New Discovery May Lead To Effective And Natural Treatment For Parkinson’s Disease

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By Eurasia Review

Investigators have identified two molecules naturally produced by the body that stimulate the production of dopamine, the molecule that is in short supply in the brains of patients with Parkinson’s disease. Stimulating dopamine production may help reverse the progression of the disease.

The research was led by scientists at McLean Hospital in collaboration with scientists at Nanyang Technical University, Singapore, and published in the journal *Nature Chemical Biology*.

The team designed the study based on the knowledge that a protein called Nurr1 is key for maintaining the health of neurons that produce dopamine, which helps control a person’s movements and emotions. It is thought that decreased Nurr1 effectiveness may lead to a decrease in dopamine levels, which then results in the development of Parkinson’s disease.
“We thought that small molecules that can activate Nurr1 may be promising
drug candidates to treat Parkinson’s disease. After many years of research, in
2015, we found three FDA-approved drugs that bind to Nurr1 and activate it,”
explained senior author Kwang-Soo Kim, PhD, director of the Molecular
Neurobiology Lab at McLean Hospital and a professor of psychiatry
at Harvard Medical School. “This finding prompted us to hypothesize that
there may be natural molecules—that is, endogenous ligands—that also bind to
Nurr1 but don’t have side effects.”

When the scientists looked for such molecules in various tissues from mice,
they found hormone-like compounds called prostaglandin A1 and E1 as
promising candidates that bound to and activated the Nurr1 protein. The
collaborative team also created a model depicting the structure of these
molecules when they are bound to the Nurr1 protein by performing X-ray co-
crystallography and nuclear magnetic resonance studies. This information will
be critical as treatment strategies that target Nurr1 are optimized.

The investigators showed that physiological concentrations of prostaglandin
A1 or E1 in the nanomolar ranges can protect dopamine neurons against
neurotoxins. Next, the investigators found that when mouse models induced to
develop symptoms similar to Parkinson’s disease were treated with
prostaglandin A1 or E1, the animals’ motor skills and functions improved
significantly without any signs of side effects, such as abnormal dyskinesia-
like behavior.

Analyses of the animals’ brains revealed that the treatment protected the
dopamine-producing brain cells from dying and made them produce higher
levels of dopamine.

“Although we showed that these molecules can correct Parkinson’s-like
symptoms in animal models in a neuroprotective manner, further studies are
essential to determine whether they can work in human clinical trials,” said
Kim.

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