Scientist at Horizon preparing to feed Cas9-expressing HAP1 cell cultures.

The one-stop CRISPR shop: Gene editing simplified

When CRISPR-Cas9, an exciting technology that allows scientists to cut and edit DNA, was introduced, it brought on a revolution in life sciences research and development. For the first time, scientists could edit genomes with high speed, agility, and precision, and the technology was seen as an invaluable tool that pushes the boundaries of what humans can do with cells. Biotech companies immediately realized the benefit of offering reagents that could make use of CRISPR-Cas9, but for many researchers who had never edited a genome, the promise of this innovation still seemed daunting. How do I pick the right guide RNA or Cas9 nuclease format? How do I determine what cell line background to work with? How do I even begin the process of harnessing the power of gene editing using CRISPR-Cas9 in my lab?

Enter Horizon Discovery, a cell engineering and research reagents company focused on commercializing the application of gene-editing and gene-modulation technologies to accelerate scientific innovation and biopharmaceutical drug development.

With corporate headquarters in Cambridge, United Kingdom, and manufacturing facilities split split between Cambridge and Boulder, Colorado, Horizon is leading the charge to ensure that CRISPR-Cas9 is easily accessible to life science investigators. The well-established firm already has a stellar international reputation and an extensive portfolio of tools and services for gene editing and modulation. These tools help scientists better understand disease mechanisms, whether their labs run the experiments or look to Horizon for help in engineering a cell line or running a large screening project.

But in June 2020, the company upped its game by debuting a new portfolio of cell lines that stably express Cas9 or dCas9-VPR. These cell lines are seamlessly bundled together with Horizon's gene-editing and gene-activation reagents, such as its synthetic single-guide RNAs (sgRNAs) and DharmaFect transfection reagents, to simplify and streamline gene-editing experiments. "By removing the need to identify a Cas9 nuclease source, researchers can streamline their experiments, getting to their desired disease model and launching experiments to interrogate gene function or disease phenotypes faster," says Travis Hardcastle, Product Manager, Cell Lines. "This is ideal for novice CRISPR users who have never done a gene-editing experiment before. Furthermore, this helps speed up the process of identifying and validating targets so that users can move through the drug discovery pipeline more quickly." Horizon empowers scientists with the ability to alter almost any gene or modulate its function by using CRISPR-Cas9 in human and other mammalian cell lines.

Helping customers and building on a legacy

To arrive at their latest CRISPR-based solution, Horizon's staff spoke with a wide spectrum of researchers, ranging from those in small academic labs to those working in large,

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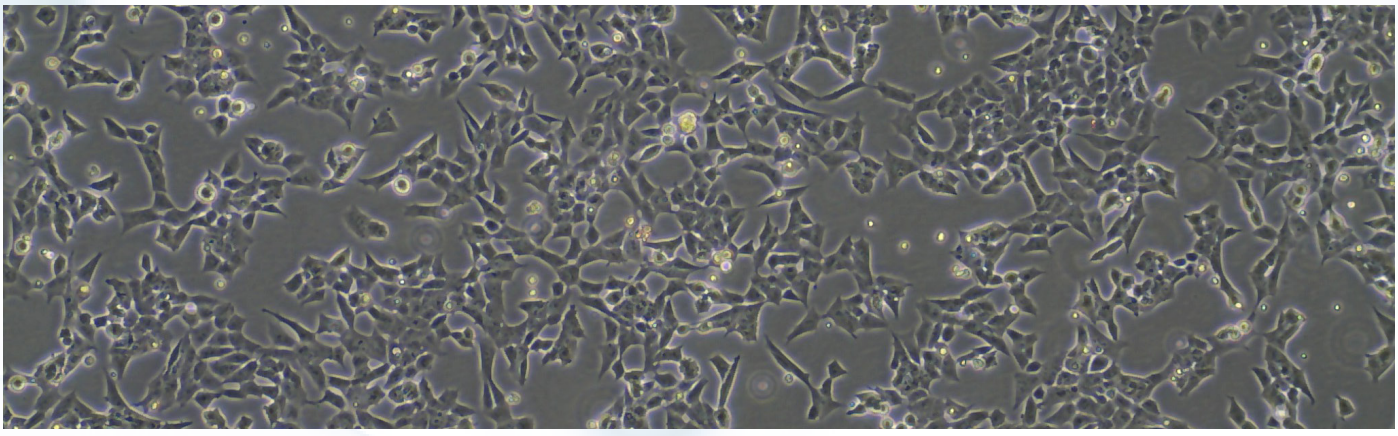

Horizon Cas9 Stable Cell Lines HAP1 background

multisite biopharma organizations, all of whom are looking to use gene editing to advance their work. Over and over again, they heard the same questions from researchers who wanted to utilize CRISPR-Cas9: To start editing my gene of interest, what components do I need, how do I pick them, and what do I do to get started?

"The biggest hurdle for scientists who want to bring this technique into their lab is that they don't know where to start. Our products tick all the boxes," says Ryan Donnelly, Product Manager, Research Reagents. "It takes away the question of what you need to edit your gene of interest. Just tell us the gene you want to knock out, and the cell line that's closest to the disease model you want to study." Because Horizon's cell lines are uniquely designed to express Cas9, they are fundamentally ready to use when researchers need them. These reagents are a cross between a turnkey and customized solution. Once the customer has identified what cell line background they want to work in, Horizon's staff draws on its vast catalog of predesigned, synthetic sgRNAs that direct Cas9 to edit the gene they want to knock out, and bundles these reagents with the cell lines.

A CRISPR project usually starts with the customer identifying the gene they want to target. As Donnelly explains, in the case of large genes, there might be tens to hundreds of potential guide RNAs that can edit those genes. Which one will give us the best shot at knocking out that gene's function? Horizon's predesigned synthetic sgRNAs solve this problem. These guides are picked by a robust CRISPR design algorithm not only selects guides with the highest knockout efficacy, but also those that are highly specific, so it is unlikely they will interfere with other genes with a similar sequence. And Horizon stands behind its product: "We guarantee our guide RNA will edit the gene of interest," says Donnelly. "This elegant system reduces the number of steps, protocols, and reagents needed to start a gene-editing experiment," he adds.

What's next?

With over a decade of experience in engineering cell lines, Horizon offers an unmatched portfolio of tools and services to help scientists gain a greater understanding of gene function and identify the genetic drivers behind human disease.

"With our cell engineering pipeline, we are looking to continually improve our processes and workflows to further drive down the cost for our customers, making such services available to more researchers," says Hardcastle, "whether they are in a small academic lab or a large biopharma company."

As Horizon debuts this new product line, its team members are carefully gathering data and staying in constant contact with its customers to ensure the company is providing products that bring value to users and are meaningful to the research they are conducting. "I'm excited to speak with scientists who use these products to simplify their experiments and to hear what it has enabled them to do, and how it has advanced their research," says Donnelly. "I love seeing that. And then to bring those success stories back to our R&D colleagues is very important. We want to make sure that the positive impact is known company-wide."

"If we can empower scientists to start using CRISPR-Cas9 and ask the bigger questions in their research, it's only going to increase the clinical solutions that can be offered in the future," says Donnelly. "It's going to help folks who want to use CRISPR but are overwhelmed by variables. It takes the design burden away. And to know that we have solutions that are advancing science in such a way is beyond exciting!"

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