AUTOIMMUNE ENCEPHALITIS (AE) IS A CONDITION IN WHICH INFLAMMATION OCCURS IN VARIOUS REGIONS OF THE BRAIN.

In AE a person’s immune system produces antibodies (proteins) that mistakenly targets components of the person’s own neurons (nerve structures). This can result in inflammation and nerve tissue damage. As a result, a person with AE can present with different neurological symptoms including seizures (sudden, uncontrolled electrical disturbances in the brain) and memory problems. There are different types of AE based on which protein the immune system is mistakenly targeting. Two of the most common types of AE are:

A) NMDAR AE - antibodies targeting a brain protein called N-methyl-D-aspartate receptor or NMDAR and

B) LGI-1 AE - antibodies targeting a brain protein called leucine-rich, glioma inactivated-1 or LGI-1

While we know antibodies play a key role in the disease, we do not know what changes occur in other parts of the immune system during the course of AE.

The innate immune system is a part of the immune system that acts as a broad first line of defence against foreign invaders to the body like viruses and bacteria. This system can often start or increase inflammation in the body as a protective mechanism. Monocytes are a major type of cell in the innate immune system that drive this response. Monocytes can alert and activate other parts of the immune system through release of small signalling proteins. These small signalling proteins can be released into the blood and tissues and are called cytokines. In AE it is unknown whether the innate immune system or monocytes play a role in the disease.

FOR THIS RESEARCH, WE SET OUT TO FIND OUT ANSWERS TO FOLLOWING –

1. Are monocytes in people with AE different than in healthy people?
2. Is there other evidence of inflammation in the blood of people with AE?
3. Does the level of inflammation in AE determine disease severity?
4. Are the inflammatory changes the same in different types of AE?

WHAT WERE THE INTERESTING THINGS WE FOUND?

We found that a certain type of monocyte known to play a key role in inflammation in other diseases are increased in number in people with AE compared with healthy volunteers.

We also identified that certain cytokines (IL-6, TNF-a) that are important in starting and maintaining inflammation are also increased in people with AE compared with healthy volunteers.

These changes were present in both severe and mild AE but were much stronger in people with LGI-1 antibody associated AE.
HOW WE DID THIS WORK

We recruited 40 people with AE and 28 healthy volunteers who provided blood samples. These blood samples were evaluated in the laboratory for:

- Characteristics of the monocytes (whether they show signs of being active and more inflammatory), and
- Levels of different cytokines in the blood that may show increased activity of the immune system and increased inflammation

These findings were then compared between people with AE and the healthy volunteers to see if there were any differences. We also compared these findings between people with different types and severities of AE.

What do these findings mean?

THIS RESEARCH SHOWED THAT THERE IS ONGOING INFLAMMATION IN THE BLOOD OF PEOPLE WITH AE. ALSO, MONOCYTES AND THE INNATE IMMUNE SYSTEM MAY PLAY A ROLE IN THE DISEASE.

The research could help clinicians to –

1. Identify new treatments that target monocytes and the innate immune system
2. Use the inflammatory changes identified as a way to diagnose and monitor the disease.

Keywords: autoimmune encephalitis, monocytes, biomarkers, innate immunity, cytokines

This plain language summary is written by Dr Robb Wesselingh
Edited by Dr Mastura Monif, Dr Loretta Piccenna, Ms Tiffany Rushen, Ms Amanda Wells (consumer representative), and Ms Michelle Mykytowycz (consumer representative).

Contact Us

Dr Mastura Monif
Research Group Leader
Monash Medicine, Nursing and Health Sciences

Research group -
monash.edu/medicine/ncs/neuroscience/research/monif-group

Australian Autoimmune Encephalitis Consortium project website
- monash.edu/medicine/autoimmune-encephalitis

We are also a member of the Monash Central Clinical School Consumer and Research Engagement (CARE) Program

Source:
https://doi.org/10.1016/j.jaut.2023.103000