Weight-loss drugs, malaria vaccines and more: CRISPR innovations headline the science breakthroughs of 2023

In the 1980s and early 1990s, scientists in Spain and Japan found strange, repeating patterns in the DNA of certain bacteria. Researchers eventually linked these sequences to an immune defense system that they named “clustered regularly interspaced palindromic repeats”—or CRISPR. In the following decades, scientists found clever ways to build on CRISPR to edit genes in plants, animals, and even humans.

CRISPR is this year’s top breakthrough not only because of heroic work done in the past 12 months, but also because of a long thread of heroes whose work spans decades.

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1. CRISPR’s Triumph: A Possible Cure for Sickle-Cell Disease

In December, the FDA approved the world’s first medicine based on CRISPR technology. Developed by Vertex Pharmaceuticals, in Boston, and CRISPR Therapeutics, based in Switzerland, Casgevy is a new treatment for sickle-cell disease, a chronic blood disorder that affects about 100,000 people in the U.S., most of whom are Black.

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2. GLP-1s: A Diabetes and Weight-Loss Revolution

In the 1990s, a small team of scientists got to know the Gila monster, a thick lizard that can survive on less than one meal a month. When they studied its saliva, they found that it contained a hormone that, in experiments, lowered blood sugar and regulated appetite. A decade later, a synthetic version of this weird lizard spit became the first medicine of its kind approved to treat type 2 diabetes.

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5. Malaria and RSV Vaccines: Great News for Kids

Malaria, one of the world’s leading causes of childhood mortality, killed more than 600,000 people in 2022. But with each passing year, we seem to be edging closer to ridding the world of this terrible disease. Fifteen months ago, the first malaria vaccine, developed by University of Oxford scientists, was found to have up to 80 percent efficacy at preventing infection.

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