A FOLLOWUP STUDY OF DIOXIN LEVELS IN THE BLOOD OF AIDS PATIENTS WITH OPPORTUNISTIC INFECTIONS AS COMPARED TO HIV POSITIVE ASYMPTOMATIC PERSONS AND CONTROLS

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INTRODUCTION

The possibility exists that the immunosuppressive dioxins (PCDDs) and dibenzofurans (PCDFs) may be cofactors in the expression of AIDS in some Human Immunodeficiency Virus (HIV) infected persons.[1-4] To test this hypothesis, we measured dioxins in pooled plasma from persons in each of these groups: HIV positive asymptomatic individuals (N=100), HIV positive asymptomatic intravenous drug users (N=50), HIV positive AIDS patients with Kaposi's Sarcoma (N=100), and HIV positive persons with opportunistic infections (N=100). These were compared to a control group that was matched for age. We found elevated dioxins and "dioxin toxic equivalents" (TEQ) in the AIDS patients with opportunistic infections and lower than control values of dioxins and dioxin toxic equivalents in the asymptomatic HIV positive infected group. The other two groups showed neither elevated nor below average levels.

At time of abstract submission, this work is being repeated and extended by analyzing pooled blood from each of four groups. The groups selected were: HIV positive persons who have not yet developed symptoms (N=200), persons HIV positive for prolonged time periods who have remained asymptomatic (N=100), HIV positive persons with opportunistic infection (N=200), and a control group (N=200).

METHODS

The dioxin laboratory was "certified" by the World Health Organization in an Interlaboratory Validation Study for human blood and milk, and methods will not be

repeated here.[5] The pooled blood plasma, with an equal volume from each individual patient, was frozen and stored at minus 20°C until analysis.

RESULTS AND DISCUSSION

Recent reviews prepared by scientists from the United States Environmental Protection Agency (USEPA) address the effects of dioxins on the immune system. On the basis of current scientific literature, they conclude that "immunotoxicity and reproductive effects appear to occur at body burdens that are approximately 100 times lower than those associated with cancer." They also note that "recent evidence has strengthened the conclusion that the sensitivity of humans is similar to that of experimental animals (for cancer, immunotoxicity, Ah receptor binding, etc.)."[6]

Since it has been suggested that various cofactors may accelerate the progression of the disease or syndrome caused by human immunodeficiency virus-1 (HIV-1),[1-4] it is possible that varying body burdens of the PCDDs and PCDFs may play a role as a cofactor in the expression of the disease in HIV infected individuals. This hypothesis was tested by determining PCDD/F levels in pooled blood samples. For our first data set, samples of heparinized blood plasma were obtained from HIV positive persons from three groups: one hundred subjects with opportunistic infections, such as *Pneumocystis carinii* pneumonia; one hundred subjects with Kaposi's sarcoma; one hundred with no symptoms (asymptomatic); and fifty asymptomatic intravenous drug users. For comparison, blood was analyzed from healthy volunteer donors to the local Red Cross Blood Bank.

Figure I illustrates the results of the analyses converted to dioxin "toxic equivalents," based on current estimates of toxicity.[7,8] Both of the asymptomatic HIV positive groups at 34.8 and 33.3 ppt are lower than the control group at 40.5 ppt, and the group with Kaposi's Sarcoma at 39.4 ppt, is similar to the control group at 40.5 ppt. However, the group with opportunistic infections is significantly higher at 52.2 ppt.

These preliminary findings must be confirmed by more definitive studies. We are attempting to replicate our first findings by performing analyses on pooled blood from HIV positive persons who have not yet developed symptoms (N=200), persons HIV positive for prolonged time periods who have remained asymptomatic (N=100), HIV positive persons with opportunistic infection (N=200), and a control group (N=200). Measurements of individual samples for PCDD/Fs are needed to address the question of whether lowering body burden would alter the progression of the disease in HIV positive patients as part of prospective health studies.

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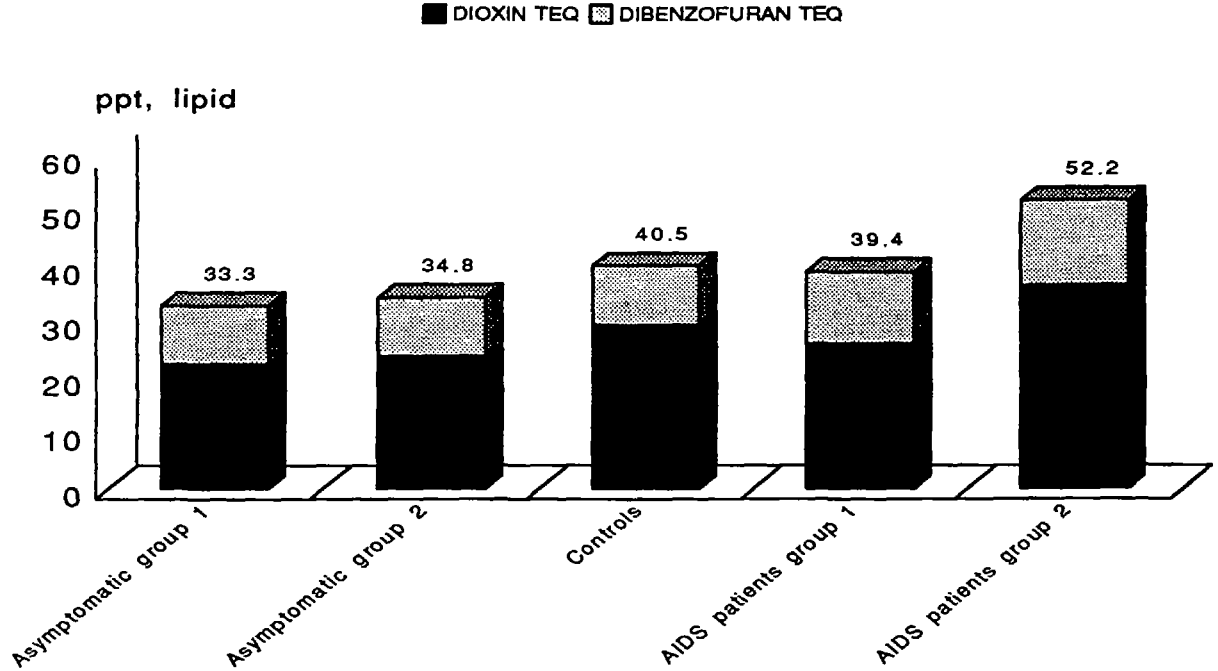
FIGURE I: TOTAL DIOXIN TOXIC EQUIVALENTS IN WHOLE BLOOD FROM HIV POSITIVE PERSONS COMPARED WITH CONTROLS



Aysmptomatic - Group 1 N=100, Group 2 (drug users) N=50
Aids patients - Group 1 (Kaposi's Sarcoma) N=100, Group 2 (opportunistic infections) N=100
Controls - N=100