

2nd International Conference on

CANCER BIOLOGY, THERAPEUTICS AND DRUG DISCOVERY AND DELIVERY

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10th Annual Congress on

BIOMARKERS, CLINICAL RESEARCH & THERAPEUTICS

October 03-04, 2018 | Los Angeles, USA



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Comparison of aspirin and ibuprofen bulk and nanoforms in peripheral lymphocytes from breast cancer patients and healthy individuals

Epidemiological studies have suggested that regular intake of some non-steroidal anti-inflammatory drugs (NSAIDs) have a preventative effect against several types of tumors including breast cancer in humans. This present study aims to investigate the effect of both ibuprofen and aspirin on DNA damage using lymphocytes obtained from breast cancer patients and comparing the result with lymphocytes from healthy females as a control. Lymphocytes are useful surrogates for cancer cells. Nanoparticles (NPs) and bulk sizes were used in the Comet and micronucleus assays. Two hundred and fifty ng/ml of ibuprofen (NPs and bulk) and 500 ng/mL of aspirin were used as non-toxic doses to treat the lymphocytes. Aspirin, both bulk and nano sizes, showed a significant reduction in DNA damage in the Comet and micronucleus assays. However, the effect of aspirin nano ($P \leq 0.01$) was more significant compared to aspirin bulk ($P \leq 0.05$). Ibuprofen in contrast, showed a significant reduction in micronucleus (MNI) frequency in the micronucleus assay with the nano form ($P \leq 0.001$) being more significant than the bulk form ($P \leq 0.01$), whilst its preventative effect with the Comet assay was insignificant. These observations suggest that NPs have better penetration through the nuclear membrane due to their smaller sizes compared to their bulk size. Aspirin was more effective than ibuprofen in the reduction of DNA damage and MNI formation in the Comet and micronucleus assays. NPs were more effective than bulk sizes. The results are consistent with the view that NSAIDs, particularly aspirin and ibuprofen, could have a promising role in cancer treatment including breast cancer.

Biography

Diana Anderson holds the Established Chair in Biomedical Sciences at the University of Bradford. She obtained her first degree in the University of Wales and second degrees in the Faculty of Medicine, University of Manchester. She has 460+ peer-reviewed papers, 9 books, has successfully supervised 32 PhDs, and been a member of editorial boards of 10 international journals. She has been or is Editor in Chief of a book Series on toxicology for J. Wiley and sons and the Royal Society of Chemistry respectively. She gives keynote addresses at various international meetings. She is a consultant for many international organizations, such as the WHO, NATO, TWAS, UNIDO and the OECD. Her h index=62.

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