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Rotenone, paraquat, and Parkinson's disease

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Abstract

Background: Mitochondrial dysfunction and oxidative stress are pathophysiologic mechanisms implicated in experimental models and genetic forms of Parkinson's disease (PD). Certain pesticides may affect these mechanisms, but no pesticide has been definitively associated with PD in humans.

Objectives: Our goal was to determine whether pesticides that cause mitochondrial dysfunction or oxidative stress are associated with PD or clinical features of parkinsonism in humans.

Methods: We assessed lifetime use of pesticides selected by mechanism in a case-control study nested in the Agricultural Health Study (AHS). PD was diagnosed by movement disorders specialists. Controls were a stratified random sample of all AHS participants frequency-matched to cases by age, sex, and state at approximately three controls:one case.

Results: In 110 PD cases and 358 controls, PD was associated with use of a group of pesticides that inhibit mitochondrial complex I [odds ratio (OR)=1.7; 95% confidence interval (CI), 1.0-2.8] including rotenone (OR=2.5; 95% CI, 1.3-4.7) and with use of a group of pesticides that cause oxidative stress (OR = 2.0; 95% CI, 1.2-3.6), including paraquat (OR=2.5; 95% CI, 1.4-4.7).

Conclusions: PD was positively associated with two groups of pesticides defined by mechanisms implicated experimentally-those that impair mitochondrial function and those that increase oxidative stress-supporting a role for these mechanisms in PD pathophysiology.

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Figures



Figure 1 Screening process of cases and...

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Spivey A.

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