

DIVERSITY IN THE APPLICATIONS OF THE SINGLE CELL GEL ELECTROPHORESIS ASSAY (COMET ASSAY)

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The development of the single cell gel electrophoresis assay (Comet Assay) as a powerful method for measuring DNA strand breakage and repair, has led to a broader understanding of the impact of certain internal and external factors on DNA damage and a cell's repair capacity. The comet assay was made more informative by incorporating additional steps by digesting the DNA on the microscope slides with enzymes that recognize particular kinds of damage to the nucleic acid (Collins, 2004). Endonuclease III are used to detect oxidized pyrimidines (McKelvey-Martin et al., 1993) and formamidopyrimidine DNA glycosylase (Fpg) to detect the major purine oxidation product 8-oxoguanine as well as other altered purines (Collins and Dusinská, 1997). In each case, the enzyme-sensitive sites are converted to additional DNA breaks, which increase the tail intensity. Applying this digestive step when assaying for DNA damage in different tissues may shed some light on differential damage and repair in different tissues. The difference in repair capacity between people exposed to occupational pollution and people working in a non-hazardous environment can also be tested by the above mentioned enzymes. Another application of the comet assay is the evaluation of a cancer patient's DNA repair capacity (before and after chemotherapy). The use of antioxidants and its effect over time was also determined in patients with chronic tiredness and Parkinson's disease. We would like to report on our experience with the Comet Assay in these fields and hope to show the versatility of the Comet Assay and its overall potential.

Collins, A.R. 2004. The Comet Assay for DNA Damage and Repair: Principles, Applications, and Limitations. *Molecular Biotechnology*. Volume 26, Issue 3: 249-261. March

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McKelvey-Martin, V.J., Green, M.H.L., Schmezer, P., Pool-Zobel, B.L., De Méo, M.P. and Collins, A. 1993. The single cell gel electrophoresis assay (comet assay): A European review. *Mut. Res.* 122: 86-94.