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Title: **A Systematic Review of Carcinogenic Outcomes and Potential Mechanisms from Exposure to 2,4-D and MCPA in the Environment, Journal of Toxicology, 2012.**

Dr. von Stackelberg has conducted a study to determine whether there was any validity to the suggestion from some epidemiologic studies that both 2,4-D and MCPA may be associated with an increased risk of non-Hodgkins lymphoma (NHL), Hodgkin's disease, leukemia and soft tissue sarcoma. The study concludes:

The combined evidence indicates it is highly implausible that exposure to 2,4-D and/or MCPA are associated with a risk of developing NHL or other lymphohematopoietic cancers.

Chlorophenoxy compounds, particularly 2,4-dichlorophenoxyacetic acid (2,4-D) and 4-chloro-2- methylphenoxy acetic acid (MCPA), are amongst the most widely used herbicides in the United States for both agricultural and residential applications. Epidemiologic studies suggest that exposure to 2,4-D and MCPA may be associated with increased risk non-Hodgkins lymphoma (NHL), Hodgkin's disease (HD), leukemia, and soft tissue sarcoma (STS).

Toxicological studies in rodents show no evidence of carcinogenicity, and regulatory agencies worldwide consider chlorophenoxyes as not likely to be carcinogenic or unclassifiable as to carcinogenicity. This systematic review assembles the available data to evaluate epidemiologic, toxicological, pharmacokinetic, exposure and biomonitoring studies with respect to key cellular events noted in disease etiology and how those relate to hypothesized modes of action for these constituents to determine the plausibility of an association between environmentally relevant concentrations of 2,4-D and MCPA and lymphohematopoietic cancers. The combined evidence does not support a genotoxic mode of action.

Although plausible hypotheses for other carcinogenic modes of action exist, a comparison of biomonitoring data to oral equivalent doses calculated from bioassay data show that environmental exposures are not sufficient to support a causal relationship. Genetic polymorphisms exist that are known to increase the risk of developing NHL. The potential interaction between these polymorphisms and exposures to chlorophenoxy compounds, particularly in occupational settings, is largely unknown.

Link: <http://24d.org/ScientificStudies/CarcinogenicOutcomes.pdf>