USE OF POWERPLEX® 18D IN THE EXAMINATION OF GENOMIC INSTABILITY IN THE SHORT TANDEM REPEAT DNA LOCI USED FOR HUMAN CELL LINE AUTHENTICATION TESTING

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In this study, 76 human cancer cell lines, profiled using the commercially available PowerPlex® 18D multiplex amplification kit (Promega), were used to determine the feasibility of using STR DNA testing for cell line authentication and identification in the face of predicted genomic instability commonly found in cancer cell lines (changes at the chromosomal and nucleotide levels).

Combined genomic instability was found in 26.4% of all cell lines tested. Total genomic instability was roughly the same for all cancer types tested (AVG: 28.0% ± 2.9%); colon cancer cell lines showed the highest combined genomic instability amongst all organ/tissue types tested. The diploid cell lines tested showed stability at the chromosomal level (no loss of heterozygosity) but expressed a high level of nucleotide instability; aneuploid cell lines showed low levels of overall genomic instability.

Unexpectedly, cell lines with a p53 wild type gene had the highest rate of genomic instability when compared to p53 mutants or p53 null cell lines. In addition, the STR locus TH01 was found to be the most stable locus examined. Most importantly, the results show that even with the presence of minor to moderate genomic instability, all but one cell line was able to be "authenticated" using the STR DNA profiling method.