

TrueAllele® Volume Crime Validation Study  
Orchid Cellmark UK & Cybergeneics  
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This study used Cybergeneics TrueAllele® Casework system and volume crime protocol. We used computer modeling to infer genotype results from Cellmark's DNA data. We then compared the TrueAllele result with Cellmark's manual review results to assess accuracy. We gathered timings, both human and computer, to determine computer process efficiency. We also documented any discrepancies that appeared between the two results sets. Below is a summary of the protocol and what we observed.

Cellmark sent us one month of volume crime data, or 2,041 samples in total. After processing the sequencer data in TrueAllele Analysis, we uploaded each plate to the TrueAllele database and created interpretation requests in batch mode, averaging three minutes of human time per 96 well plate. The TrueAllele Casework system processed these requests, for both one and two unknown contributors, and inferred genotypes for each sample. For the one unknown contributor requests, the system took about 30 minutes per sample, and the time doubled when assuming two unknown contributors. TrueAllele Casework employed 24 parallel processors, and so the total turnaround time for one week's worth of data (500 samples) was about 30 hours.

For each locus of each sample, our post-processing protocol first looks at the TrueAllele inferred genotypes when assuming one unknown contributor. When no genotype is found at a 95% highest posterior probability (HPD) level, the protocol next looks at the genotypes inferred assuming two unknown contributors. If no genotype is found at 95% HPD, the protocol determines if an obligate allele is in the 95% HPD genotype set when assuming one unknown contributor. Failing that, the protocol does not report the locus for that sample.

Of the 2,041 Cellmark samples, manual review had produced 924 profiles (45%) that were uploadable to the UK National DNA Database (NDNAD). TrueAllele computer modeling, with our post-processing volume crime protocol, produced 1,316 uploadable profiles (64%). The computer increased property crime yield by 42%.

We compared the Cellmark human and TrueAllele computer results using the TrueAllele AutoValidate™ module. The Cellmark uploadable profiles all agreed with the TrueAllele results.

We conclude that TrueAllele computer modeling is more effective than human review of property crime data for the purpose of producing DNA profiles that can be uploaded to the NDNAD.