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There is no therapy more potent than levodopa for the symptoms of Parkinson's, even four decades after Dr Cotzias first showed its ability to 'awaken' Parkinson's patients. But is this about to change?

The Levodopa Story: Zombies and frozen addicts

Levodopa is converted into dopamine in the body: an essential brain chemical that is deficient in Parkinson's [5].

Long before the 'elixir of life' dopamine was first discovered, a strange sleeping sickness [6] swept the world from 1916 to 1927. Many of those who survived were 'as insubstantial as ghosts, and as passive as zombies', sitting motionless and speechless all day in their chairs.

Administration of levodopa restored dopamine levels, 'awakening' the patients, as beautifully portrayed in the book of the same name [7] by neurologist Oliver Sacks [8].

Meanwhile, a group of young drug addicts [9] in California suddenly developed an exceptionally severe form of Parkinson's in 1982 after taking a contaminated form of heroin which destroyed their dopamine-producing brain cells.

These unfortunate events have proved the importance of dopamine in controlling movement.

Restoring dopamine – add it, mimic it, boost it or 'regrow' it

Dopamine can be added to the brain by swallowing levodopa, often in combination with a second drug that

prevents it being converted into dopamine until it reaches the brain. This reduces side effects and means that lower doses can be prescribed. Common combination drugs include Sinemet and Madopar.

Drugs that mimic dopamine include pramipexole and ropinirole. Unlike levodopa, their action is relatively constant: levodopa can have a troublesome ‘on-off effect’, where the patient suddenly stops whilst walking and is rooted to the spot, probably due to fluctuating blood levels of the drug.

Drugs that mimic dopamine have, however, been linked to excessive sleepiness, hallucinations and even compulsive behaviours such as gambling.

Dopamine levels can be boosted by drugs that prevent its natural breakdown in the brain. One such recently-introduced drug is Xadago. According to Professor Olanow from the Mount Sinai School of Medicine, “Xadago is the first drug to be approved for the treatment of Parkinson’s disease in the past 10 years.”

It has been tested on more than 3000 patients in 30 countries and is welcomed in the EU, but is yet to convince the US market.

Regrowing dopamine neurons sounds like something out of science fiction, but experiments into stem cell transplants and gene therapy keep the dream alive. Meanwhile, Dr Alan Whone and his team at Frenchay hospital are looking into injecting a drug called GDNF into the brain of Parkinson’s patients to trigger growth of brain cells.

Beyond dopamine – surprises in store?

Love them or hate them, statins provoke mixed reactions in the media. Used to prevent heart attacks, a ground-breaking new study is testing whether statins can stop dopamine nerve cells from dying.

Investigator Dr Mary Akinola from Oxford states; “This is an exciting prospect because all current drugs only reduce the symptoms of Parkinson’s: statins may actually slow or halt the progression of the disease”.

Other common drugs such as ibuprofen, levetiracetam (an antiepileptic), metformin (a diabetes drug), minocycline (an acne drug) and coenzyme Q10 (a food supplement) also show promise in Parkinson’s therapy. There is hope on the horizon.

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