	1,321609974	0,02346
ENSMUSG00000039660	Spout1	-0,556089997	0,02351
ENSMUSG00000063320	1190007I07Rik	1,064589977	0,02352
ENSMUSG00000032459	Mrps22	0,497110009	0,02363

ENSMUSG00000070639	Lrrc8b	-2,9582901	0,02364
ENSMUSG00000023143	Nagpa	0,433970004	0,02367
ENSMUSG00000022010	Tsc22d1	-0,827520013	0,0237
ENSMUSG00000074591	Ankub1	1,90395999	0,02375
ENSMUSG00000021175	Cdca7l	-1,366880059	0,02382
ENSMUSG00000031629	Cenpu	-1,30903995	0,02382
ENSMUSG00000022211	Carmil3	-2,089960098	0,02384
ENSMUSG00000030652	Coq7	0,953639984	0,02389
ENSMUSG00000096215	Smim22	1,607750058	0,02389
ENSMUSG00000055761	Nkain3	-6,15955019	0,02393
ENSMUSG00000042284	Itga1	0,861240029	0,02393
ENSMUSG00000033751	Gadd45gip1	0,859179974	0,02399
ENSMUSG00000041845	Rhod	0,790740013	0,024
ENSMUSG00000095687	Rnaset2a	1,189450026	0,02406
ENSMUSG00000032473	Cldn18	-2,283669949	0,02409
ENSMUSG00000062997	Rpl35	-0,793540001	0,02412
ENSMUSG00000028882	Ppp1r8	-0,484930009	0,02415
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ENSMUSG00000023033	Scn8a	1,268479943	0,02416
ENSMUSG00000051671	Coa6	1,057260036	0,02417
ENSMUSG00000020062	Slc5a8	-3,086329937	0,02421
ENSMUSG00000038331	Satb2	-1,393460035	0,02422
ENSMUSG00000015837	Sqstm1	0,430860013	0,02422
ENSMUSG00000040675	Mthfd1l	-1,06219995	0,02423
ENSMUSG00000038742	Angptl6	1,065639973	0,02423
ENSMUSG00000049929	Lpar4	-1,801929951	0,02424
ENSMUSG00000029433	Diablo	0,423070014	0,02424
ENSMUSG00000064125	Prr36	-0,692770004	0,02425
ENSMUSG00000030850	Ate1	0,670899987	0,02426
ENSMUSG00000042185	Nfrkb	-0,561489999	0,02429
ENSMUSG00000035413	Tmem98	-0,786310017	0,02435
ENSMUSG00000043964	Orai3	0,45965001	0,02435
ENSMUSG00000030956	Fam53b	0,696829975	0,02435
ENSMUSG00000053931	Cnn3	-0,476029992	0,02438
ENSMUSG00000060657	Marf1	0,485720009	0,02443
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ENSMUSG00000023826	Prkn	2,293989897	0,02461
ENSMUSG00000070644	Etnk2	1,385589957	0,02462
ENSMUSG00000002057	Foxn1	-3,729370117	0,02466
ENSMUSG00000022350	Washc5	-0,555209994	0,02469
ENSMUSG00000064115	Cadm2	-6,819900036	0,02471
ENSMUSG00000071645	Tut1	-0,392820001	0,02474
ENSMUSG00000028001	Fga	1,371739984	0,02474
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ENSMUSG00000030282	Cmas	0,498730004	0,02482
ENSMUSG00000030869	Ndufab1	0,945010006	0,02483
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ENSMUSG00000034781	Gna11	0,586799979	0,02486
ENSMUSG00000030880	Polr3e	-0,305750012	0,02486
ENSMUSG00000048281	Dleu7	3,794260025	0,02497
ENSMUSG00000037443	Cep85	0,963980019	0,02499
ENSMUSG00000037070	Rbmxl1	-0,679929972	0,025
ENSMUSG00000063594	Gng8	-4,003240108	0,02502
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ENSMUSG00000030325	Klrb1c	-1,756080031	0,02508
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ENSMUSG00000031820	Babam1	0,559620023	0,02516
ENSMUSG00000028243	Ubxn2b	0,542620003	0,02519
ENSMUSG00000031669	Gins3	-0,857039988	0,0252
ENSMUSG00000030657	Xylt1	-4,458650112	0,02521
ENSMUSG00000027347	Rasgrp1	-0,935389996	0,02523
ENSMUSG00000040441	Slc26a10	1,132279992	0,02523
ENSMUSG00000025147	Mob2	0,66249001	0,02528
ENSMUSG00000024360	Etf1	-0,309460014	0,02534
ENSMUSG00000039745	Htatip2	0,893939972	0,02535
ENSMUSG00000024164	C3	1,233209968	0,02537
ENSMUSG00000022824	Muc13	-3,335589886	0,02539
ENSMUSG00000018196	Glrx2	0,568189979	0,02541
ENSMUSG00000022898	Vps26c	0,425940007	0,02542
ENSMUSG00000053646	Plxnb1	1,001790047	0,02545
ENSMUSG00000038957	Edc3	-0,441060007	0,02549
ENSMUSG00000004018	Fancl	0,73763001	0,02549
ENSMUSG00000043384	Gprasp1	-0,620859981	0,02551
ENSMUSG00000038028	Tigar	0,359030008	0,02551
ENSMUSG00000090019	Gimap1	0,945219994	0,02551
ENSMUSG00000037321	Tap1	0,974020004	0,02556
ENSMUSG00000028240	Cyp7a1	1,628409982	0,02556
ENSMUSG00000037890	Wdr19	-0,901139975	0,02557
ENSMUSG00000004934	Pias4	-0,527750015	0,02557
ENSMUSG00000029415	Sdad1	-0,569310009	0,02558
ENSMUSG00000039050	Osbpl2	0,457859993	0,02559
ENSMUSG00000034825	Nrip3	-2,36383009	0,02561
ENSMUSG00000049300	Prmt6	-0,378149986	0,02562
ENSMUSG00000052336	Cx3cr1	-1,014189959	0,02563
ENSMUSG00000059326	Csf2ra	-0,784940004	0,02564
ENSMUSG00000089809	Rasgef1b	2,517740011	0,02573
ENSMUSG00000055723	Rras2	-0,662150025	0,02577
ENSMUSG00000015290	Ubl4a	0,416449994	0,0258
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ENSMUSG00000006526	Tmem110	0,523649991	0,02586
ENSMUSG00000037705	Tecta	-3,699150085	0,02588
ENSMUSG00000051397	Tacstd2	-2,164069891	0,02591
ENSMUSG00000036411	9530077C05Rik	-1,898480058	0,02593
ENSMUSG00000020088	Sar1a	-0,336210012	0,02593
ENSMUSG00000042628	Zfyve1	0,686999977	0,02594
ENSMUSG00000033565	Rbfox2	-0,767560005	0,02596
ENSMUSG00000029557	Mrm2	0,842949986	0,02598
ENSMUSG00000051853	Arf3	-0,451719999	0,02599
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ENSMUSG00000050732	Vamp8	1,100379944	0,02611
ENSMUSG00000022422	Dscc1	-1,936490059	0,02613
ENSMUSG00000066595	Flvcr1	-0,702700019	0,02614
ENSMUSG00000020389	Cdkl3	-1,136279941	0,02618
ENSMUSG00000031993	Snx19	0,603810012	0,02629
ENSMUSG00000019143	Hars2	0,222299993	0,02634
ENSMUSG00000041974	Spidr	-0,566680014	0,02635
ENSMUSG00000044348	Slc25a53	-0,512340009	0,0264
ENSMUSG00000053483	Usp21	-0,379429996	0,0264
ENSMUSG00000033697	Arhgap39	-0,583840013	0,02641
ENSMUSG00000077440	Gm23130	-1,451509953	0,02643
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ENSMUSG00000025876	Unc5a	-1,054909945	0,02644
ENSMUSG00000028013	Ppa2	0,897300005	0,02645
ENSMUSG00000025050	Pcgf6	0,394430012	0,02647
ENSMUSG00000013629	Cad	-1,015110016	0,02654
ENSMUSG00000030269	Mtmr14	0,302839994	0,02656
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ENSMUSG00000029177	Cenpa	-0,953909993	0,02672
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ENSMUSG00000030168	Adipor2	1,015650034	0,02674
ENSMUSG00000031654	Cbln1	-11,43340015	0,02675
ENSMUSG00000026632	Tatdn3	0,550759971	0,02683
ENSMUSG00000036196	Slc26a8	-3,729419947	0,02684
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ENSMUSG00000092887	Snord53	-2,616319895	0,02686
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ENSMUSG00000019943	Atp2b1	-0,572560012	0,02718
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ENSMUSG00000025857	Dnaaf5	-0,610279977	0,02732
ENSMUSG00000035365	Parpbp	-1,739959955	0,02736
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ENSMUSG00000038079	Tmem237	-0,822109997	0,02752
ENSMUSG00000033904	Ccp110	-0,775990009	0,02753
ENSMUSG00000026686	Lmx1a	-3,151959896	0,02757
ENSMUSG00000058672	Tubb2a	1,21826005	0,02761
ENSMUSG00000026219	Trip12	-0,668470025	0,02763
ENSMUSG00000025793	Hgs	-0,221190006	0,02763
ENSMUSG00000021671	Poc5	-0,503830016	0,02766
ENSMUSG00000037331	Larp1	0,513149977	0,0277
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ENSMUSG00000024190	Dusp1	-0,916949987	0,02786
ENSMUSG00000054469	Lclat1	0,557099998	0,02787
ENSMUSG00000020677	Ddx52	-0,491059989	0,02798
ENSMUSG00000040726	Hesx1	-4,100220203	0,02803
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ENSMUSG00000030030	1700003E16Rik	0,894050002	0,02805
ENSMUSG00000040785	Ttc3	-0,805100024	0,02807
ENSMUSG00000028071	Sh2d2a	1,418560028	0,02809
ENSMUSG00000022651	Retnlg	-2,593800068	0,0281
ENSMUSG00000046442	Ppm1e	-2,139260054	0,02815
ENSMUSG00000043501	Lgals2	-1,747869968	0,02816
ENSMUSG00000034021	Pds5b	-0,534169972	0,02819
ENSMUSG00000042155	Klhl23	-0,90377003	0,0282
ENSMUSG00000042446	Zmym4	-0,616959989	0,0282
ENSMUSG00000039735	Fnbp1l	-0,897580028	0,02823
ENSMUSG00000046010	Zfp830	-0,301230013	0,02823
ENSMUSG00000016624	Phf21b	-1,21705997	0,02824
ENSMUSG00000029394	Cdk2ap1	-0,679920018	0,02824
ENSMUSG00000096001	2610528A11Rik	-2,736049891	0,02826
ENSMUSG00000038379	Ttk	-1,534890056	0,0283
ENSMUSG00000028410	Dnaja1	0,54697001	0,02832
ENSMUSG00000035206	Sppl2b	-0,479719996	0,02836
ENSMUSG00000015312	Gadd45b	-1,159610033	0,0284
ENSMUSG00000052369	Tmem106c	0,539969981	0,02841
ENSMUSG00000047844	Bex4	1,757740021	0,02841

ENSMUSG00000018433	Nol11	-0,502470016	0,02842
ENSMUSG00000019763	Rmnd1	0,413309991	0,02842
ENSMUSG00000035121	Neil2	-1,163699985	0,02843
ENSMUSG00000078521	Aunip	-2,04211998	0,02854
ENSMUSG00000020930	Ccdc103	-1,459740043	0,02855
ENSMUSG00000027335	Adra1d	-4,52699995	0,02856
ENSMUSG00000024570	Rbfa	0,752349973	0,02859
ENSMUSG00000061536	Sec22c	0,502759993	0,02863
ENSMUSG00000002028	Kmt2a	-0,929120004	0,02877
ENSMUSG00000038402	Foxf2	-11,28512001	0,02879
ENSMUSG00000038535	Zfp280d	-0,495649993	0,02879
ENSMUSG00000018347	Zkscan6	-0,520439982	0,02889
ENSMUSG00000052609	Plekhg3	-0,596310019	0,02893
ENSMUSG00000025894	Aasdhppt	0,582970023	0,02895
ENSMUSG00000056978	Hamp2	1,777099967	0,02897
ENSMUSG00000001687	Ubl3	0,414840013	0,02898
ENSMUSG00000030357	Fkbp4	0,57397002	0,02898
ENSMUSG00000038725	Pkhd1l1	-2,352679968	0,029
ENSMUSG00000022913	Psmg1	0,831480026	0,02902
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ENSMUSG00000027185	Nat10	-0,34277001	0,02906
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ENSMUSG00000074802	Gas2l3	-0,908959985	0,02907
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ENSMUSG00000000759	Tubgcp3	-0,577279985	0,02918
ENSMUSG00000031156	Slc35a2	-0,371950001	0,02919
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ENSMUSG00000063808	Gpatch1	0,449889988	0,02942
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ENSMUSG00000037225	Fgf2	-5,371829987	0,02951
ENSMUSG00000031278	Acsl4	0,358550012	0,02957
ENSMUSG00000073563	Csnk1g3	-0,342559993	0,02958
ENSMUSG00000027460	Angpt4	-3,618240118	0,02959
ENSMUSG00000066363	Serpina3f	1,481719971	0,0296
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ENSMUSG00000032547	Ryk	-0,416649997	0,03001
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ENSMUSG00000004364	Cul3	-0,393920004	0,03063
ENSMUSG00000045594	Glb1	-0,472939998	0,03066
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ENSMUSG00000028631	Kcnq4	-1,381450057	0,03083

ENSMUSG00000066392	Nrxn3	-2,630219936	0,03085
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ENSMUSG00000016386	Mpped2	-1,569829941	0,03182
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ENSMUSG00000024900	Cpt1a	1,018669963	0,03193
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ENSMUSG00000052551	Adarb2	3,208159924	0,0325
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ENSMUSG00000043131	Mob1a	-0,422049999	0,03348
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ENSMUSG00000036805	Noxa1	-1,690260053	0,03357
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ENSMUSG00000035694	Caps2	-3,099370003	0,03685
ENSMUSG00000032850	Rnft2	-1,908179998	0,0369
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ENSMUSG00000060261	Gtf2i	0,396109998	0,03694
ENSMUSG00000046634	Pkd1l1	-4,21532011	0,03697
ENSMUSG00000025103	Btbd1	0,277429998	0,03698
ENSMUSG00000024764	Naa40	-0,367020011	0,037
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ENSMUSG00000038039	Gcc2	0,537670016	0,03714
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ENSMUSG00000068329	Htra2	-0,508059978	0,03734
ENSMUSG00000048655	Ccdc169	-3,761970043	0,03737
ENSMUSG00000040605	Bace2	-0,69352001	0,03741
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ENSMUSG00000040767	Snrnp25	-1,066499949	0,03757
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ENSMUSG00000026516	Nvl	-0,853370011	0,03774
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ENSMUSG00000029993	Nfu1	0,668299973	0,03791
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ENSMUSG00000020650	Bcap29	0,413690001	0,03794

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ENSMUSG00000025468	Caly	-3,037430048	0,04166
ENSMUSG00000024544	Ldlrad4	-0,606450021	0,04167
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ENSMUSG00000025979	Mob4	-0,466829985	0,04282
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ENSMUSG00000020014	Cfap54	-1,264969945	0,043
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ENSMUSG00000013833	Med16	0,322459996	0,04586
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ENSMUSG00000033847	Pla2g4c	-1,621170044	0,04615
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geneid_mus musculus	symbol_mus musculus	*Akt/Nicd Parp-1-* vs. *Akt/Nicd Parp-1+*_log2fc	*Akt/Nicd Parp-1-* vs. *Akt/Nicd Parp-1+*_pvalue
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ENSMUSG00000062737	Prl3d2	19,8629303	0,00015
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ENSMUSG00000037872	Ackr1	1,805029988	0,00106
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ENSMUSG00000070524	Fcrlb	-2,961899996	0,00213
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ENSMUSG00000035105	Egln3	-1,473520041	0,00585
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ENSMUSG00000020092	Pald1	-0,570119977	0,00768
ENSMUSG00000025784	Clec3b	3,212769985	0,00781
ENSMUSG00000032978	Guca2b	-2,629679918	0,00786
ENSMUSG00000020788	Atp2a3	1,115159988	0,00791
ENSMUSG00000000628	Hk2	-1,421839952	0,00801
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ENSMUSG00000026542	Apcs	1,566179991	0,00933
ENSMUSG00000000731	Aire	-2,97961998	0,00965
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ENSMUSG00000038209	Itln1	5,532730103	0,01107
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ENSMUSG00000059895	Ptp4a3	-0,882499993	0,01133
ENSMUSG00000038528	Mfsd4b5	2,116600037	0,01153

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ENSMUSG00000024558	Mapk4	-1,247259974	0,01347
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ENSMUSG00000031380	Vegfd	1,024500012	0,02202
ENSMUSG00000092887	Snord53	-3,124059916	0,0223
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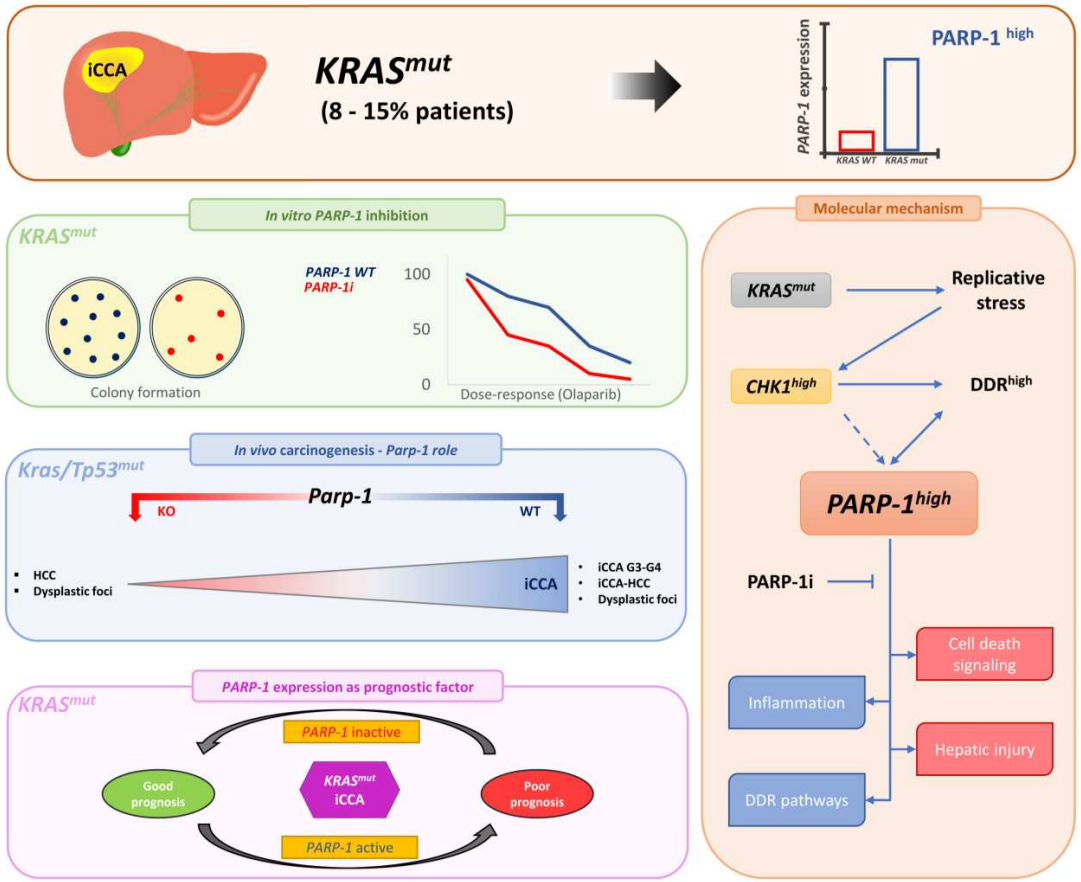
PARP1 selectively impairs KRAS-driven phenotypic and molecular features in intrahepatic cholangiocarcinoma



Keggenhoff FL, et al. *Gut* 2024. DOI: 10.1136/gut-2023-331237.R1

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