

1. More than one individual contributed to the blood samples collected from the console of the Bronco.
2. All individuals carrying the 2 and 3 DQ $\alpha$  alleles are eliminated as contributors to the detected DNA. All others are included as possible donors.
3. Individuals included in the evaluation in Step 2 are eliminated if they do not have some combination of the D1S80 18, 24, or 25 alleles. The remainder are included as possible donors.

The genotypes of the three reference samples each contain some combination of the DQ $\alpha$  1.1, 1.2, 1.3, or 4 alleles. Each also contains at least one of D1S80 18, 24, or 25 alleles. Thus, none of the three principles are eliminated as possible contributors to this sample.

Another way of evaluating the results would be to examine combinations of types from the reference samples to see if any combination could produce the pattern seen in the evidence stain. The Bronco console stain(s) cannot be just a mix of NB and OS; they both lack the DQ $\alpha$  1.3 and 4 alleles. All other combinations are possible (NB/RG; OS/RG; NB/OS/RG). Similarly, the stain(s) cannot be a mix of only OS and RG; neither carry the D1S80 18 allele. The stain(s) also cannot be a mix of only NB and RG; neither has the D1S80 25 allele. Other combinations cannot be eliminated (NB/OS; NB/OS/RG).

Thus, all pairwise combinations of the reference genotypes are eliminated by the results from either one or the other marker system. Only a mixture of all three could account for the evidentiary pattern. Therefore, the stain was either contributed by a mixture of all three principles, or by two or more unknown individuals. Likelihood ratios would assist in determining which of these hypotheses was a more likely cause of the evidence.

(Courtesy of Dr. Ed Blake, Forensic Science Associates.)