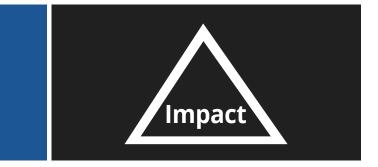
PON1 and Pesticides

Policv Application and Synthesis Implementation and Adjustment **Fundamental** and Questions Practice 1990 1999-2000 2004-2014 Reported that PON1 genotype and Showed that human PON1 variants Found that administering the PON1 protein to rats protected against exposure protein quantity may better predict introduced into mice influenced their to chlorpyrifos oxon, the toxic breakdown organophosphate sensitivity than sensitivity to organophosphate toxicity; genotype alone.¹⁰⁻¹¹ identified associations between PON1 product of the pesticide chlorpyrifos.¹ and human birth outcomes and neurodevelopmental effects.²⁰⁻²⁷ 2003 1991 Purified human PON1 protein for Demonstrated the validity of a 2008 the first time; cloned human PON1 gene functional genomic assay in detecting Suggested that human PON1 protein for further study.²⁻³ PON1 mutations.¹² expressed in bacteria could be used to treat exposure to diazoxon, a metabolic byproduct of diazinon.²⁸ 1993 2003-2006 Observed that mice lacking PON1 were Indicated that fetuses and newborns susceptible to organophosphate toxicity and 2008 are more sensitive to organophosphate atherosclerosis, or plaque buildup in arteries; exposure than adults; suggested that found that PON1 protection depends on the Developed laboratory protocols for PON1 levels plateau between 6 and type of organophosphate exposure.⁶⁻⁸ determining people's PON1 blood 15 months of age, with high variability concentrations and activity levels without between individuals.13-16 the use of toxic organophosphates.²⁹ 1999 2004-2012 CHAMACOS was established at the University 2009 of California, Berkeley, to investigate the Found that chlorpyrifos exposure Observed that low levels of a less active form effects of pesticides and other environmental interfered with brain development exposures among children living in an of the PON1 protein were associated with the in rats and humans.¹⁷⁻¹⁹ agricultural region in California.⁹ inhibition of butyrylcholinesterase, a protein used to monitor organophosphate exposure.³⁰ _____







Using mice, found that maternal PON1 protein quantity and activity influenced neonatal sensitivity to chlorpyrifos exposure.³¹



Recommended policy reforms on organophosphate use. ³²



Informed by NIEHS-funded studies, among others, the EPA banned use of chlorpyrifos on food sold in the United States.^{33*}

*No NIEHS funding was used to advocate the EPA for this policy change.

NIEHS supported research for all of the milestones highlighted above.