Parkinson's Disease and the Environment: A Scientific Consensus Statement

Executive Summary

In June 2007, 40 leading scientists, physicians, and patient advocates were invited to Sunnyvale, California to evaluate the latest research on possible environmental triggers of Parkinson's disease (PD) and to reach consensus on the relative certainty of the various environmental factors. The conference was organized by The Parkinson's Institute, the Parkinson's Action Network and the Collaborative on Health and the Environment. The resulting consensus statement was formulated and agreed upon by the participating scientists after the meeting. The document outlines the areas in which scientific consensus were achieved.

The meeting itself was historic in its commitment to foster cooperation and collaboration between researchers, clinicians, patient-advocates and representatives from national organizations and institutions. All attendees were encouraged to fully participate in the discussions at the meeting. The meeting agenda included the following goals:

1) To review findings from diverse research disciplines concerning environmental factors that alone or in combination with genetic variables provide a biologic basis of Parkinson's disease;
2) To identify conclusions that could be drawn with confidence from existing data;
3) To identify plausible but uncertain conclusions; and
4) To identify research gaps and needs and to describe features of a coherent research agenda.

The consensus statement includes discussion of the current understanding of Parkinson's disease. However, because there is a spectrum of symptoms and pathologies seen in epidemiologic and laboratory research studies, participants were not asked to develop a consensus definition of "Parkinson's disease." The environmental factors that were identified for the meeting are not intended to be all-inclusive or definitive. These topics were chosen because of the frequency with which they occur in scientific literature and because they were identified as areas of concern by the conference planning committee.

Based on their expertise and the research studies discussed, the scientific participants at the meeting used criteria similar to those used by the Institute of Medicine to rank their perspectives on the various factors. Please see the results of their findings below. In addition, visit http://www.healthandenvironment.org for further information about the meeting, the scientific consensus statement and related materials.

Findings

Scientific participants at the Sunnyvale Conference were **confident** of the following, **based on existing evidence**:

- The risk of developing PD increases with age.
- Studying PD helps researchers to understand other neurodegenerative diseases.
- Genetic mutations collectively account for less than 10 percent of all U.S. cases of PD. Even then, environmental factors may influence features of the disease, such as age of onset.

They believed that there was **sufficient evidence of an association** between being male and having an **increased risk** of developing Parkinson's disease. (Researchers do not know why.) Conversely, it was agreed that there was sufficient evidence to indicate that cigarette smokers and men who drink coffee are associated with a **lower risk** of PD. Users of other tobacco or caffeinated products and women who drink coffee *may* have less risk.

The group found **limited suggestive evidence of an association** between greater chances of developing PD in

- men with a high dairy intake;
- farmers and agricultural workers;
- people who have been exposed to pesticides. (No single chemical or compound was identified);
- people who have experienced a traumatic brain injury; or
- individuals with certain genetic variants. (Risks may be lower or higher, depending upon the variant.

They determined that **limited suggestive evidence of an association** exists to indicate that the **risk** of developing the disease is **lower** among

- people who are more physically active;
- men with elevated urate levels (women with high urate levels may also have a reduced risk); or
- people who are taking non-steroidal anti-inflammatory drugs (NSAIDs).

Scientific participants found that there was **inadequate or insufficient evidence to determine whether an association exists** between a **higher risk of PD** and

- people with increased body-mass index (BMI) or body fat;
- women who were occupationally exposed to polychlorinated biphenyls (PCBs) - specifically, electrical capacitor workers;
- people with a higher level of education; or
- people exposed to some specific pesticides.

Likewise, the group determined existing evidence was either inadequate or insufficient to determine an association between lower risk of PD and

- people with a higher dietary intake of polyunsaturated fatty acids;
- people with higher blood cholesterol;
- people taking statins; or
- post-menopausal women taking exogenous estrogen.

They determined that there was **limited suggestive evidence of no association** between welding and an increased risk of PD.

Lastly, the scientific participants could not reach consensus on the category of association for the following:

- People living in rural areas have/do not have an increased risk of PD.
- Vitamin E, C and carotenoids are/are not associated with PD risk.
- Dietary saturated fats are/are not associated with risk of PD.
- Well water drinking is/is not associated with PD risk.

Note: this list of determinations is based upon the issues discussed at the conference and is not intended to be inclusive of all environmental factors that may play a role in Parkinson's disease.