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MilliporeSigma to Use Genome Editing in Study of Gut Bacteria to Benefit Malnourished Children

- **Collaboration with Washington University on gut bacteria research could lead to diagnostics, treatment for malnourished children**
- **Study to use MilliporeSigma's genome-editing technology**

Burlington, Massachusetts, May 16, 2018 – [MilliporeSigma](#), a leader in genome editing, today announced a collaboration with Washington University in St. Louis that could lead to the optimizing of nutritional supplements to restore a healthy gut microbial community (microbiome).

The two-year collaboration will employ [MilliporeSigma's CRISPR genome-editing technology](#) in research studies by Dr. Jeffrey Gordon of Washington University School of Medicine. The research aims to determine the differences between gut bacterial communities in healthy and malnourished children, and to identify what features of healthy intestinal bacteria are critical for supporting healthy growth. From there, nutritional approaches to restore a normal microbiome can be developed and optimized, as nutritional interventions to date have failed to solve the problem.

“Development of the gut microbiome is disrupted in severely malnourished children, leaving them with immature communities compared with healthy children,” said Udit Batra, CEO, MilliporeSigma. “Our collaboration with the leading expert in the study of the human microbiome, Dr. Jeffrey Gordon, will focus on how to repair and reconstitute a normal microbiome in malnourished children. Using our foundational genome-editing technology, we will continue to form collaborations with the global scientific community to explore how to develop exciting new treatments for many diseases.”



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CRISPR-based genomic scissors have unveiled new possibilities in medicine and biotechnology. Similar to a word processing program that finds, deletes and replaces words or letters, these CRISPR RNA-protein complexes search for certain DNA sequences in a cell, cut them and allow the cell to paste in new DNA information. MilliporeSigma, together with Dr. Gordon's group, will use its CRISPR genome scissors in this collaboration to modify the sequence of DNA in microbes cultured from human gut microbiome samples. The results will help the researchers obtain essential, new information about the microbes' functions and nutritional needs.

"Our shared goal is to apply gene-editing technology to further understand the mechanisms by which beneficial human gut microbes promote healthy growth in children," said Jeffrey Gordon, MD, director of the Edison Family Center for Genome Sciences and Systems Biology at Washington University. "By marrying this technology with our preclinical models, we can decipher how gut microbes become established in the developing gut, what nutrients are necessary to sustain those microbes and how gut microbial communities influence muscle and bone growth, maturation of our immune systems and metabolic health.

"Development of a healthy gut community is linked to the healthy growth of infants and children. Results obtained from this collaboration should aid our ongoing efforts to devise new, safe and culturally acceptable ways to repair the developing gut communities in malnourished children or children at risk of malnutrition. This knowledge will facilitate development of new types of microbiota-directed foods, composed of naturally occurring ingredients, that increase the representation and beneficial functions of naturally occurring bacterial strains in the immature gut communities of these children," Dr. Gordon added.

With a 13-year history in the genome-editing field, MilliporeSigma was the first company to offer custom biomolecules for genome editing globally (TargeTron™ RNA-guided group II introns and CompoZr™ zinc finger nucleases), driving adoption of these techniques by researchers all over the world. MilliporeSigma was also the first company to manufacture arrayed CRISPR libraries covering the entire human genome, accelerating cures for diseases by allowing scientists to explore more questions about root causes.

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[As a company that has been highly involved in genome-editing innovation,](#) MilliporeSigma recognizes that genome editing has resulted in major positive advancements in biological research and medicine. At the same time, the growing potential of gene-editing technologies has opened scientific, legal and societal concerns. As both a user and supplier of gene-editing technology, MilliporeSigma supports research with genome editing under careful consideration of ethical and legal standards. MilliporeSigma's parent company, Merck KGaA, Darmstadt, Germany, has established a [Bioethics Advisory Panel](#) to provide guidance for research in which its businesses are involved, including research on or using genome editing, and has defined a clear operational [position](#) taking into account scientific and societal issues while not blocking any promising therapeutic approaches for use in research and applications.

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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 20,000 employees and 60 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, Darmstadt, Germany is a leading company for innovative and top-quality high-tech products in healthcare, life science and performance materials. The company has five businesses – Biopharmaceuticals, Consumer Health, Allergopharma, Life Science and Performance Materials – and generated sales of €15.3 billion in 2017. Almost 53,000 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



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an approximately 70 percent interest, the founding family remains the majority owner of the company to this day. The company 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.