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## Lundbeck part of major advances in the understanding of Parkinson's disease

**In collaboration with researchers from the University of York in the UK, Lundbeck researchers have discovered groundbreaking methods that could be used for the diagnosis and treatment of Parkinson's disease at such an early stage that the disease is potentially delayed or never breaks out.**

H. Lundbeck A/S (Lundbeck) is involved in new research on Parkinson's disease, which may be the first step towards a new and significantly improved treatment of the debilitating and devastating disease.

In collaboration with researchers from the University of York, Lundbeck's researchers have made discoveries in fruit flies with regards to Parkinson's disease, which is a breakthrough in the understanding of the biological processes that occur in the brain in connection with the disease. The discoveries have just been published in the renowned scientific journal, Human Molecular Genetics.

The researchers have discovered a method that could potentially be used to diagnose the cause of Parkinson's disease many years before the disease breaks out. At the same time they have found a way in which the cause can be targeted, so that the disease is potentially delayed or never breaks out. Both would be major advances in Parkinson's disease, where there are still significant unmet treatment needs.

"This new research may prove to be groundbreaking in the understanding and treatment of Parkinson's disease. Science does not currently have answers for what happens in the brain before and during the disease, but these discoveries may bring us closer to this understanding. This may also give us the opportunity to revolutionize the diagnosis and treatment of Parkinson's disease, for the benefit of patients and their families," says Kim Andersen, Senior Vice President, Research at Lundbeck.

Dr. Chris Elliott, of the Department of Biology at York, said: "If this kind of drug proves to be successful in clinical trials, it would have the potential to bring long-lasting relief from PD symptoms and fewer side effects than existing levodopa therapy."

Dr. Alex Wade, of the University's Department of Psychology, added: "This technique forms a remarkable bridge between human clinical science and animal research. If it proves successful in the future, it could open the door to a new way of studying a whole range of neurological diseases."

### **Have researched gene mutation**

The researchers behind the discoveries have studied a specific mutation in a human gene. The mutation is the largest genetic risk factor for developing Parkinson's disease, probably because it results in over-activity in a particular enzyme in the brain.

It is believed that this over-activity causes brain cells to die in both humans and fruit flies, and it is this cell death which causes the disease in humans. The researchers have now discovered that you can prevent precursors to this cell death in fruit flies by reducing the over-activity with medicine, and that brings hope that the same can be done in humans.

By hatching fruit flies with the mutation, the researchers have been able to study its specific effect in a complex living organism immediately from this organism's birth. It has been previously demonstrated that the gene mutation will cause the brain cells of fruit flies to die by changing the communication processes in the brain. Researchers have now been able to measure these changes in the fruit fly's eye long before cell death occurs.

Thus, for the first time ever, researchers have been able to measure the effects of the mutation long before cells have died, and therefore before damage have occurred to the brain. If these processes also occur in humans, the new research may allow for the possibility of detecting and treating Parkinson's disease before brain cells die.

This would represent great progress compared to the situation today, where treatment typically only begins when the disease is relatively advanced and there has been a great loss of brain cells.

### **Preventive treatment**

At the same time, the new discoveries prove that the gene mutation results in changes in the brain as a result of over-activity of a particular enzyme in the fruit fly's brain cells. A process which researchers see as parallel to the processes that lead to the death of brain cells in people with Parkinson's disease.

In the new studies, researchers have also been able to determine what happens if you reduce this over-activity by giving the flies a drug with a dampening effect on gene mutation. The result was that the cells and processes in the brain are normalized when the over-activity is reduced, which is expected to eliminate cell death.

The discovery is groundbreaking because it might pave the way for people with the specific gene mutation - and possibly Parkinson's patients in general - to be diagnosed earlier, receive preventive treatment and thus never develop Parkinson's disease. In other words, the same principle used today to for example, provide cholesterol-lowering medication to minimize the risk of future blood clots.

At best, new treatments based on this new research could be on the market within 10 years. Lundbeck currently has a number of research projects and collaborations relevant to Parkinson's disease.

### **About Parkinson's Disease**

Parkinson's disease is a serious brain disorder that causes tremors and muscle stiffness. In addition to the motion-related, motor symptoms, many Parkinson's patients experience non-motor symptoms, which include sleep disorders, sensory symptoms, depression and gastrointestinal symptoms.

More than five million people worldwide have Parkinson's disease, but many more are affected as relatives to people with the disease. The average age of diagnosis is 61 years old, however the disease also affects younger people all the way down to their late 20s.

In healthy people, the musculoskeletal system is controlled by nerve cells that communicate with each other by means of dopamine. In Parkinson's disease the dopamine-producing cells in the brain degenerate, which affects the entire central nervous system. Therefore, communication between the cells deteriorates and the patient may lose control of his/her movements.

### **More information**

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### **About Lundbeck**

H. Lundbeck A/S (LUN.CO, LUN DC, HLUYY) is a global pharmaceutical company specialized in brain diseases. For more than 50 years, we have been at the forefront of research within neuroscience. Our development and distribution of pioneering treatments continues to make a difference to people living with brain diseases. Our key areas of focus are alcohol dependence, Alzheimer's disease, depression/anxiety, epilepsy, Huntington's disease, Parkinson's disease, schizophrenia and stroke.

Our approximately 6,000 employees in 57 countries are engaged in the entire value chain throughout research, development, production, marketing and sales, and are committed to improving the quality of life of people living with brain diseases. Our pipeline consists of several late-stage development programs and our products are available in more 100 countries. We have research centres in China, Denmark and the United States, and production facilities in China, Denmark, France, Italy and Mexico. Lundbeck generated revenue of approximately DKK 15 billion in 2013 (EUR 2.0 billion; USD 2.7 billion).

For further information please visit [www.lundbeck.com](http://www.lundbeck.com).

For more information about the Department of Biology at the University of York, please visit <http://www.york.ac.uk/biology/>

For more information about the Department of Psychology at the University of York, please visit <http://www.york.ac.uk/psychology/>