APPLICATION NOTE

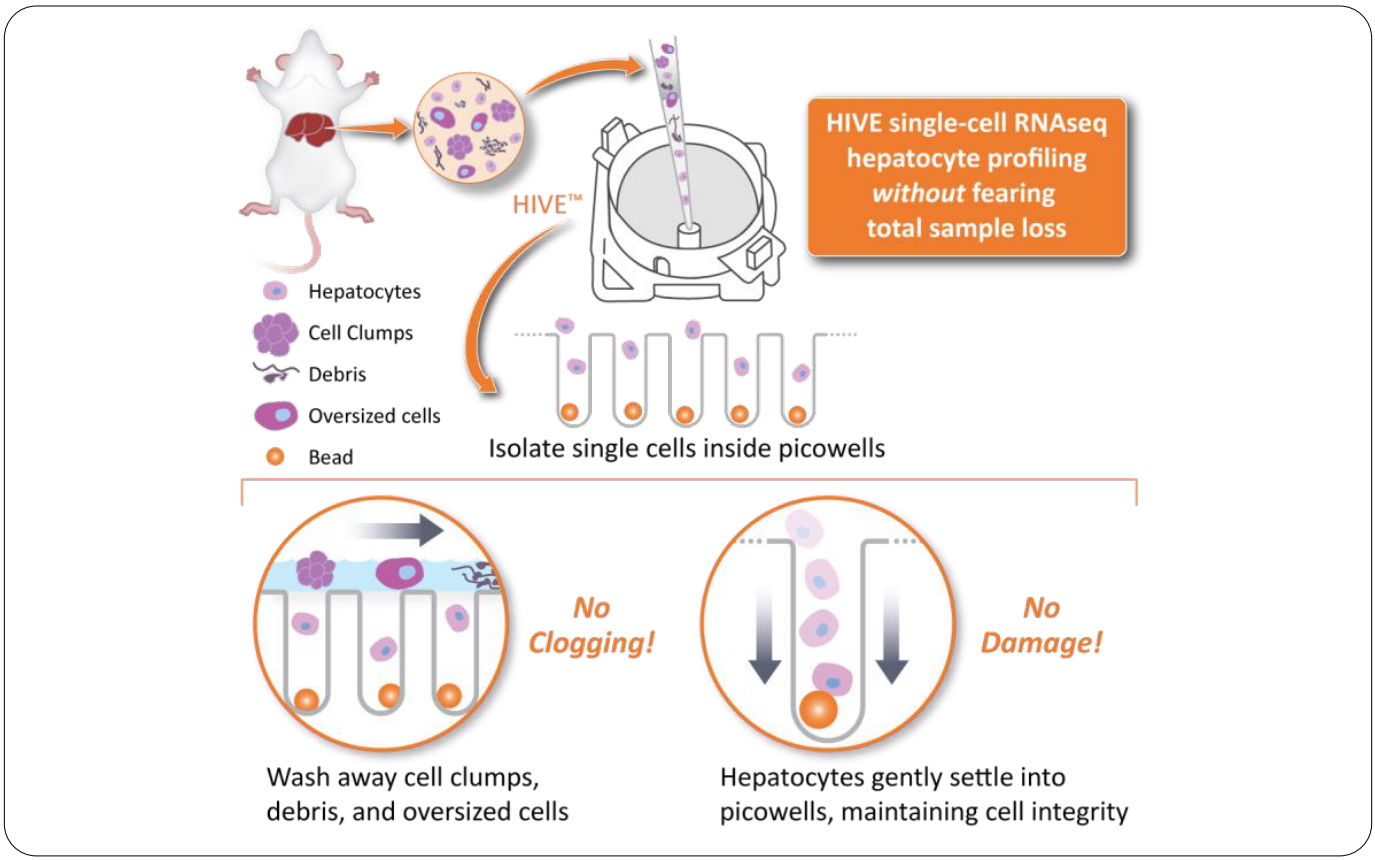
HIVE™ scRNAseq mouse liver hepatocytes.

For research use only. Not for use in diagnostic procedures.

Use the HIVE™ solution to harvest single cell from liver samples

Liver samples[1,2] are notoriously difficult for single-cell platforms. About 80% of liver cells are hepatocytes,[3] cells that are large enough to clog microfluidic devices while fragile enough to be destroyed in shear flow. Given the high risk of total failure, researchers often freeze such tissues and isolate nuclei for RNAseq, compromising the amount of mRNA recovered and leading to sparse data.

The HIVE™ technology offers new capabilities to perform scRNAseq from freshly digested liver samples. With gravity or a low-speed spin, single hepatocytes can gently settle into HIVE™ picowells (60 µm size). Extremely large cells, clumps, or debris that can clog other technologies are washed away from the HIVE™, and isolated hepatocytes are ready for whole-cell scRNAseq or can be stably frozen for months on end.



Study parameters

Seamless HIVE™ workflow

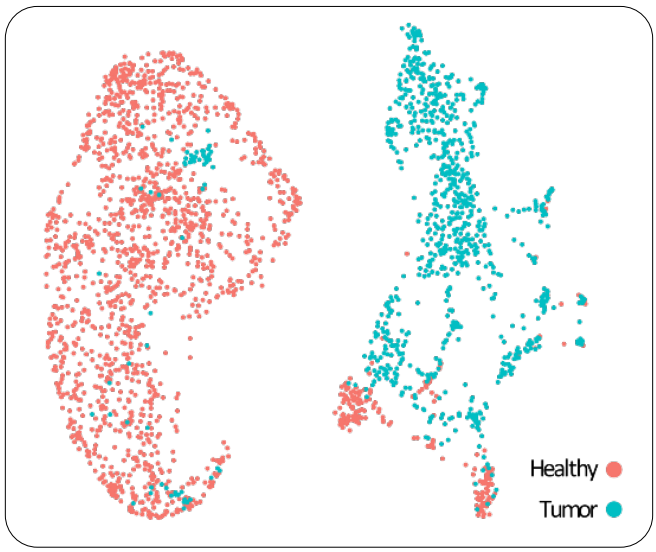
- **Freshly dissociated cells from mouse livers**
  - 2 healthy samples, 1 tumor biopsy
  - Enriched for hepatocytes (20–50 mm)
- **Captured single cells with the HIVE™ scRNAseq solution**
  - Stored at -20 °C for 1.5 weeks before generating scRNAseq libraries

scRNAseq metrics*'

Liver type	Cells	Unique genes	Unique transcripts	Total reads
Healthy	812	1,769	4,676	44,017
Tumor	915	2,773	6,862	39,186

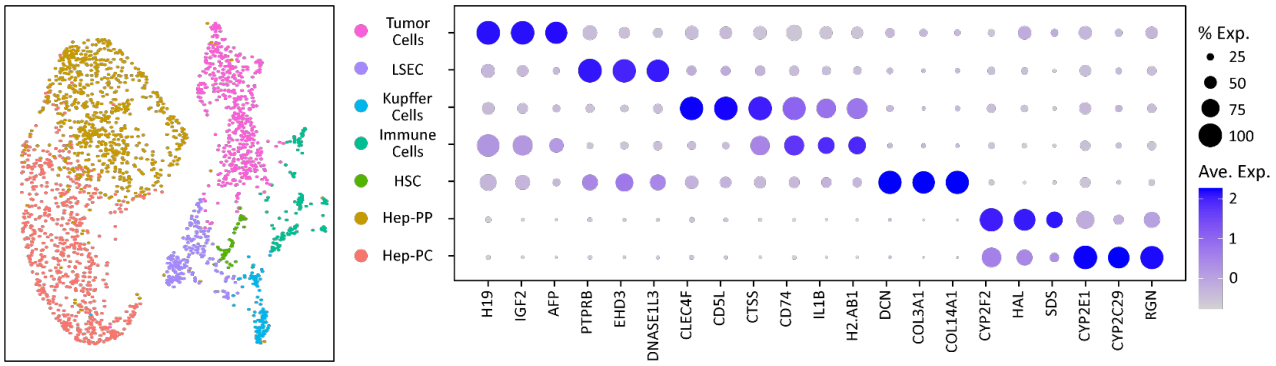
**median values*

scRNAseq by sample type



UMAP plot filtered for >50 genes, >100 transcripts, and cluster quality based on mitochondrial and ribosomal reads

Robust mRNA expression with HIVE™ scRNAseq



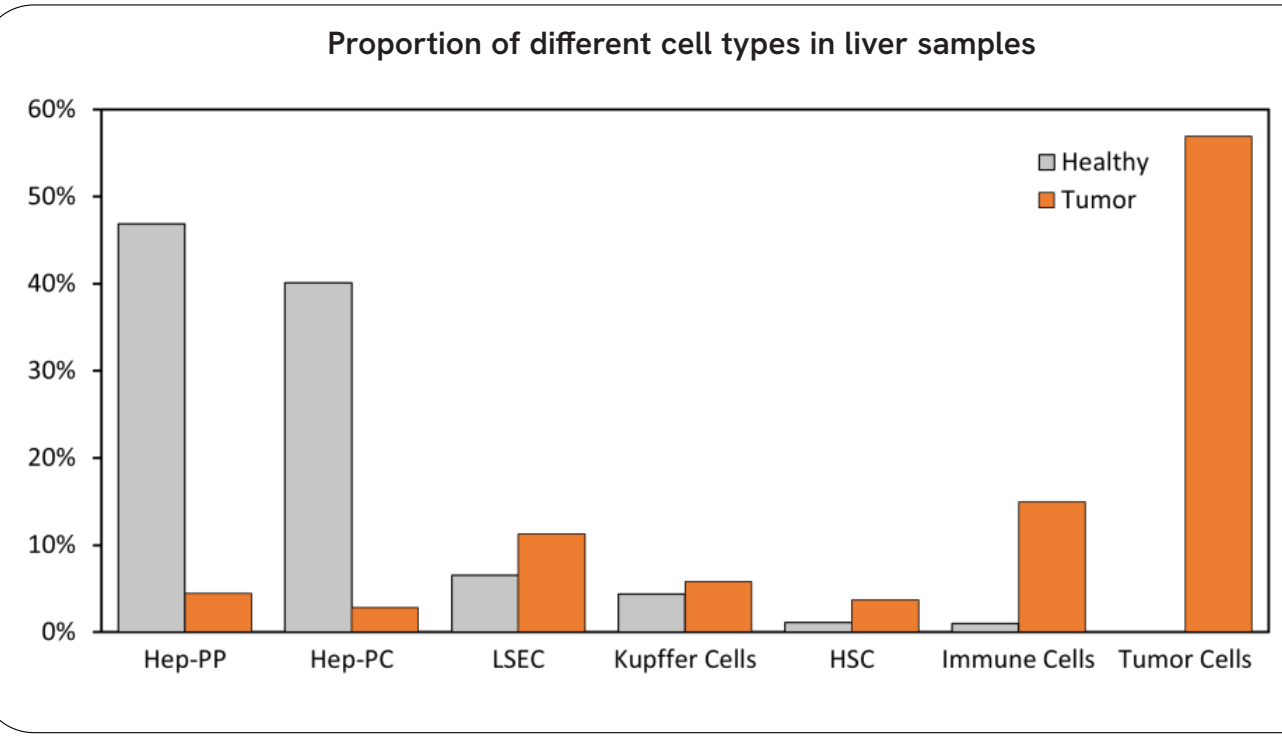
HIVE™ captures the diverse liver microenvironment

Healthy liver

- 87% normal hepatocytes (Hep-PC/PP)
- 7% endothelial cells (LSEC)
- 4% macrophages (Kupffer)
- 1% pericytes (HSC), 1% immune cells

Liver tumor

- 60% tumor cells
- 7% normal hepatocytes (Hep-PC/PP)
- Expansion of immune cells (15%), endothelial cells (LSEC, 11%) and pericytes (HSC, 4%)



References

1. Bissig-Choisat, B., Alves-Bezerra, M., Zorman, B. et al. A human liver chimeric mouse model for non-alcoholic fatty liver disease. JHEP Rep 3, 100281 (2021). https://doi.org/10.1016/j.jhepr.2021.100281

2. Yuan, L., Liu, X., Zhang, L. et al. A chimeric humanized mouse model by engrafting the human induced pluripotent stem cell-derived hepatocyte-like cell for the chronic Hepatitis B virus infection. Front Microbiol 9, 908 (2018). https://doi.org/10.3389/fmicb.2018.00908

3. Schulze, R., Schott, M., Casey, C. et al. The cell biology of the hepatocyte: A membrane trafficking machine. J Cell Biol 218, 2096 (2019). https://doi.org/10.1083/jcb.201903090

Revvity, Inc.
940 Winter Street
Waltham, MA 02451 USA

(800) 762-4000
www.revvity.com

AG012209_29_AP