

HAP1 knockout cell line application references

The use of Horizon's HAP1 cell lines has expanded into a wide range of research applications such as studies in virology, functional genomics, energy metabolism, and apoptosis, to name a few. Highlighted below is a list of peer-reviewed publications that cited Horizon's HAP1 cell lines along with their corresponding functional assay methodologies.

Virology

1. Flint, M. *et al.* [A genome-wide CRISPR screen identifies N-acetylglucosamine-1-phosphate transferase as a potential antiviral target for Ebola virus.](#) *Nat. Commun.* **10**, 285 (2019).
2. Lyoo, H. *et al.* [ACBD3 Is an Essential Pan-enterovirus Host Factor That Mediates the Interaction between Viral 3A Protein and Cellular Protein PL4KB.](#) *mBio* **10**, e02742-18, /mbio/10/1/mBio.02742-18.atom (2019).
3. Baggen, J. *et al.* [Bypassing pan-enterovirus host factor PLA2G16.](#) *Nat. Commun.* **10**, 3171 (2019).
4. McPhail, J. A. *et al.* [Characterization of the Golgi c10orf76-PI4KB complex, and its necessity for Golgi PI4P levels and enterovirus replication.](#) <http://biorxiv.org/lookup/doi/10.1101/634592> (2019) doi:10.1101/634592.
5. Liu, Y. *et al.* [Correction to: Tat expression led to increased histone 3 tri-methylation at lysine 27 and contributed to HIV latency in astrocytes through regulation of MeCP2 and Ezh2 expression.](#) *J. Neurovirol.* **25**, 901–901 (2019).
6. Pokharel, S. M. *et al.* [Integrin activation by the lipid molecule 25-hydroxycholesterol induces a proinflammatory response.](#) *Nat. Commun.* **10**, 1482 (2019).
7. Shen, Q. *et al.* [RanBP2/Nup358 enhances miRNA activity by sumoylating and stabilizing Argonaute 1.](#) <https://www.biorxiv.org/content/10.1101/555896v2>.
8. LaFontaine, E. *et al.* [Ribosomal protein RACK1 facilitates efficient translation of poliovirus and other viral IRESs.](#) <http://biorxiv.org/lookup/doi/10.1101/659185> (2019) doi:10.1101/659185.
9. Moskovskich, A. *et al.* [The transporters SLC35A1 and SLC30A1 play opposite roles in cell survival upon VSV virus infection.](#) <http://biorxiv.org/lookup/doi/10.1101/573253> (2019) doi:10.1101/573253.
10. Chiramel, A. I. *et al.* [TRIM5a Restricts Flavivirus Replication by Targeting the Viral Protease for Proteasomal Degradation.](#) *Cell Rep.* **27**, 3269–3283.e6 (2019).

Methods: CellTiter-Glo viability assays (Promega, Madison, USA)¹; reporter virus assays¹; virus quantification (endpoint dilution)²; luciferase reporter assays³; plaque diameter/ size assays³; NFκB measurement⁶. Golgi staining⁴; Viral time-course assays⁵; Zn-level quantification⁹; Cell Death/ Apoptosis assays⁹; IL6 quantification⁷.

Genome integrity/Functional genomics

1. Bacolla, A., Ye, Z., Ahmed, Z. & Tainer, J. A. [Cancer mutational burden is shaped by G4 DNA, replication stress and mitochondrial dysfunction.](#) *Prog. Biophys. Mol. Biol.* **147**, 47–61 (2019).
2. Cui, J., Gizzi, A. & Stivers, J. T. [Deoxyuridine in DNA has an inhibitory and promutagenic effect on RNA transcription by diverse RNA polymerases.](#) *Nucleic Acids Res.* (2019) doi:10.1093/nar/gkz183.
3. Serebrenik, Y. V., Sansbury, S. E., Kumar, S. S., Henao-Mejia, J. & Shalem, O. [Efficient and flexible tagging of endogenous genes by homology-independent intron targeting.](#) *Genome Res.* **29**, 1322–1328 (2019).
4. Mair, B. *et al.* [Essential Gene Profiles for Human Pluripotent Stem Cells Identify Uncharacterized Genes and Substrate Dependencies.](#) *Cell Rep.* **27**, 599–615.e12 (2019).
5. Xing, M. & Oksenyich, V. [Genetic interaction between DNA repair factors PAXX, XLF, XRCC4 and DNA-PKcs in human cells.](#) *FEBS Open Bio.* **9**, 1315–1326 (2019).
6. Castañe da-Zegarra, S., Xing, M., Gago-Fuentes, R., Sæterstad, S. & Oksenyich, V. [Synthetic lethality between DNA repair factors Xlf and Paxe is rescued by inactivation of Trp53.](#) *DNA Repair* **73**, 164–169 (2019).
7. Garvin, A. J. *et al.* [The deSUMOylase SENP2 coordinates homologous recombination and nonhomologous end joining by independent mechanisms.](#) *Genes Dev.* **33**, 333–347 (2019).
8. Sarno, A. *et al.* [Uracil–DNA glycosylase UNG1 isoform variant supports class switch recombination and repairs nuclear genomic uracil.](#) *Nucleic Acids Res.* **47**, 4569–4585 (2019). **Methods:** G4 DNA staining¹; Intron tagging³; survival assays of NHEJ factors deficient HAP1 cells⁵; cell cycle synchronization/ staining⁷.

Mitochondria/Energy metabolism

1. Sánchez-Caballero, L. *et al.* [A dual function of TMEM70 in OXPHOS: assembly of complexes I and V.](#) <http://biorxiv.org/lookup/doi/10.1101/697185> (2019) doi:10.1101/697185.

- Kondadi, A. K. *et al.* [Cristae undergo continuous cycles of fusion and fission in a MICOS-dependent manner](#). <http://biorxiv.org/lookup/doi/10.1101/654541> (2019) doi:10.1101/654541.
- Yang, Y., Mohammed, F. S., Zhang, N. & Sauve, A. A. [Dihyronicotinamide riboside is a potent NAD⁺ concentration enhancer in vitro and in vivo](#). *J. Biol. Chem.* **294**, 9295–9307 (2019).
- Malecki, J. M. *et al.* [Human FAM173A is a mitochondrial lysine-specific methyltransferase that targets adenine nucleotide translocase and affects mitochondrial respiration](#). *J. Biol. Chem.* **294**, 11654–11664 (2019).
- Malecki, J. M. *et al.* [Lysine methylation by the mitochondrial methyltransferase FAM173B optimizes the function of mitochondrial ATP synthase](#). *J. Biol. Chem.* **294**, 1128–1141 (2019).
- Gioran, A. *et al.* [Multi-omics identify xanthine as a pro-survival metabolite for nematodes with mitochondrial dysfunction](#). *EMBO J.* **38**, (2019).
- Guiducci, G. *et al.* [The moonlighting RNA-binding activity of cytosolic serine hydroxymethyltransferase contributes to control compartmentalization of serine metabolism](#). *Nucleic Acids Res.* **47**, 4240–4254 (2019).
Methods: electron microscopy², super-resolution nanoscopy⁶; respiration measurements by Seahorse^{2,4,5,6}; NADH measurement³; detection of respiratory chain complexes (MS/MS analysis)^{1,4}; Pulse labelling of mitochondrial translation products¹; cell lysate activity tests of KO/WT cells³.

Autophagy/Apoptosis

- Cao, J. Y. *et al.* [A Genome-wide Haploid Genetic Screen Identifies Regulators of Glutathione Abundance and Ferroptosis Sensitivity](#). *Cell Rep.* **26**, 1544–1556.e8 (2019).
- Lenk, G. M. *et al.* [CRISPR knockout screen implicates three genes in lysosome function](#). *Sci. Rep.* **9**, 9609 (2019).
- Keskitalo, S. *et al.* [Dominant TOM1 mutation associated with combined immunodeficiency and autoimmune disease](#). *Npj Genomic Med.* **4**, 14 (2019).
- Atakpa, P., van Marrewijk, L. M., Apta-Smith, M., Chakraborty, S. & Taylor, C. W. [GPN does not release lysosomal Ca²⁺ but evokes Ca²⁺ release from the ER by increasing the cytosolic pH independently of cathepsin C](#). *J. Cell Sci.* **132**, jcs223883 (2019).
- Agrotis, A., Pengo, N., Burden, J. J. & Ketteler, R. [Redundancy of human ATG4 protease isoforms in autophagy and LC3/GABARAP processing revealed in cells](#). *Autophagy* **15**, 976–997 (2019).
- Simons, I. M. *et al.* [The highly GABARAP specific rat monoclonal antibody 8H5 visualizes GABARAP in immunofluorescence imaging at endogenous levels](#). *Sci. Rep.* **9**, 526 (2019).
Methods: human haploid cell genetic screening¹; glutathione (GSH) quantification via monochlorobimane (MCB) GSH probes/ FACS Analysis and Ellman's reagent¹; immuno-staining via autophagy marker (e.g.LC3 puncta)⁵; transmission electron microscopy (TEM)⁵.

Drug validation

- Hopkins, T. A. *et al.* [PARP1 Trapping by PARP Inhibitors Drives Cytotoxicity in Both Cancer Cells and Healthy Bone Marrow](#). *Mol. Cancer Res.* **17**, 409–419 (2019).

- Depetter, Y. *et al.* [Selective pharmacological inhibitors of HDAC6 reveal biochemical activity but functional tolerance in cancer models: Activity of HDAC6 inhibitors in cancer models](#). *Int. J. Cancer.* **145**, 735–747 (2019).
Methods: drug cytotoxicity assays¹; drug target validation².

Extracellular matrix (ECM)

- Blum, A. *et al.* [Transcriptomics of a KDEL1R1 knockout cell line reveals modulated cell adhesion properties](#). *Sci. Rep.* **9**, 10611 (2019).
Methods: whole transcriptome analysis, in vitro adhesion assays (e.G. scratch assays).

Ubiquitylation

- Campagne, A. *et al.* [BAP1 complex promotes transcription by opposing PRC1-mediated H2A ubiquitylation](#). *Nat. Commun.* **10**, 348 (2019).
Methods: chromatography analysis of nuclear extracts.

Epigenetics

- Choi, S. *et al.* [H2A.Z-dependent and -independent recruitment of metabolic enzymes to chromatin required for histone modifications](#). <http://biorxiv.org/lookup/doi/10.1101/553297> (2019) doi:10.1101/553297.
Methods: cellular extraction in cytosol, mitochondrial and membrane, nuclear, and chromatin-bound protein fractions.

Translational apparatus

- Vindry, C., Guillin, O., Mangeot, P. E., Ohlmann, T. & Chavatte, L. A [Versatile Strategy to Reduce UGA-Selenocysteine Recoding Efficiency of the Ribosome Using CRISPR-Cas9-Viral-Like-Particles Targeting Selenocysteine-tRNA\[Ser\]Sec Gene](#). *Cells* **8**, 574 (2019).
- Henriques, S. F., Gicquel, E., Marsolier, J. & Richard, I. [Functional and cellular localization diversity associated with Fukutin-related protein patient genetic variants](#). *Hum. Mutat.* **40**, 1874–1885 (2019).
Methods: Northern blot analysis¹, tRNA transduction¹; TIDE analysis¹.

Cell biology

- Nixon, A. M. L. *et al.* [A rapid in vitro methodology for simultaneous target discovery and antibody generation against functional cell subpopulations](#). *Sci. Rep.* **9**, 842 (2019).
- Sergeeva, O. A. & van der Goot, F. G. [Anthrax toxin requires ZDHHC5-mediated palmitoylation of its surface-processing host enzymes](#). *Proc. Natl. Acad. Sci.* **116**, 1279–1288 (2019).
- Taneja, N. & Burnette, D. T. [Myosin IIA drives membrane bleb retraction](#). *Mol. Biol. Cell* **30**, 1051–1059 (2019).
- Taneja, N. *et al.* [Precise tuning of cortical contractility regulates cell shape during cytokinesis](#). <http://biorxiv.org/lookup/doi/10.1101/635615> (2019) doi:10.1101/635615.
- Tuladhar, R. *et al.* [Stereoselective fatty acylation is essential for the release of lipidated WNT proteins from the acyltransferase Porcupine \(PORCN\)](#). *J. Biol. Chem.* **294**, 6273–6282 (2019).
- Karsai, G. *et al.* [DEGS1-associated aberrant sphingolipid metabolism impairs nervous system function in humans](#). *J. Clin. Invest.* **129**, 1229–1239 (2019).
Methods: differential Interference Contrast (DIC) microscopy and Fluorescence Recovery After Photobleaching (FRAP)⁴; WNT secretion assay (cdDNA transfection, ConA–Sepharose affinity chromatography and Western Blot Analysis)⁵; metabolite labeling and detection⁶.

For more information

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