

CLUES ABOUT THE ROOT CAUSE

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Researchers at the Indian Institute of Science (IISc), Bengaluru, have found that a class of cells that defends the body against invaders also triggers obsessive-compulsive behaviour in patients suffering from autoimmune disorders such as multiple sclerosis (MS).

The researchers discovered this while studying mice made to exhibit MS-like conditions. They found that immune cells called Th17 lymphocytes induced them to excessively groom themselves, a behaviour similar to Obsessive Compulsive Disorder (OCD).

The team had induced MS-like conditions in mice and looked closely at their behaviour. The diseased animals were found to spend 60-70% more time grooming themselves when compared to the healthy ones. This is suggestive of OCD, which is typified by uncontrollable repetitive behaviour.

Trying to figure out what triggered the behaviour, the team zeroed in on Th17 cells, as earlier studies had shown them to be capable of penetrating the blood-brain barrier and playing a key role in the progression of MS. In MS, the immune system attacks the protective sheath (myelin) that covers nerve fibres and disrupts the communication networks between the brain and the rest of the body. Eventually, the disease can cause the nerves themselves to deteriorate or become permanently damaged.

For their experiment, the researchers infused the diseased mice with the Th17 cells and found that the mice spent more time grooming themselves, burying more marbles and shredding their bedding more. Further, brain tissue analysis in these mice showed that many of these cells were lodged in the brain stem and cortex — areas that are known to regulate grooming.

However, the obsessive grooming reduced when the mice were given an anti-depressant that boosts the uptake of serotonin — an important chemical messenger that influences mood. This suggested that the Th17 cells eventually disrupted serotonin uptake giving rise to the OCD-like symptoms.

The team also gave the diseased mice digoxin, a molecule that inhibits Th17 development, and found that the time spent on grooming and the number of grooming bouts almost halved.

Prof. Avadhesh Surolia, honorary professor at the Molecular Biophysics Unit, IISc, conducted the study in collaboration with his former research associates, Ravi Kant and Shweta Pasi.

“Targeting the development of Th17 cells using drugs could offer a novel method to correct compulsive behaviour in patients with autoimmune disorders. In this way, we will be able to treat the root cause of the malady rather than merely targeting its manifestations and symptoms,” explained Dr. Surolia in a press release issued by IISc.

Autoimmune disorders, where the body’s immune system goes rogue and attacks healthy cells, are very difficult to treat. For instance, MS, which affects over two million people world-wide, has no known cure. What makes such disorders all the more severe is that patients are also known to suffer from depression, anxiety or OCD. So far, the relationship between such illnesses and the immune system was not clear. The new study has shown a new path.

The findings have been published in *Frontiers in Immunology*. — India Science Wire

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