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Parkinson's disease risks associated with dietary iron, manganese, and other nutrient intakes

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Background: Dietary influences on oxidative stress have been thought to play important role in the etiology of PD.

Objective: To examine associations of PD with dietary nutrients, including minerals, vitamins, and fats.

Methods: A population-based case-control study was conducted among newly diagnosed case (n = 250) and control subjects (n = 388) identified between 1992 and 2002 from enrollees of the Group Health Cooperative health maintenance organization in western Washington state. Controls were frequency matched to cases on sex and age. In-person interviews elicited data on food frequency habits during most of adult life. Nutrient intakes were calculated and analyzed by adjusting each person's nutrient intake by their total energy intake (the nutrient density technique).

Results: Subjects with an iron intake in the highest quartile compared with those in the lowest quartile had an increased risk of PD (odds ratio = 1.7, 95% CI: 1.0, 2.7, trend $p = 0.016$). There was an apparent joint effect of iron and **manganese**; dietary intake above median levels of both together conferred a nearly doubled risk compared with lower intakes of each nutrient (odds ratio = 1.9, 95% CI: 1.2, 2.9). No strong associations were found for either antioxidants or fats.

Conclusion: A high intake of iron, especially in combination with high **manganese** intake, may be related to risk for PD.

High dose