



**NORAH RUDIN, Ph.D.**  
Forensic DNA Consulting

650 Castro St., Suite 120-404, Mountain View, CA 94041  
(650) 605-3411      norah@forensidna.com  
www.forensidna.com

---

State of MO v. Marcellus Williams

**Background**

On or about August 1998, Felicia Gayle was found dead of multiple stab wounds. Marcellus Williams was subsequently convicted of her murder. The knife found in her neck was not tested prior to trial. DNA testing on this knife is the subject of this report.

**Summary**

Marcellus Williams could not have contributed the detected profile on item Q5 / CCB1536-0303-E03, the knife.

**Items reviewed**

The following items were reviewed:

- April 8, 2016 DNA report of Jennifer Sampson Fienup of Bode Cellmark Forensics
- August 12, 2016 DNA report of Jennifer Sampson Fienup of Bode Cellmark Forensics
- Supporting laboratory notes and raw electronic data

**Presumptive and preliminary testing**

The item that is the subject of the report is a knife (Agency Q5, Bode CCB1536-0303-E03), purportedly the murder weapon in the instant case.

- Sample CCB1536-0303-E03b1: The handle of the knife was initially swabbed, avoiding the areas of red/brown staining. The swabs were combined and consumed for DNA testing.
- Sample CCB1536-0303-E03c1: The handle of the knife was re-swabbed, this time including about 50% of the red/brown stained area. The swabs were combined and extracted for DNA testing. The DNA extract was combined with a small amount remaining from E03b1 for DNA testing. The combined sample retained the identifier CCB1536-0303-E03c1.

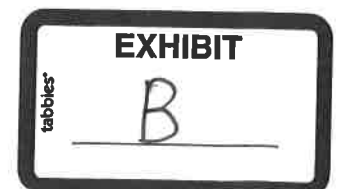
**DNA testing**

*Sample CCB1536-0303-E03b1, the first swab*

Sample E03b1 was profiled using the Promega PowerPlex® Y23 kit. This kit tests for male DNA only. Ms. Fienup reports that “due to the possibility of allelic drop out, no conclusions can be made on this partial mixture profile.”

Comparing the reported profile on page 4 of the report to the profile of Marcellus Williams (Appx. A), it is clear that he could not have contributed the profile reported by Ms. Fienup. At 11 of the 15 loci reported, the types from the knife handle differ from the profile of Marcellus Williams.

However, more information is present in the profile than reported by Ms. Fienup. The analytical threshold required by the Bode-Cellmark protocol leaves legitimate alleles uncalled. Using an empirically determined analytical threshold that is both run-specific and color-specific, it is possible to glean more information from the profile. Using this method, only two of the 23 possible loci were left uncalled. Reducing the analytical threshold did reveal additional minor alleles at several loci, suggesting the possibility of an additional minor contributor. Each of these loci will be discussed in detail.



At the 16 detected loci exhibiting only one called allele, 11 exhibit types different from the profile of Marcellus Williams. The remaining loci require additional discussion. DYS576 exhibits four peaks. The largest peak, a 20 at 135 RFU, is not found in the profile of Williams; a minor 17 peak, at 56 RFU, is also not found in the profile of Williams. Two trace peaks, a 16 at 23 RFU and a 19 at 22 RFU each appear in a "stutter" position of the two larger peaks. While they are both higher than would be expected in a high quality, high quantity profile, expected stutter percentages calculated for these type of samples don't necessarily hold for low quality, low template profiles. Thus these peaks may not be categorically classified as either artifacts or legitimate DNA peaks. The 19 allele, in any event, is not found in Williams profile, however the 16 is found in his profile.

The next locus to consider is DYS391. The large 10 allele at 579 RFU is found in the profile of Williams, however, the much smaller 11 at 35 RFU is not found in his profile. Like the trace level peaks discussed above, it is not possible to tell whether this peak is artifactual or authentic as it falls in a "plus stutter" position to the 10.

Moving through the profile, two peaks are observed at the DYS438, however only one of them is called, even at the lower empirical threshold. The called peak, a 10 at 26 RFU is not found in the profile of Williams.

Next, the DYS570 locus exhibits two peaks, a 16 at 139 RFU and a 17 at 69 RFU. The 17 peak is in a "plus stutter" position to the 16 peak; although it is quite high to derive from a stutter artifact, that explanation can't be ruled out in this type of profile. It should also be noted that two alleles are sometime found at this locus, and a 16,17 is listed in the US Y-STR database. Thus these two alleles don't necessarily indicate two male contributors. Nevertheless, neither of these alleles are found in the profile of Williams, either singly or together.

DYS385 is a duplicated locus at which two alleles are generally observed. In this instance, the locus exhibits three peaks, a larger 11 at 132 RFU, a smaller 14 at 77 RFU, and a yet smaller 15 at 49 RFU. Neither the 11 or the 14 is found in the profile of Williams. The 15 allele is present in his profile, but the evidence profile lacks the second allele of the pair in his reference profile, a 16.

Several additional trace peaks can be visually observed, but are not called even at the lower empirical threshold. Although these alleles cannot legitimately be called, it is worth, in an abundance of caution, to examine them. It can be seen that: an uncalled peak at DYS438 in the 12 position is not found in the profile of Williams.; an uncalled peak at DYS437 in the 16 position is not found in the profile of Williams; an uncalled peak at DYS643 in the 10 position is not found in the profile of Williams; An uncalled peak at DYS456 in the 16 position is not found in the profile of Williams. Thus, if these are legitimate DNA alleles, four more alleles in this profile must come from a male source other than Williams.

*Sample CCB1536-0303-E03c1, combination of the first swab and the second swab*

Again, Ms. Fienup reports that "due to the possibility of allelic drop out, no conclusions can be made on this partial mixture profile." And again, the profile reported on page 2 of her report does not comport with the reference profile of Marcellus Williams. Of the four loci reported (a subset of the first profile), three of them exhibit a different allele than that of Williams.

A weaker profile was obtained from this second combined sample. Using an empirically determined threshold, 7 of the 10 loci exhibiting only one allele differ from the profile of Marcellus Williams. These loci all comport with the first sample.

Two loci require additional discussion. At locus DYS570, the result was different between the two samples. In sample E03b1, a 16 allele and a 17 allele were detected; in sample E03c1 a 16 allele and an 18 allele were detected. It is not possible, in either case, to determine whether these two alleles derive from two males or whether DYS570 is presenting as a duplicated locus. Both the 16,17 and 16,18 combinations are present in the US Y-STR database. Regardless, none of these alleles, either singly or in combination are present in the profile of Williams.

At DYS439, a different single allele was detected in the second sample. In E03b1, a 12 was observed, an allele found in the profile of Williams; in E03c1, a 14, not found in the profile of Williams was observed.

**Discussion**

Unlike the loci that comprise an autosomal profile, all of the loci in a Y-STR profile are located on the Y-chromosome, and therefore physically linked. Thus allelic drop-out does not occur in the same way as it does for an autosomal profile where all of the loci are located on different chromosomes. For Mr. Williams to be considered a possible contributor to the profile detected in sample E03b1, the alleles present in his profile would have to be assumed present but not detected (dropped out) in at least 13 of the 21 detected loci. Additionally, alleles from a second contributor would have to replace his missing alleles at each of those loci. A better explanation is that Marcellus Williams is not a contributor to the profile(s) found on the knife.

Ambiguity was introduced with the second swabbing, E03c1. A factor confounding resolution of this ambiguity is that remaining DNA extract from E03b1 was combined with E03c1, such that it is not possible to know what profile would have been produced by E03c1 on its own. Regardless, the two non-concordant alleles detected in E03c1 would also require drop-out of alleles from Mr. Williams' profile and replacement with alleles from another male profile.

**Conclusion**

Based on the data from the detected profiles, the simplest and most reasonable explanation for the profile detected on the knife is that Marcellus Williams is not a contributor.

Respectfully submitted



Norah Rudin, Ph.D.  
December 28, 2016

PowerPlex Y23  
Marcellus Williams

Appendix A

Sample	DYS276	DYS388I	DYS446	DYS388II	DYS19	DYS381	DYS481	DYS549	DYS533	DYS438	DYS437	DYS570	DYS635	DYS390	DYS439	DYS392	DYS543	DYS393	DYS458	DYS385	DYS456	YGATAH4
R05a1.1 Marcellus Williams	16	13	20	29	14	10	26	11	12	11	14	19	23	21	12	11	13	14	18	15,16	15	11
E03b1.1 knife handle 20_25_30_30	17<20 (16,19)	13	20	31	14	10>11	23	13	13	10,N	15,N	16>17	23	24	12	13	N	13	17	11 (14,15)	N	12
Bode calls	20	13	NR	NR	NR	10	23	NR	13	NR	15	16	23	24	12	13	NR	13	17	11,14	NR	NR
E03c1.1 3b+3c (reswab)	20	13	20	NR	NR	10	N	13	N	NR	NR	16,18	NR	24	14	NR	N	13	17	N	N	12
Bode calls	NR	NR	NR	NR	NR	10	NR	NR	NR	NR	NR	NR	NR	24	NR	NR	NR	13	17	NR	NR	NR