Annotated bibliography

National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Population Health and Public Health Practice; Committee to Review the Health Effects in Vietnam Veterans of Exposure to Herbicides (Eleventh Biennial Update). Veterans and Agent Orange: Update 11 (2018). Washington (DC): National Academies Press (US); 2018 Nov 15. Available from: https://www.ncbi.nlm.nih.gov/books/NBK535904/ doi: 10.17226/25137

This review article is done by groups of scientists and committee board members. Digging a little bit deeper into the authors, the first provided is the “National Academies of Science”. This is a private, non profit company that claims they offer “expert” advice. According to their websites their current projects involve the Ukraine war. Next up is the board of public health formulated to review the health effects on the vietnamese. This article is a review of previous articles done by the same aforementioned authors. This article and its predecessors is designed to be a full scope study of health effects related to the spraying of dioxin during the Vietnam war. After reviewing the evidence the authors for the 11th time update their conclusions, and findings for the toxicity of dioxin. Citing the many advances made in science as to why they continue to add new pathologies related to the exposure of agent orange. Ultimately they add just three new related diseases in this particular review, hypertension, monoclonal gammopathy of undetermined significance(a precursor to myeloma), and type 2 diabetes (which was highly debated). The intended audience for this article is both government officials in Washington, D.C. the general public, and the Vietnamese, and American veterans affected by agent orange. I chose this article because I believe other more independent studies offer evidence that links developmental disabilities to dioxin, which this study finds no correlation between the two.

Faqi AS, Dalsenter PR, Merker HJ, Chahoud I. Reproductive toxicity and tissue concentrations of low doses of 2,3,7,8-tetrachlorodibenzo-p-dioxin in male offspring rats exposed throughout pregnancy and lactation. Toxicol Appl Pharmacol. 1998 Jun;150(2):383-92. doi: 10.1006/taap.1998.8433. PMID: 9653070.

The authors of this article are respected members of the scientific community. All of the authors have participated in peer reviewed, published scientific studies in the past. The second author works for the Klinische Institute of Pharmacology and

Toxicology. This particular paper, and its findings were presented to the European Teratology society. The method of research used in the study is subcutaneous exposure to TCDD (tetrachlorodibenzo-dioxin) on male rats for the purpose of studying the effects in their offspring. The conclusion of the study found reduced sperm rates, increased abnormal sperm, development of pyknotic nuclei, and other adverse effects. Although this is helpful to my research the work was limited.

Baker TR, King-Heiden TC, Peterson RE, Heideman W. Dioxin induction of transgenerational inheritance of disease in zebrafish. Mol Cell Endocrinol. 2014 Dec;398(1-2):36-41. doi: 10.1016/j.mce.2014.08.011. Epub 2014 Sep 3. PMID: 25194296; PMCID: PMC4262573.

The authors of this study are again all respected members of the scientific community who have published literature before. The research is funded by National Institute of Health, The National Institute of Environmental Health Sciences, National Sea Grant College Program and others. In this article the epigenetic effects of dioxin are studied in zebrafish and their offspring. This study was particularly looking at cases where neither the offspring, nor the parent had been exposed to dioxin but rather the "grandparent" in this case. The study had a very useful chart which laid out the pathologies they would be studying including; change in sex ratio, increased skeletal deformities, decreased egg release, and decreased egg formation. This graphic also referenced several other animal studies related to the multi generational pathological effects of dioxin, and these included; decreased pregnancy rate, increased preterm birth, increased kidney disease, decreased primordial follicles, and more. This study was particularly helpful in supporting my research because it supported that dioxin is a toxic chemical that can alter DNA material which is then passed down to future generations.

Viluksela M, Pohjanvirta R. Multigenerational and Transgenerational Effects of Dioxins. Int J Mol Sci. 2019 Jun 17;20(12):2947. doi: 10.3390/ijms20122947. PMID: 31212893; PMCID: PMC6627869.

This study was done in Finland, and the authors cite no conflicts of interest. The study is affiliated with the School of Pharmacy and Department of Environmental and Biological Sciences, as well as the University of Eastern Finland. The study argues that exposure to dioxin can cause pathological multi generational effects. This study had a graph which goes more into depth about what exactly epigenetic mechanisms are. Essentially the graph shows that exposure to dioxin

can modify gene expression by methylating DNA which inhibits transcription, modification of the histone tail H3, and H4 which functions to activate, or suppress the binding of transcription factors. Small non coding RNA such as siRNA, or micro RNA which function to silence RNA by cleaving it. This particular article was a review study which cited several other studies, one of which was included in my research above. I felt this article did a nice job examining the biological developmental processes and citing multiple research articles that showed the effects of dioxin in animal studies on these processes. I believe the data leads them to a compelling conclusion which the authors state at the end of the article: “ The human health significance of the dioxin-induced preconceptional paternally mediated and transgenerational effects should be addressed in future studies.”