

News Release

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September 8, 2016

MilliporeSigma Launches New Gene Editing Technology to Engineer Virus Resistant CHO Cell Lines

- **Reduces minute virus of mice contamination risk**
- **Enhances viral safety while maintaining cell line productivity, protein quality**

Billerica, Massachusetts, September 8, 2016 — [MilliporeSigma](#) today launched a first-of-its-kind gene editing technology to modify CHO cell lines to be resistant to minute virus of mice (MVM), a common contamination threat that remains despite the shift to chemically-defined, animal component-free manufacturing processes. CHO cells are commonly used in the manufacture of biologics.

MilliporeSigma's new Centinel™ technology targets genes which play a role in MVM susceptibility. Viral contaminations like MVM can have major consequences for biopharmaceutical manufacturers, costing hundreds of millions of dollars, according to industry reports. The greatest impact of such contamination is on patients, as access to therapies can be put in jeopardy. Centinel™ technology provides manufacturers with an additional path for mitigating the risk of MVM contamination, while maintaining an equivalent level of protein quality and cell line productivity.

"The Centinel™ program is just one example of how we are combining years of expertise and credibility in process development, biologics manufacturing and gene editing tools to increase safety for our customers and their patients," said Udit Batra, CEO, [MilliporeSigma](#). "We are also leveraging this unique combination of experience



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and technologies to address some of the industry's most complex challenges and exciting applications, including cell therapy."

Under the Centinel™ program, MilliporeSigma can modify customers' CHO cell lines to provide viral resistance to MVM. A patent application has been submitted for the technology used in the gene editing approach to viral resistance.

The company's BioReliance® testing services can validate MVM resistance and demonstrate the virus is not propagated in the cell line. Alternatively, customers can purchase the zinc finger nuclease pairs to engineer cell lines directly.

MilliporeSigma's new Centinel™ technology builds on the company's expertise in gene editing and biomanufacturing processes, as well as its in-depth understanding of the regulatory environment. In addition to enhancing the safety of biomanufacturing, MilliporeSigma is also applying this expertise and approach to develop other technologies and services, including those supporting the cell therapy industry.

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About the Life Science Business of Merck KGaA, Darmstadt, Germany

The life science business of Merck KGaA, Darmstadt, Germany, which operates as MilliporeSigma in the U.S. and Canada, has 19,000 employees and 65 manufacturing sites worldwide, with a portfolio of more than 300,000 products enabling scientific discovery. Udit Batra is the global chief executive officer of MilliporeSigma.

Merck KGaA, Darmstadt, Germany completed its \$17 billion acquisition of Sigma-Aldrich in November 2015, creating a leader in the \$125 billion global life science industry.

Merck KGaA of Darmstadt, Germany is a leading company for innovative and top-quality high-tech products in healthcare, life science and performance materials. The company has six businesses – Biopharmaceuticals, Consumer Health, Allergopharma, Biosimilars, Life Science and Performance Materials – and generated sales of €12.85 billion in 2015. Around 50,000 employees work in 66 countries to improve the quality of life for patients, to foster the success of customers and to help meet global challenges.

Merck KGaA, Darmstadt, Germany is the world's oldest pharmaceutical and chemical company – since 1668, the company has stood for innovation, business success and responsible entrepreneurship. Holding an approximately 70 percent interest, the founding family remains the majority owner of the company to this day. Merck KGaA, Darmstadt, Germany holds the global rights to the name and the trademark "Merck" internationally except for the United States and Canada, where the company operates as EMD Serono, MilliporeSigma and EMD Performance Materials.