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Toxicological Evaluation of Disulfiram, Copper Gluconate and Disulfiram/Copper Gluconate Combination on Renal Function in Rodents

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Introduction

Cancer, also termed malignant tumour or neoplasm, is a group of diseases involving abnormal cell growth with a potential to invade or spread to other parts of the body. In Nigeria, breast cancer, cervical cancer and prostate cancer are most prevalent amongst women and men respectively. Added to this, is the burden cancer imposes on the Niger delta region of Nigeria where this study is sited. Repurposing non-cancer related drugs with possible anti-tumoral activities is a promising strategy for identifying

prospective new anti-cancer drugs in a cost-efficient and time- saving way.

Methods: This research work investigated and compared the chronic renal toxicological profile of disulfiram, copper gluconate and disulfiram/copper gluconate combination, in a 90-day time- and dose-de- pendent study in rodents. 88 rats weighing an average of 280 g divided into eleven groups consisting of 8 rats each were used for this experiment. The control groups received normal saline as placebo and 99.5% dimethyl sulfoxide (DMSO) (solvent control). Three oral doses (low, medium and high) of disulfiram (18.65 mg/kg, 37.3 mg/kg and 74.6 mg/kg), copper gluconate (3.75 mg/kg, 7.5 mg/kg and 15 mg/kg) and both drugs in combination were administered daily with those of the combination given 12 hours apart. Blood samples were collected via cardiac puncture in heparinised bottles and centrifuged, and the serum was decanted on 30, 45, 60 and 90 days for analysis. Renal function parameters—electrolytes (Na^+, K^+), urea and creatinine were evaluated.

Results: Results showed significant ($p < 0.05$) dose- and time-dependent increase in electrolyte level (Na^+, K^+), blood urea and creatinine respectively. The results are all pointers to the development of renal failure.

Conclusion: It therefore appears that the DSF/CG combination is nephrotoxic and this effect is dose-dependent and synergistic.

Keywords: Disulfiram, Copper Gluconate, Renal Function

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