Cedars-Sinai Investigators ID Gene Critical to Human Immune Response

May 27, 2022 sarah Jonas Research Results

Post Views: 43

LOS ANGELES (May 27, 2022) — Cedars-Sinai investigators have identified a gene that plays an essential role in the innate human immune system. The gene, *NLRP11*, helps activate the inflammatory response that tells the body's white blood cells to go on the attack against a foreign presence.

The findings, published in *Nature Immunology*, bring medical science closer to understanding a biological process that can both help and harm the body.

"Chronic inflammation is an underlying cause of innumerable human diseases," said Christian Stehlik, PhD, a co-senior author of the study and director of Pathology Research at Cedars-Sinai. "If you study the molecular mechanisms involved in how inflammation occurs and how it is regulated, you find something that can be applied very broadly."

When the immune system senses a bacteria, virus, toxin or other foreign presence in the body, it sends white blood cells to surround the unwanted substance and release chemicals to attack it. This response leads to inflammation, which causes redness, pain, warmth and swelling in the affected area as the body heals itself. Sometimes this defensive response lasts longer than it should, resulting in chronic inflammation. Or, the immune system may mistakenly attack healthy cells, leading to autoimmune disease.

“Acute inflammation is necessary and beneficial to eradicate infection and initiate wound healing,” said Andrea Dorfleutner, PhD, co-senior author of the study and associate professor in the departments of Academic Pathology and Biomedical Sciences at Cedars-Sinai. “Chronic, long-term, uncontrolled inflammation, however, is detrimental and can damage the body’s organs and tissues.”

The key to controlling the inflammatory response and preventing chronic inflammation may lie in being able to influence the expression of the *NLRP11* gene.

The investigators used a gene-editing system called CRISPR/Cas9 to remove genes or introduce gene mutations in human white blood cells called macrophages. They observed that when they deleted *NLRP11*, it prevented an immune system sensor called the NLRP3 inflammasome from being activated and launching the inflammatory response.

When the investigators restored the *NLRP11* gene, the NLRP3 inflammasome sent its attack signals, which triggered the typical inflammatory process. The investigators chose to focus on this gene in particular because it is not expressed in mice, which led them to hypothesize that it was integral to the complex immune system that exists in humans.

“Now that we have a better picture of the mechanisms behind inflammation, we can come up with completely new strategies to target it that have not been possible before,” Dorfleutner said.

The first authors of the study are Anu Gangopadhyay, Savita Devi, PhD, and Shivendra Tenguria, PhD, all investigators in the Stehlik and Dorfleutner Laboratory.

Feature Experts Tip Sheet
Feature Tip Sheet
Grant
Higher Education Event
Marketplace
Medical
Policy
Research Alert
Research Results
Research Tip Sheet
Uncategorized
Video Only
نتائج البحث
研究结果

RECENT POSTS

Many Attendees of Gatherings Like Burning Man Report “Transformative Experiences”
High Cost of Cancer Care in the U.S. Doesn’t Reduce Mortality Rates
Study Finds Health Benefits of ‘Aging in Place’ at TigerPlace
Easy, Flexible Access to Produce, Resources Boosts Healthy Eating for

Funding: The study was funded by the National Institutes of Health (award numbers AI099009, AR064349, AI134030, AI140702, AI165797, and AI120625) and the American Heart Association (award number 834502).

Read more: A Double-Edged Sword: Inflammation and Your Health

Follow Cedars-Sinai Academic Medicine on Twitter for more on the latest basic science and clinical research from Cedars-Sinai.

Autoimmune Disease, Biomedical Sciences, Cedars-Sinai, chronic inflammation, CRISPR/Cas9, Gene Mutations, inflammatory response, Macrophages

← British Coral Predicted to Be Resilient to Climate Change

Rutgers Cancer Institute of New Jersey RWJBarnabas Health Facilities Receive First Regional Accreditation by American College of Radiology →

Related Posts

May 27, 2022

Many Attendees of Gatherings Like Burning Man Report "Transformative Experiences"

May 27, 2022

High Cost of Cancer Care in the U.S. Doesn't Reduce Mortality Rates

May 27, 2022

Study Finds Health Benefits of 'Aging in Place' at TigerPlace

Central Texas Kids

Critical race theory at center of UW study of unequal access to treatment for opioid addiction

ARCHIVES

May 2022
April 2022
March 2022
February 2022
January 2022
December 2021
November 2021
October 2021
September 2021
August 2021
July 2021
June 2021
May 2021
April 2021
March 2021
February 2021
January 2021
December 2020
November 2020
October 2020
September 2020

August 2020
July 2020
June 2020
May 2020
April 2020
March 2020
February 2020
January 2020
December 2019
November 2019
October 2019
September 2019
August 2019
July 2019
June 2019
September 2018

TAGS

Aging
Agriculture
Atmospheric Science
BEHAVIOR
BIOCHEMISTRY
Biodiversity
Biology
BIOMEDICAL/ENVIRONMENTAL/ENGINEERING
Biotechnology
BUSINESS/ECONOMICS

Cancer
Cardiology
Cell Biology
CHEMISTRY/PHYSICS/MATERIAI SCIENCES
Climate Change
Climate Science
Clinical Trials
Coronavirus
COVID-19
Earth Science
ECOLOGY/ENVIRONMENT
Education
EPIDEMIOLOGY
Evolution
Genetics
HEALTH CARE SYSTEMS/SERVICES
HEALTH PROFESSIONALS
IMMUNOLOGY/ALLERGIES/ASTH
INFECTIOUS/EMERGING DISEASES
MARINE/FRESHWATER BIOLOGY
MEDICINE/HEALTH
Mental Health
Microbiology
Molecular Biology
NANOTECHNOLOGY/MICROMAC

Neurobiology
Pediatrics
PHARMACEUTICAL SCIENCES
Physiology
PLANT SCIENCES
Public Health
RESEARCH/DEVELOPMENT
SOCIAL/BEHAVIORAL SCIENCE
SPACE/PLANETARY SCIENCE
TECHNOLOGY/ENGINEERING/CO SCIENCE

RECENT COMMENTS

Safety Advice on COVID-19 (coronavirus) | sciencenewsnet.in on COVID-19（コロナウイルス）に関する安全アドバイス

Study shows exposure to multiple languages may make it easier to learn one | Articles Dunia Free Article Submission site on Study shows exposure to multiple languages may make it easier to learn one

- Using VR brings History to Life for Students on Virtual Reality Brings History to Life for Students
- TheMeisterAce (reddit user) on Engineered Cell Evolution May Provide Pathway to Halting Cancer Drug Resistance
- reddit user "HumanDrinkingTea" on Music Students Score Better in Math, Science, English Than Non-Musical Peers