HUMAN DNA DEGRADATION DEPENDING ON UV RADIATION WAVELENGTH AND EXPOSURE TIME

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These studies were conducted to evaluate the effect of UV radiation on degradation of human DNA as related to wavelength and exposure time. The results of these trials could help to establish the limitations of forensic science's ability to obtain a genetic profile after DNA has been exposed to UV radiation at varying intensities and wavelengths. Human DNA was isolated from whole human male blood by organic method. The human genomic DNA was determined using the Quantifiler® Human DNA Kit on ABI 7500 Real-Time PCR. Human DNA 1 ng/µL with a total volume of 25 µL samples were exposed to 280, 302, and 365 nm wavelengths at time intervals of 20 minutes up to 120 minutes. The Polymerase Chain Reaction (PCR) was prepared according to the manufacturer's recommended protocol using the AmpFlSTR®IdentifilerFiler® Kit. All amplification reactions were accompanied by negative and positive controls. Following PCR amplification, the ABI PRISM® 310 Genetic Analyzer was employed for electrophoretic separation of amplified products, and then subjected to capillary electrophoresis. Data was analyzed using a peak detection threshold of 100 relative fluorescence units with GeneMapper® ID v3.2.1. The analysis showed that genetic profiles recognized by Combined DNA Index System standards, which require 10 identifiable markers, became unviable between 100-120 minutes of exposure at 302 nm. No genetic profiles were available between 20 to 40 minutes at 280 nm. The UV radiation with 365 nm did not appear to cause any degradation.