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**8-HYDROXY-2'-DEOXYGUANOSINE (8-OHdG) AS AN  
INDICATOR FOR ENVIRONMENTAL TOXICITY**

By

**Shreen D. Nusair**

Supervisor

**Dr. Hasan Abdr-Rahman Ali**

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**Faculty of Graduate Studies**

**The University of Jordan**

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## ABSTRACT

Environmental toxicity is a wide spread problem changes the air, the water, the soil, and the food qualities. These changes have been associated with many health problems in the short term of exposure such as, respiratory, digestive, and neuronal problems, and may lead to cancer and death in the long term of exposure. In addition, environmental toxicity causes DNA damage. This damage will produce many products that appear in the body tissues or fluids. These by-products are called biomarkers. One of these biomarkers is called 8-hydroxy-2'-deoxyguanosine (8-OHdG). This biomarker can be measured using different methods such as gas chromatography (GC), high pressure liquid chromatography (HPLC), and enzyme linked immunosorbent assay (ELISA).

The present study was carried out to investigate whether the biomarker 8-hydroxy-2'-deoxyguanosine (8-OHdG) can be used as good indicator for environmental toxicity. A total of 153 urine samples were collected from individuals

live in the north, and the middle area of Jordan. A total of 73 samples were from workers exposed to different types of toxicants. Those workers were from: carbonic factory workers, pathology lab technicians, taxi drivers, chemical factory workers, paint workers, benzene station workers, cement factory workers, vehicle exhaust exposurers in the city center, and smokers. In addition, samples from workers in the carbonic factory workers, and the chemical factory workers were taken from the same individuals before, and after the work shift.

A total of 30 samples were collected from normal healthy individuals live in the north and the middle areas. Those are supposed not to be exposed to any environmental toxicants, and considered as a control. A questionnaire of name, address, body height and weight, any diseases, drugs, physical activity, and family history of health problems was arranged for every case.

A total of 50 samples were excluded. These samples were from individuals suffering health problems, or having family history of health problems. This exclusion is done for accurate 8-OHdG evaluation. Chronic diseases, or positive family history of diseases are known to be associated with increase in the production of the 8-OHdG. The rest of the samples were assessed for the level of the 8-OHdG using the ELISA method. The creatinine was measured as an internal standard to remove the dilution factor in urine.

The results were entered in a data system to make the statistical studies. Results were calculated as mean  $\pm$  standard deviation in ng 8-OHdG/mg creatinine. Results in the study groups according to occupation were as follows: the carbonic factory worker (n=5) was  $5.9 \pm 3.6$ , the pathology lab technician (n=5) was  $6.2 \pm 3.2$ , the taxi drivers (n=6) was  $9.1 \pm 3.1$ , the chemical factory workers (n=11) was  $10 \pm 5.5$ , the paint workers (n=6) was  $12 \pm 8.9$ , the benzene station workers (n=10) was  $14.6 \pm 11.1$ , the

cement factory workers (n= 8) was  $15 \pm 6.1$ , the vehicle exhaust exposurer in the city center (n=12) was  $16.4 \pm 3.2$ , and the smokers (n=10) was  $18.6 \pm 3.2$  ng/mg. The control group (n=30) was  $4.5 \pm 2.3$ , and the p-value between all of the above studied groups, and the control was significant ( $p < 0.05$ ).

In conclusion it can be extrapolated that the exposure to environmental toxicants leads to a noticeable increase in the level of 8-OHdG. Thus, the biomarker 8-OHdG can be used as a good indicator for environmental toxicity. In the future, additional searches are needed with additional larger sample sizes.