

Cigarette smoke-induced transgenerational alterations in genome stability in cord blood of human F1 offspring

Diana Anderson

School of Life Sciences, University of Bradford, UK

The relevance of preconceptional and prenatal toxicant exposures for genomic stability in offspring is difficult to analyze in human populations, because gestational exposures usually cannot be separated from preconceptional exposures. To analyze the roles of exposures during gestation and conception on genomic stability in the offspring, stability was assessed *via* the Comet assay and highly sensitive, semiautomated confocal laser scans of γ H2AX foci in cord, maternal, and paternal blood as well as spermatozoa from 39 families in Crete, Greece, and the United Kingdom. With use of multivariate linear regression analysis with backward selection, preconceptional paternal smoking (% tail DNA: $P>0.032$; γ H2AX foci: $P>0.018$) and gestational maternal (% tail DNA: $P>0.033$) smoking were found to statistically significantly predict DNA damage in the cord blood of F1 offspring. Maternal passive smoke exposure was not identified as a predictor of DNA damage in cord blood, indicating that the effect of paternal smoking may be transmitted *via* the spermatozoal genome. Taken together, these studies reveal a role for cigarette smoke in the induction of DNA alterations in human F1 offspring *via* exposures of the fetus *in utero* or the paternal germline. Moreover, the identification of transgenerational DNA alterations in the unexposed F1 offspring of smoking-exposed fathers supports the claim that cigarette smoke is a human germ cell mutagen

Biography

Professor Diana Anderson currently holds the Established Chair of the Division of Biomedical Sciences at the University of Bradford, UK. She obtained her first degree in the University of Wales and second degrees in the Faculty of Medicine, University of Manchester. After tutoring at the University of Sydney, Australia, she became a research worker in the Department of Cancer Studies at the University of Leeds and at the Paterson Laboratories, Christie Hospital, Manchester. In 1974, she was appointed as Head of Mutagenesis Studies at ICI's Central Toxicology Laboratory. She joined BIBRA International in 1981 as Head of Genetic and Reproductive Toxicology and became Assistant Director and Group Forum Co-ordinator in 1987. In 1992, she became Senior Associate and Co-ordinator of External Affairs at BIBRA. She has attended various management courses. She has served on the editorial board of 8 international journals plus 2 on line journals, has over 400 publications, has edited/authored 8 books and guest-edited 9 special issues of 4 international journals. She is Series Editor of books in Current Toxicology for John Wiley and Sons and Issues in Toxicology for the Royal Society of Chemistry. She is an active Committee member and has been Vice-President of the Institute of Biology. She has successfully supervised 26 PhD students and is currently supervising other PhDs and has managed several post-doctoral positions. She has been external examiner for 29 PhDs and was External Examiner for the Dept. of Genetics, University of Wales, Swansea. She has been invited to speak at many international meetings and chair numerous symposia. She has helped establish new research laboratories in India and Korea under the auspices of the British Council and UNIDO. Funded by various international agencies, scientists from America, Australia, the Czech Republic, Italy, India, Iran, Korea, Poland, Serbia, Spain and Turkey have received training under her supervision. She has organised both national and international meetings and was/is a member of various national (e.g. MRC Advisory Board, Veterinary Products Committee) and was of international committees, including the European Union Scientific Committee for Animal Nutrition (SCAN). She recently won a prize as an Enterprise Fellow. She has hosted and participated in 56 meetings for WHO/IPCS. She is a consultant for many international organisations, such as the WHO, NATO, TWAS, UNIDO and the OECD

D.Anderson1@bradford.ac.uk