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The Analysis of DNA Damage and Cell Loss due to Alcohol and Opiate Drug Exposure on Undifferentiated Stem Cells.

In Fetal Alcohol Spectrum Disorders (FASD), alcohol promotes mental and physical alterations accredited to vicissitudes in the proliferation, differentiation, migration, and cell death in cells within the developing neural crest. Studies show that oxidative stress and changes in cellular proliferation (S-Phase) in these cells plays a role in single and double stranded DNA breaks, leading to a heightened amount of apoptosis in exposed stem cell populations. Opiate drug abuse is common across the world, but the cellular impact is poorly understood. The way that opiate drugs affect the neural crest cells may relate to the alcohol induced apoptotic pathway. It is thought that dose may play a role in the magnitude of the cell loss from alcohol, opiate drugs may also follow this standard. Our hypothesis is that alcohol and opiate drug induced DNA damage is similar and causes an overall increased amount of apoptosis among cell populations. We used a comet assay to analyze the type and extent of DNA damage, caused by single doses of alcohol, methamphetamine, and DAMGO (opioid agonist). We show increased cell losses and heightened amounts of single and double stranded DNA breaks. Research sponsored by WV-INBRE grant **P20GM103434**.