Sperm chromatin alteration and DNA damage by methyl-parathion, chlorpyrifos and diazinon and their oxon metabolites in human spermatozoa

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Abstract

Extensive use of organophosphorous pesticides (OP) by young men represents a public health problem. Toxicity of OP mainly results in neurotoxicity due to their oxygen analogues (oxons), formed during the OP oxidative activation. OP alter semen quality and sperm chromatin and DNA at different stages of spermatogenesis. Oxons are more toxic than the parent compounds; however, their toxicity to spermatogenic cells has not been reported. We evaluated sperm DNA damage by several OP compounds and their oxons in human spermatozoa from healthy volunteers incubated with 50-750 μM of methyl-parathion (MePA), methyl-paraoxon (MePO), chlorpyrifos (CPF), chlorpyrifos-oxon (CPO), diazinon (DZN) or diazoxon (DZO). All concentrations were not cytotoxic (evaluated by eosin-Y exclusion), except 750 μM MePO. Oxons were 15% to 10 times more toxic to sperm DNA (evaluated by the SCSA parameter, %DFI) than their corresponding parent compounds, at the following order: MePO>CPO=MePA>CPF>DZO>DZN, suggesting that oxon metabolites participate in OP sperm genotoxicity.