U.S. Department of Health & Human Services

NIH National Institutes of Health
Turning Discovery Into Health

NIH RESEARCH MATTERS

# 2021 Research Highlights

With NIH support, scientists across the United States and around the world conduct wide-ranging research to discover ways to enhance health, lengthen life, and reduce illness and disability. Groundbreaking NIH-funded research often receives top scientific honors. In 2021, these honors included Nobel Prizes to five NIH-supported scientists. Here's just a small sample of the NIH-supported research accomplishments in 2021. For more health and medical research findings from NIH, visit NIH Research Matters.

## Human Health Advances

Disease Prevention, Diagnosis, and Treatment

### COVID-19 spread and vaccines

Gene therapy effective in human trials

Advances in gene therapy are showing promise for people with life threatening conditions. Using gene therapy, researchers were able to introduce a healthy copy of a disease-causing gene and restore immune system function in children with a rare genetic disorder called severe combined immunodeficiency, or SCID. In another study, researchers safely delivered gene therapy to the brain to treat a debilitating neurological disease for which there are no effective treatments.

Low-fat diet compared to low-carb diet

There has been a great deal of debate over what aspects of our diets affect weight control. A carefully controlled study found that people ate fewer calories per day and lost more weight on a plant-based, low-fat diet compared to an animal-based, low-carb diet. However, the low-fat diet led to

## Developments in Alzheimer's disease research

One of the hallmarks of Alzheimer's is an abnormal buildup of amyloid-beta protein. A study in mice suggests that antibody therapies targeting amyloid-beta protein could be more effective after enhancing the brain's waste drainage system (94)

### Nanoparticle-based flu vaccine

Influenza, or flu, kills an estimated 290,000-650,000 people each year worldwide. The flu virus changes, or mutates, quickly. A single vaccine that conferred protection against a wide variety of strains would provide a major boost to global health. Researchers developed a nanoparticle-based vaccine that protected against a broad range of flu virus strains in animals. The vaccine may prevent flu more effectively than current seasonal vaccines. Researchers are planning a Phase 1 clinical trial to test the vaccine in people.

### A targeted antibiotic for treating Lyme disease

Lyme disease cases are becoming more frequent and widespread. Current treatment entails the use of broad-spectrum antibiotics. But these drugs can damage the patient’s gut microbiome and select for resistance in non-target bacteria. Researchers found that a neglected antibiotic called hygromycin A selectively kills the bacteria that cause Lyme disease. The antibiotic was able to treat Lyme disease in mice without disrupting the microbiome and could make an attractive therapeutic candidate.

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## Basic Research Insights