

Beta-propiolactone treatment impairs the biological activity of residual DNA from BHK-21 cells infected with rabies virus

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Abstract:

The effects of beta-propiolactone (BPL), an alkylating and virus inactivating agent, on the structural and in vitro biological properties of different DNA preparations from BHK-21 cells were investigated. Both uninfected and rabies virus-infected cells were used. Purified cellular DNA (celDNA) was used as the reference, and supernatants from infected cells were treated with BPL. For structural and biological studies three types of DNA preparation were tested: celDNA; purified DNA from cell (infected or uninfected) supernatant (pcsDNA) with or without BPL treatment; and residual cell DNA present in purified rabies virus (inactivated or not) preparations. Rabies infection and BPL (diluted 1:4000) treatment induced modifications in the structure of the three DNA types, including strand breaks and nicks. The damage to the DNA structure by BPL modifies the biological properties of the pcsDNA appraised by its ability to serve as the template in vitro for different polymerases. When rabies virus was inactivated with BPL diluted 1:1000 the DNA damage increased dramatically: small double-stranded DNA fragments (50-200 base pairs) were generated which could not function as templates for polymerases.