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Scientists link soil particles to Parkinson's

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Tiny specks of dirt have been pinpointed as causes of Parkinson's disease. Scientists have found that soil contains strains of bacteria linked to the incurable neurological illness.

Their research raises the prospect of creating vaccines to protect individuals from Parkinson's, which affects more than 120,000 Britons and whose sufferers include the Pope and the American film star Michael J. Fox.

'We are not saying every case of Parkinson's disease is caused by soil bacteria but our evidence suggests a fairly substantial number are triggered by them,' said microbiologist Professor Blaine Beaman of the University of California.

The bacterium *Nocardia asteroides* is found in soil and several strains are known to cause lung infections and occasionally brain abscesses.

'If you treat nocardia infections quickly enough, you can usually mop them up - unless the bacterium has spread to the brain, where it becomes difficult to deal with,' said Beaman.

He and his colleagues took samples of nocardia and infected mice with them. Many mice developed abnormal movements - shaking, hunched posture and slowness in action - similar to those displayed by Parkinson's patients.

Even more striking were analyses of the brains of infected mice. 'The bacteria affected the same brain cells that are damaged in Parkinson's cases,' said Beaman. 'They caused protein clumps to form inside cells, and this also happens in Parkinson's in humans.'

Parkinson's disease occurs when brain cells involved in controlling movement swell and die. These cells are responsible for producing dopamine, a chemical messenger that enables people to perform co-ordinated movements. Without dopamine, victims lose the power to walk, swallow, write and talk; they suffer shaking, muscle stiffness and slowness of movement.

The loss of dopamine-producing cells, triggered by nocardia infections in mice, was a critical discovery. Beaman and his colleagues followed up their research - presented at a

conference at East Anglia University this month - by carrying out similar experiments on monkeys and on human brain cells grown in the laboratory.

The effects were like those produced by Parkinson's in the brain: protein clumps formed in monkey brains and dopamine-producing cells were killed off. But the Californian team also found that once bacteria produce such brain damage, they die without leaving any evidence. 'That means we cannot expect to find bacteria in Parkinson's patients and so confirm our theory,' said Beaman.

'Nor can we infect humans with nocardia to see if they induce Parkinson's. Obviously that is ethically unacceptable. So we are going to have to try to work out some other way to prove a link between the bacterium and Parkinson's.'

Beaman estimates that between 30 and 40 per cent of Parkinson's cases may be triggered by soil bacteria.



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