Using Expert Systems for Casework Analysis of Degraded and Inhibited Single Source Samples

INTRODUCTION

Mixture deconvolution tools are available today to assist forensic scientists with casework analysis. These mixture deconvolution tools rely on the same settings optimized for the single source data evaluated for the NEST Project and are run on an ABI PRISM® 3130 Genetic Analyzer (Applied Biosystems), and run on an ABI PRISM® 3130 v.3.2 (Applied Biosystems), FSS-i3™ Expert System Software (Forfeiture Support Associates, Quantico, VA 22134; Center for Disease Control, Atlanta, GA 30333; Department of Justice.

Degradation and inhibition were obvious with many of the samples amplified. The FSS-i3™ Expert System Software has a Dependency rule that calculates a ratio of the total height of the peaks at the lowest threshold for each allele. This rule was a common rule firing since many samples did not present data above 50 RFU. If the sample did not present data above 50 RFU, this rule fired. No alleles were often the result in the degraded and inhibited samples for both of their alleles drop out.. This is an example of how an analyst can use an expert system to assist in casework analysis.

For casework samples, it is acceptable to use software tools to assist the examiner. At this time, the examiner is required to determine thresholds? There are no standards approving the use of an expert system for casework analysis; however, an expert system can be used to assist the analyst in review of case data. A forensic analyst can use a computer and software tool to assist in making these determinations.

RESULTS

In figure A, with no UV irradiation, the Degradation and inhibition rule not firing on these samples. This rule will fire if a locus contains no data above the baseline threshold (50 RFU). In this study, this rule is used to flag the data obtained from the expert system to alert the examiner to a low peak height ratio, often called a Non-SCF peak at the end of the profile. The rule was used to alert the examiner to the presence of a low peak height ratio, which may indicate a loss of alleles due to degradation or inhibition.

The FSS-i3™ Expert System Software has a Low Peak Height Ratio rule that calculates a ratio of the total height of the peaks at the lowest threshold for each allele. This rule was a common rule firing since many samples did not present data above 50 RFU. If the sample did not present data above 50 RFU, this rule fired. No alleles were often the result in the degraded and inhibited samples for both of their alleles drop out. This is an example of how an analyst can use an expert system to assist in casework analysis.

For casework samples, it is acceptable to use software tools to assist the examiner. At this time, the examiner is required to determine thresholds. There are no standards approving the use of an expert system for casework analysis; however, an expert system can be used to assist the analyst in review of case data. A forensic analyst can use a computer and software tool to assist in making these determinations.

A forensic analyst can use a computer and software tool to assist in making these determinations. For example, the examiner can use a computer and software tool to assist in making these determinations. A forensic analyst can use a computer and software tool to assist in making these determinations. Therefore, the examiner needs to determine thresholds? There are no standards approving the use of an expert system for casework analysis; however, an expert system can be used to assist the analyst in review of case data.