EuroSciCon

Annual Congress on
Medicinal Chemistry, Pharmacology and toxicology

July 30-31, 2018
Amsterdam, Netherlands

D.Anderson et al, J Org Inorg Chem 2018, Volume 4
DOI: 10.21767/2472-1123-C3-007

RESPONSES TO WELL-KNOWN GENOTOXIC AGENTS IN GERM STEM CELLS *IN VITRO*

D.Anderson, K. Habas, M. Najafzadeh, A. Baumgartner and M.H.Brinkworth

School of Medical Sciences, University of Bradford, Bradford, U.K

Germline stem cells are extremely sensitive to genotoxic chemotherapeutic agents which induce DNA damage, and even low doses to the testis may pose reproductive risks with potential treatment-related infertility. Strand breaks represent a great threat to the genomic integrity of spermatogonial stem cells, which are essential to maintain spermatogenesis and prevent reproduction failure. The single-cell gel electrophoresis (Comet) assay has been used to measure DNA damage in male germ cells. We investigated the effects in vitro, of six well-known genotoxins on rat germ stem cells separated using STA-PUT unit-gravity velocity sedimentation. N-ethyl-N-nitrosourea (ENU), N-methyl-N-nitrosourea (MNU), 6-mercaptopurine and 5-bromodeoxyuridine, methyl methanesulfonate (MMS) and ethyl methanesulfonate (EMS) are potent male rodent germ cell mutagens. All compounds were significantly genotoxic in cultured germ cells. Treatment of the isolated germ cells with ENU and MNU produced a concentration-related increase in DNA damage in spermatogonia; spermatocytes were most sensitive to 6-MP and 5-brdU with MMS and EMS most damaging in spermatids. Immunocytochemistry and western blot analysis revealed that the purities of the isolated germ cells were 90% with viability over 95%. These results indicate that STA-PUT isolated rat testicular germ cells are a suitable model to study the genotoxicity of individual chemicals in germ stem cells and could be used as a surrogate system for humans. Only sperm can be examined in this way in humans.

Biography

Professor Anderson completed her PhD at the University of Manchester, UK in the Faculty of Medicine. She is the Established Chair in Biomedical Sciences at the University of Bradford. She has published more than 450 papers, 9 books, successfully supervised 32 PhD students, has a Hirsch index of 59. She is Editor –in- Chief of a Book Series for the Royal Society of Chemistry and is a Consultant to many International Organisations, such as the World Health Organisation/ International Programme of Chemical Safety.

d.anderson1@bradford.ac.uk