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Sensitivity and specificity of the empirical lymphocyte genome sensitivity (LGS) assay: Implications for improving cancer diagnostics

Statement of the Problem: This study examined differences in the sensitivity to genomic damage of lymphocytes derived from cancer patients, pre/suspect cancer patients, and normal healthy volunteers. We investigated responses from 208 individuals: 20 melanoma, 34 colon cancer, 4 lung cancer patients (58); 18 suspect melanoma, 28 polyposes, 10 COPD patients (56) and 94 healthy volunteers. The natural logarithm of the Olive tail moment was plotted for exposure to UVA through 5 different agar depths (100 cell measurements/depth) and analyzed using a repeated measures regression model. Genomic damage in lymphocytes from cancer patient samples plateaued and did not decrease as UVA intensity decreased. In comparison, lymphocyte response patterns for healthy individuals returned towards control values as UVA intensity decreased. The responses for samples from pre/suspected cancers patients were intermediate. All cancers tested exhibited comparable responses. Results indicated that lymphocyte sensitivity was cancer status dependant, thus an analysis of Receiver Operating Characteristic curves was undertaken on 208 individuals. The mean log Olive tail moments, for all cancers plus pre/suspected-cancer versus controls gave a value for the area under the curve of 0.87 (95% CI: 0.82, 0.92); for cancer versus pre/suspected-cancer plus controls the value was 0.89 (95% CI: 0.83, 0.95); and for cancer alone versus controls alone (excluding pre/suspected-cancer), the value was 0093 (95%CI: 0.88, 0.98). For all 3 values $p<0.001$. Results indicated that the characterization of differences in lymphocyte sensitivity to UVA enabled discrimination between cancer patients, pre/suspect cancer patients, and healthy volunteers. This relationship could be used in an assay that functions as a stand-alone test or as a possible adjunct to other tests as part of a detection programme for cancer.

Biography

Diana Anderson (H index 59) 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, is an Editorial Board Member of 10 international journals. She is Editor-in-Chief of a book series on Toxicology for the Royal Society of Chemistry. She gives keynote addresses at various international meetings. She is a consultant for many international organizations, including WHO, EU, NATO, TWAS, UNIDO, OECD.

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