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General overview of the comet assay

The comet assay measures DNA strand breaks in single cells. Cells in agarose on a microscope slide are lysed with detergent and high salt. Electrophoresis results in structures resembling comet tails formed by DNA fragments moving towards the anode. The assay is used for testing genotoxicity, ecotoxicity, human biomonitoring, molecular epidemiology and basic research into DNA damage and repair and effects of nanoparticles. This overview will consider examples from the author's group and collaborators. These will include the work on the specificity and sensitivity of the assay for testing genotoxicity, the work with DBP halogenated acetic acids for ecotoxins, the work with mother and babies, diabetes and lead-exposed children for human bio-monitoring and molecular epidemiology and the work on the drug resistant Non-Hodgkin's lymphoma patients over-expressing p53 mutant protein and lacking DNA repair for fundamental research, respectively. Most of this work is on somatic human lymphocytes and human sperm. Using sperm, the positive response to oestrogens can be diminished with anti-oxidants, suggesting an ROS involvement. Also as age increases in men, so does DNA damage and in both cell types nanoparticles of zinc and titanium dioxide can also produce damage. When modified, it can be used as a blood test to predict cancer. From a regulatory viewpoint, the assay is regarded as an indicator test, and has been incorporated into guidelines in some countries.

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 over 450 peer-reviewed papers, 8 books, has successfully supervised 26 PhDs, and been an Editorial Boards Member 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 key note addresses at various international meetings. She is a consultant for many international organisations, such as the WHO, NATO, TWAS, UNIDO and the OECD.

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