

ARE THE NEUROTOXIC EFFECT OF LOW-LEVEL LONG-TERM EXPOSURE TO ORGANOPHOSPHATES PERMANENT?

Yoram Finkelstein MD, PhD¹, Amit Ophir, MSc² and Elihu D. Richter, MD, MPH²

¹Neurology and Toxicology, Shaare Zedek, Medical Center. and ²The Department of Occupational and Environmental Medicine, Hebrew University-Hadassah School of Medicine, Jerusalem, Israel

Tel: +972-2-6555655. Fax: +972-2-6666941. email: yoramf@ekmd.huji.ac.il

Purpose: The Hula valley in the Upper Galilee has been extensively cultivated during the last five decades since its swamps were drained. Between 1987 and 1991, our studies which were supported by the World Health Organization assessed the low-level long-term exposures to OP pesticides and the consequent long-term neurological and neurobehavioral effects in workers and residents in several kibbutzim in the valley. We are currently continuing the work started on the original cohorts of 200 individuals more than 20 years ago to assess the extended outcome of prolonged everyday OP exposure. This is the first study with such a long follow-up.

Methods: We have generated a strong database of the original cohorts. Cognitive tests, neurophysiology and blood biochemistry studies including paroxonase-1 and neuropathy target esterase, and urinary OP metabolites measurements are under way.

Results: The original cohorts showed symptoms and signs of neurobehavioral dysfunction, with dose-response gradients between the symptoms and the measured levels of OP metabolites in urine samples of kibbutz residents, including children. Electrophysiological tests demonstrated mildly impaired nerve conduction velocities and amplitudes in both sensory and motor nerves. Neurobehavioral tests showed changes in measures of mood, and mental and motor performance. Measures of short-term memory, attention and time to reaction performance were impaired more in field workers than in other residents of the kibbutzim. Preliminary results of the current cognitive tests show mild signs of impairment in the performance of executive tasks of kibbutz residents.

Conclusions: These findings significantly contribute to the existing knowledge on the deleterious late cognitive effects of prolonged everyday long-term low-level exposure to environmental OP pesticides. The methodology of the study provides a template for introducing epidemiologic approaches to neurobehavioral toxicology in Israel. The final results will allow to guide planning and regulation of OP use in agriculture.