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SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF MONTEREY

PEOPLE OF THE STATE OF CALIFORNIA, Plaintiff, vs. PAUL RUBEN FLORES, Defendant.	Case No. 22CR003712 PEOPLE'S OPPOSITION TO MOTION FOR NEW TRIAL Date: March 10, 2023 Time: 8:30 a.m. Location: Department 4

I

INTRODUCTION

On October 18, 2022, a jury convicted Paul Flores of the first-degree murder of Kristin Smart. On Friday, February 24, 2023, at 4:54 p.m., the defense served the People with their Motion for a New Trial. The Court should deny the motion because the claims of misconduct are baseless and the claims of judicial error are incorrect, and the Court should consider the remedies it has available to it under the law for the baseless claims of misconduct that appear to willfully misrepresent the actual arguments of the prosecutor and the defense.

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II

LAW AND ARGUMENT

Penal Code section 1181, subdivision (5), provides, in pertinent part, that "the court may, upon [a defendant's] application, grant a new trial … [w]hen the court … has erred in the decision of any question of law arising during the course of the trial, and when the prosecutor has been guilty of prejudicial misconduct during the trial thereof before a jury[.]" The Court has not erred, and the prosecutor has not committed prejudicial misconduct, and the defense motion for a new trial should be denied.

A. NO PROSECUTORIAL ERROR DURING REBUTTAL ARGUMENT

"Under the federal Constitution, a prosecutor's behavior deprives a defendant of his rights 'when it comprises a pattern of conduct 'so egregious that it infects the trial with such unfairness as to make the conviction a denial of due process.' [Citation.]" (*People v. Gamache* (2010) 48 Cal.4th 347, 370.) "Prosecutorial misconduct that falls short of rendering the trial fundamentally unfair may still constitute misconduct under state law if it involves the use of deceptive or reprehensible methods to persuade the trial court or the jury." (*People v. Panah* (2005) 35 Cal.4th 395, 462, 25 Cal.Rptr.3d 672, 107 P.3d 790.)

"Advocates are given significant leeway in discussing the legal and factual merits of a case during argument." (*People v. Centeno* (2014) 60 Cal.4th 659, 666.) "A prosecutor's argument may properly be based on evidence, including reasonable inferences or deductions drawn from the evidence, and on matters that are common knowledge." (*People v. Mendoza* (2000) 24 Cal.4th 130, 172, superseded by statute on other grounds in *People v. Brooks* (2017) 3 Cal.5th 1, 63; see also *People v. Welch* (1999) 20 Cal.4th 701, 752-753 [prosecution has broad discretion to state views as to what evidence shows, what inferences may be drawn].)

> " ' " '[A] prosecutor is given wide latitude during argument. The argument may be vigorous as long as it amounts to fair comment on the evidence, which can include reasonable inferences, or deductions to be drawn

> therefrom....' [Citation.] 'A prosecutor may "vigorously argue his case and is not limited to 'Chesterfieldian politeness' " [citation], and he may "use appropriate epithets...." ' " [Citation.]' " [Citations.] "To prevail on a claim of prosecutorial misconduct based on remarks to the jury, the defendant must show a reasonable likelihood the jury understood or applied the complained-of comments in an improper or erroneous manner." [Citation.]

(*People v. Gamache*, *supra*, 48 Cal.4th 347, 371.)

Rebuttal argument is allowed even more leeway, as it "must permit the prosecutor to fairly respond to arguments by defense counsel[.]" (*People v. Bryden* (1998) 63 Cal.App.4th 159, 184; see also *People v. Reyes* (2016) 246 Cal.App.4th 62, 74.) "[E]ven otherwise prejudicial prosecutorial argument, when made within proper limits in rebuttal to arguments of defense counsel, does not constitute misconduct." (*People v. McDaniel* (1976) 16 Cal.3d 156, 177; see also *People v. Hill* (1967) 66 Cal.2d 536, 560-561 ["a prosecutor is justified in making comments in rebuttal, perhaps otherwise improper, which are fairly responsive to argument of defense counsel and are based on the record"].) The prosecutor "cannot be charged with misconduct if his comments only spill over somewhat into a forbidden area; the departure from propriety must be a substantial one." (*People v. Hill*, *supra*, 66 Cal.2d at p. 561.)

1. <u>The Prosecutor Did Not Misstate the Reasonable Doubt Standard</u>

While advocates have broad discretion in arguing the legal and factual merits of a case, they cannot misstate the law. (*People v. Bell* (1989) 49 Cal.3d 502, 538.) A prosecutor may not attempt to absolve the prosecution from its obligation to overcome reasonable doubt on all the elements of a charge. (*People v. Centeno*, *supra*, 60 Cal.4th at p. 666.) That the prosecution has presented a reasonable account is not enough; the prosecutor "may not 'confound[ ] the concept of rejecting unreasonable inferences with the standard of proof beyond a reasonable doubt.' [Citation.]" (*People v. Meneses* (2019) 41 Cal.App.5th 63, 71-72 (*Meneses*).) However, a prosecutor may argue that defense interpretations are unreasonable. (*Id.*)

When considering whether a prosecutor's comments amount to prejudicial misconduct, a court "must view the challenged statement in the context of the entire argument and the jury instructions to determine whether there was a reasonable likelihood the jury understood or applied the comments in an improper or erroneous manner." (*Id.* at p. 74.) In general, the Court's instructions, not the prosecution's argument, are determinative; courts " ' "presume that jurors treat the court's instructions as a statement of the law by a judge, and the prosecutor's comments as words spoken by an advocate in an attempt to persuade." ' [Citation.]" (*People v. Mendoza* (2000) 24 Cal.4th 130, 173.) Courts " ' "do not lightly infer" that the jury drew the most damaging rather than the least damaging meaning from the prosecutor's comments.' [Citation.]" (*People v. Covarrubias* (2016) 1 Cal.5th 838, 894.)

In this case, after jury instructions that made clear the correct legal burden[1] and a closing argument where the prosecutor accurately stated the reasonable doubt standard (10/3 RT 80-81),[2] the start of the prosecutor's rebuttal made clear that he was framing the defense argument, not the jury's role, as a binary one:

> MR. PEUVRELLE So I want to start by taking you back 24 hours ago, when Counsel first started giving his closing argument. Do you remember what he said? He said the People's entire case is a conspiracy theory. Everyone remember that? This is a conspiracy.
>
> So he would have you believe that it's not just possible but a reasonable interpretation that 50-something witnesses, spanning 26 years, are involved in a grand conspiracy to convict Paul Flores. He would have you believe that six dogs are involved in a grand conspiracy to convict Paul

[1] Before closing arguments, the Court repeatedly instructed the jury that the prosecution's burden was to prove guilt beyond a reasonable doubt. (10/3 RT 6-7, 15, 17, 19, 22, 24, 27, 28, 32, 33.) The Court instructed the jurors that questions, opening statements, and closing arguments by the attorneys were not evidence. (10/3 RT 7.) The Court instructed jurors that, before they relied on circumstantial evidence to find the defendant guilty, they must be convinced the only reasonable conclusion supported by the circumstantial evidence was that the defendant was guilty. (10/3 RT 9-10.)

[2] The People are separately lodging the certified transcripts on which they rely (July 18, 2022, opening statement by Mr. Peuvrelle [hereafter, "7/18 RT"], October 3, 2022, jury instructions and closing arguments [hereafter, "10/3 RT"], and October 4, 2022 closing argument and rebuttal [hereafter, "10/4 RT"] with the court. It is the People's understanding that the defense has already obtained copies of the transcripts from the court reporter(s) and the People are not serving them with copies of the transcripts in accordance with the strictures of Government Code section 69954, subdivision (d).

Flores. He would have you believe that even the media is on, with the dogs and with the witnesses, to convict Paul Flores. That's not possible, that's absurd.

Just for that, Counsel has presented you a binary choice. Is this a conspiracy theory? Is that the truth? Or is it true that Paul Flores is guilty of first degree murder.

MR. SANGER: So objection. Misstates the burden of proof.

THE COURT: Overruled. This is argument –

MR. PEUVRELLE: The only –

THE COURT: -- and you may continue.

MR. PEUVRELLE: Sorry, your Honor. The only reasonable conclusion, based on all of the evidence, is that Paul Flores is guilty.

(10/4 RT 91-92.)

After closing arguments and rebuttal, the defense moved for a mistrial based on their claim—this same claim—that the prosecutor misstated the burden of proof. (10/4 RT 118.) The Court denied the motion:

> I have, on numerous occasions, indicated to the jury that this is argument of counsel. If the statements of Counsel, either factual statements or legal statements, conflict with the Court's instructions on the law, they are to follow my instructions. That is also clearly stated in the jury instructions, which the jury will receive and have to review should they wish to do so during deliberations.

(10/4 RT 121.) The Court also characterized the record on rebuttal as follows:

> And I will just make a couple of notes with respect to what the Court heard.
>
> My characterization of the defense rebuttal is, at least what I heard, somewhat different than I think your take on it, Mr. Sanger. I did not take from Mr. Peuvrelle's comments that the Defense had any burden at all to produce any evidence. In fact, quite the contrary.
>
> My understanding, or how I heard his argument was – and no offense is meant – but a summary that he did not find your characterization of the case credible as a conspiracy theory and if they don't believe that, then what is reasonable, which is the position that he has advanced.

> And so, my hearing of the rebuttal argument was somewhat different than I think has been taken by you. I'm not saying I'm correct or you're correct but that was my understanding of things.

(10/4 RT 123.) After reviewing the record and case law provided by the defense, the Court denied the motion for a mistrial, found that there was no misconduct, and declined the request to give a curative instruction. (10/4 RT 124, 127.) The Court did not modify its previous characterization of the rebuttal argument.

The Court was correct in its ruling. Mr. Peuvrelle's statement did not misstate the reasonable doubt standard. His words made clear that he was critiquing the defense argument—"Just for that, *Counsel* has presented you a binary choice"—and not telling the jury that if they found the defense theory unreasonable they therefore must find Paul Flores guilty. This is further supported by the immediate assertion that followed the Court's overruling of a defense objection that the only reasonable conclusion, based on all of the evidence, was that Paul Flores is guilty. The prosecutor's argument did not misstate the burden of proof in this case.

Even if the prosecutor's words left some question as to the burden of proof, he emphasized the prosecution's burden later in his rebuttal argument: "So again, I don't have to prove this beyond all doubt, it's just beyond a reasonable doubt. So what Defense is saying, this conspiracy theory that everyone is in, is possible but unreasonable. You still hold the defendant accountable for his crimes *so you look at all of the evidence* and compare[.]" (10/4 RT 113, emphasis added.) Mr. Peuvrelle then discussed the categories of specific evidence that supported a verdict of guilty, including evidence of Kristin Smart's incapacitation, Paul Flores's sexual intent, Paul Flores's lies, Paul Flores's interest in Kristin Smart, Kristin Smart's disappearance, Paul Flores's body language during his interview, Ruben Flores's guarding of the area under his deck, the trailer evidence and removed fence, the human-sized anomaly under the deck, the surface disturbance and staining, the positive results for human blood in the soil, the staining pattern, and the fibers. (10/4 RT 113-116.)

Given the contents of the arguments and the focus on the reasonable interpretation of the evidence, just like the Court of Appeal concluded in the *Meneses* case, the jurors would have understood the prosecutor's initial statement in rebuttal to be about reasonable and unreasonable inferences and not to be minimizing or misstating the reasonable doubt standard. And just like in *Meneses*, it is significant that the Court correctly defined the reasonable doubt standard for the jury, and the Court's instructions left no doubt about the prosecution's burden of proof, the proper application of each juror's common sense and experience, and the role of reasonableness in reaching a verdict. (See *Meneses*, *supra*, 41 Cal.App.5th at p. 75.) Considered in the context of the whole argument and the instructions given to the jury, the jury was not reasonably likely to understand the prosecutor's comments as diminishing the reasonable doubt standard and therefore there was no prosecutorial error.

2. <u>The Prosecutor Accurately Portrayed the Defense Argument</u>

The defense motion claims that they "did not contend that the prosecution was a conspiracy." (Def. Mot. at p. 11.)

> To the contrary, the defense argument was that, *by analogy*, the prosecution asked jurors to 'suspend disbelief' and asked them to believe in a theory contrary to facts. The point being, that the prosecution's *argument* was equivalent to a conspiracy theory and that theory was refuted by the actual evidence in the case. At no time did the defense argue that the 50 witnesses and six dogs conspired—the point was that the random evidence did not prove that there was a murder or that the defendant did it. [¶] Therefore, it was patently false that the defense argued that there was actually a conspiracy, let alone that the jury had to believe that the 50 witnesses and six dogs had conspired.

(Def. Mot. at p. 11, emphasis in original.) This is simply not true. What is patently false is the defense claim that they did not argue there was actually a conspiracy to convict Paul Flores, because Mr. Sanger argued not only that the prosecution's theory of the case was akin to conspiracy theories but that the people involved in the case had colluded to come up with a story and to convict Paul Flores—an argument that he continues to argue it in his motion for a new trial.

After brief introductory remarks, Mr. Sanger began his closing argument likening the prosecution case to conspiracy theories:

> And what he said was basically a bunch of conspiracy theories that aren't really backed up by facts. Now, I know if you followed that and you were convinced by the end of his argument you probably think I'm being unfair, rude, or something. I don't mean to be any of those things. I may be, I just don't mean to be, okay?
>
> But the point of the story is is conspiracy theories are fun and a lot of us, you know, follow one television network or another, can be on either side or in the middle or somewhere else, and we love to hear conspiracy theories and we love to either hear them or refute them or come up with another one, and that's human nature, okay?
>
> But you're not here as the same people that sat at home and watched the TV and try to decide what's going on in politics, you're here as jurors. And this is – under the rule of law, you took an oath that you would follow the rule of law, and we'll get into what that says in particular in just a moment.
>
> So your job is not to buy into a conspiracy theory one way or another, it's to decide whether or not the People have proven the case with evidence – and we're going to talk about that – beyond a reasonable doubt.

(10/3 RT 97-98.)

Later in his argument, Mr. Sanger claimed that witness statements had morphed over time after they were influenced by outside information. He then went on to say,

> More insidious really is – are the people in the background who, as Detective Cole said, inserted themselves in the – into the case, okay? Dennis Mahon, Chris Lambert. Those are two that you heard about. Justin Goodwin. They inserted themselves in the case. They had theories. They gave Detective Cole theories that turned out not to be true. They gave them witnesses who were going to crack the case and he went and he said he investigated and found most of them were not credible, okay?

(10/3 RT 101-102.) Mr. Sanger highlighted multiple times the people he claimed had "inserted themselves" in the case. He focused repeatedly on Chris Lambert in a later part of his argument, stating he had "inserted himself – as Detective Cole said about the others, inserted himself into a case that doesn't involve him and has come up with a lot of conspiracy theories." (10/3 RT 139.) He then returned to "all these people that were inserting themselves" and listed "Dennis Mahon; Chris Lambert, the podcaster;

Justin Goodwin; their website Son of Susan; Justice for Kristin Smart, oriented towards prosecute – convicting Paul Flores" as well as the Your Own Backyard podcast and True Crimes with Aphrodite Jones. (10/3 RT 142-143.)

And then Mr. Sanger described the larger conspiracy, though at this point he did not use the word conspiracy, to convict his client:

> We noticed that a number of people were subscribing to this web page, the Justice for Kristin, and there's the hand and all that sort of thing. And that's nice. You know, there's solidarity and that sort of thing, but it's not nice when there's solidarity, We've got to get Paul Flores.
>
> And one of the things you notice was up at the top there's an alarm clock on this. And when you first saw it you probably didn't know what it was for and it turns out that Justin Goodwin was one of the – the moderators. […]
>
> This is Justin Goodwin. And forgive my language, "Tick Tock motherfucker." And the "motherfucker" he's talking about is Paul Flores because they are after Paul Flores. "Tick tock," time is running out. He's looking for his reward. He's now part of this web page, he's part of the Dennis Mahon, Chris Lambert crusade to convict Paul Flores.

(10/3 RT 145.) The prosecutor's comments were in clear response to arguments by defense counsel, combatting the claims that people had "inserted themselves" into the case and conspired, through words and deeds, to convict Paul Flores. This was a fair response and appropriate rebuttal argument.

3. <u>The Prosecutor Did Not Violate the Court Order</u>

The defense does not provide the full text or the citation to the record where the prosecutor's statement about the ball gag photograph occurs. If they had, the actual context of the statement would be clear:

> MR. PEUVRELLE: But think about the dogs would have to be in on it. Remember when the handlers were on the stand and they were asked, Do you speak dog? Now I know why that question was asked. It's to prove that there was a conspiracy among the dogs.
>
> Now I know why it was asked, Were your dogs friends? Because the dogs were able to get together and be part of the conspiracy.
>
> And then the coup de grace was, the Prosecutor put all of these people up to it. Well, in 1996, when the dogs were speaking to their handlers and being

friends with each other, I was a freshman in high school. It is so ridiculous, it is so absurd, you can reject it out of hand.

And then Counsel said, Conspiracy theories are fun. Okay, maybe you think it's possible that everybody, the dogs, are in on it. Did it look like the woman with the ball gag in her mouth was having fun in this conspiracy theory.

Did it look like –

MR. SANGER: Objection, your Honor.[3]

THE COURT: Overruled. This is argument.

MR. PEUVRELLE: Did it look like Sarah Doe was in a conspiracy, having fun.

Did it look like Steve Fleming, proud man, he spent his life serving his country, was having fun being disrespected, with his words twisted around and thrown in his face?

Did it look like Margarita Campos, who was involved in a grand conspiracy, having fun with the conspiracy theory?

Did it look like Jennifer Phipps was having fun in a grand conspiracy, who had held on to the guilt of waiting 26 years for this to happen when she did everything she possibly could to raise the alarm that Kristin was gone and this was not right?

Did it look like anybody was having fun? No. Because this is not a fun case. I apologize but you have seen things in this case no human being should see.

(10/4 RT 92-93.) From the context of the argument, it is clear that the prosecutor is addressing the defense claim that all of the evidence was manufactured, tainted, or mischaracterized by highlighting the absurdity of the notion that all of the evidence and all of the people involved were out to get Mr. Flores. The use of the "having fun" phrase was a rhetorical flourish of repetition and did not violate the Court's order but served to emphasize that the photograph—located on Mr. Flores's computer that was

[3] The defense claim they were "powerless to address" the argument because it came in rebuttal is not true. Defense counsel could and did object (though he did not state a basis for his objection), and the Court appropriately overruled him.

consistent with an item that he used in uncharged offenses—was an objective piece of evidence located by law enforcement that was not affected by the outside forces counsel claimed were out to get Paul Flores. Additionally this argument occurred during the People's Rebuttal argument and was in direct response to defense counsel's absurd argument that the whole case was a grand conspiracy theory.

Even if the Court were to find that the argument was improper, considered in the context of the whole argument, instructions given to the jury including a limiting instruction as to the evidence when it was admitted, the brief mention was not prejudicial.

Additionally, defense counsel also informed the jury that statements of attorneys were not evidence. (Reporter's Transcript: October 4, 2022, page 20-22) On balance, the jurors were properly instructed by the court that statements of attorneys were not evidence and both attorneys properly told the jury that statements of attorneys were not evidence. There is no doubt the jurors understood what was evidence and what was not.

4. <u>No Additional Error During Argument</u>

The defense motion includes a list of other complaints regarding error. Nothing in their list of grievances amounts to misconduct or error, much less prejudicial misconduct.

a. <u>Cindy Arrington's Testimony</u>

The defense did not include the specific statement by the prosecutor in their motion or a citation to where it could be found. In his rebuttal, Mr. Peuvrelle stated the following: "Well, we had that, thankfully for you in this case in Cindy Arrington, who testified that the staining in the grave site was different than staining in every single other excavation that they had." (10/4 RT 105-106.)

It is important to note that this was very soon after Mr. Peuvrelle reiterated that what lawyers say is not evidence:

> But it leads me to my next point, which is statements of attorneys are not evidence and Defense's closing shows you why the law tells you this.

> There were so many misstatements of fact I stopped counting. And I don't want to keep you here until 4:30 going through every single one so I'll leave you with if any one of you go back there and say, Oh, but I heard this in Defense closing, please request read back of the actual evidence, because that is what happened in this case.

(10/4 RT 104-105.) Cindy Arrington testified she has spent her career as an Archeologist in California. She has participated in hundreds of excavations in California, unlike the defense witnesses. She also was the only witness to personally inspect the gravesite to confirm her observations. She testified unequivocally that the staining in the gravesite under the deck was consistent with human decomposition and was different than other staining across the property, or Lamellae as Dr. Carter claimed without even visiting the scene.

b. The Prosecutor Accurately Stated Forensic Conclusions

The defense motion does not provide any of the surrounding context or a citation to the portion in the transcript where the comment can be found. By isolating a single sentence, the defense grossly misrepresents its meaning. In his rebuttal, Mr. Peuvrelle stated the following:

> Now, we know this is human blood found in this grave site. I was kind of waiting last week for evidence of the Flores family ferret farm that they had for years down there and that we were going to see carcasses after carcasses of ferrets. I was kind of waiting for evidence of the Flores family gorilla sanctuary, that there was evidence of higher primates up there. So it is 100 percent beyond any doubt human blood.

(10/4 RT 108-109.) In the context of its full paragraph, it is clear Mr. Peuvrelle was arguing that the jury had no evidence that the other animals whose blood could cause a positive result had been present. This was a fair comment on the evidence and fair response to defense claims that the test results were wrong and not human blood.

c. The Prosecutor Accurately Depicted Ruben Flores' Documents

Once again, the defense motion does not include the specific statement by the prosecutor that they challenge or a citation to where it can be found in the transcript. And once again, when the Court examines the specific comment and its context, it is

clear that Mr. Peuvrelle was making an appropriate argument and fair comment regarding the significance of the items located in Ruben Flores's bedroom:

> Counsel claimed that Ruben's – Ruben Flores's bedroom contained all sorts of hate mail. Well, it wasn't hate mail. It was an essay contest for Kristin Smart. That's not hate mail. It was a note about digging the yard. That's not hate mail. It was a poster of her face that he had kept in his bedroom like some sick trophy. That's not hate mail. That tells you he had a weird, perverse obsession with Kristin Smart because she was buried under his deck. It was his trophy room.

(10/4 RT 111.) This is proper rebuttal argument that was made directly in response to defense counsel claiming this was hate mail, which it clearly was not.

d. The Prosecutor Accurately Depicted David Stone's Testimony

The defense does not include the text of or a citation to the record for the rebuttal argument where the prosecutor discussed David Stone's testimony, and the actual argument of the prosecutor is different from the defense characterization of it:

> Counsel discussed David Stone and the issue of the plumber and said that no, he sent the plumber away because he was going to fix it himself. But if Ruben Flores was going to fix it himself he would have done it, he wouldn't have called a plumber in the first place, so that doesn't make any sense at all. The only thing that makes sense is he didn't want a plumber poking around underneath his deck because that's where Kristin is buried.

(10/4 RT 113.) Mr. Peuvrelle then referred to specific evidence of Ruben Flores keeping people away from the area underneath the deck: "And then if that's not enough you have Ruben Flores's guarding of the deck, you have the dogs underneath the deck, you have him getting rid of Angie Carrizal, not letting David Stone store stuff down there, not letting the plumber down there." (10/4 RT 114.) Numerous photographs of the area beneath the deck were given to the jury so they could see for themselves the layout of the area. The photographs depict an area behind the lattice work and then a door that entered into the sub-floor area below the deck. The door is *beneath the deck* and Mr. Stone properly explained where the 55-gallon drums were located.

e. Accurately Depicted BlueStar Reaction

The defense motion claims that "[i]n rebuttal, the prosecutor once again argued that the Blue Star reaction in the trailer was evidence of human blood." (Def. Mot. at p. 14.) This is false, and yet another example of the defense misrepresenting the nature of Mr. Peuvrelle's statements by failing to include the full paragraph of his statement and by failing to provide a citation to enable the Court to easily check their claims. In rebuttal, on the topic of the Bluestar reaction, Mr. Peuvrelle said:

> And if that's not enough you have the Bluestar lighting up like a Christmas tree in this dirty old trailer, where they just happened to clean it with bleach for a two-foot area? There's no reason to clean that spot where the door was right next to that deck unless Kristin was there and you're trying to destroy evidence of a crime.

(10/4 RT 115.) This was in direct response to the defense closing argument that claimed the Bluestar reaction was not proof of anything (10/4 RT 80, 81), and was a fair comment on the evidence.

5. Defense Counsel Has Committed Sanctionable Offenses

The California State Rules of Professional Conduct prohibit lawyers from knowingly making false statements of fact or law to a tribunal or failing to correct a false statement of material fact or law previously made to the tribunal by the lawyer. (Cal. Rules of Prof. Conduct, Rule 3.3.) Business and Professions Code section 6068 codifies duties of attorneys that include that they must counsel or maintain those actions, proceedings, or defenses only as appear to him or her legal and justice, except the defense of a person charged with a public offense (subd. (c)), and they must employ, for the purpose of maintaining the causes confided to him or her those means only as are consistent with truth, and never to seek to mislead the judge or any judicial officer by an artifice or false statement of fact or law" (subd. (d)). Attorneys are responsible for briefs that bear their signatures. (*In re Rozzo* (2009) 172 Cal.App.4th 40, 64.)

The defense motion makes repeated claims of misconduct that misrepresent their own arguments as well as the arguments made by the prosecutor. Claims of

prosecutorial misconduct should not be utilized as a sword but as a shield to ensure the right of a defendant to a fair trial. Unfortunately, the baseless allegations follow a pattern that has included the repeated denigration of counsel documented in the record, including in the defense closing argument in this case. (See, e.g., 10/3 RT 102 [alleging prosecutor introduced evidence to be able to make repeated vile comments to appeal to the jury's passion and prejudice], 10/4 RT 10 [alleging prosecutor utilized 1108 evidence to demean Paul Flores], 10/4 RT 11 [same], 10/4 RT 67 [calling counsel "inappropriately emotional" and "cruel"], 10/4 RT 70 [criticizing prosecutor's tone of voice when he said "accredited lab"], 10/4 RT 75 [claiming prosecutor "tried to make fun of" defense witness].) It is improper to resort to personal attacks on the integrity of opposing counsel. (*People v. Bell* (1989) 49 Cal.3d 502, 538; *People v. Sandoval* (1992) 4 Cal.4th 155, 184.)

In their motion, the defense mischaracterized their own argument, they mischaracterized the prosecutor's argument, they failed to include many all of the actual statements they were challenging and when they did they failed to provide the surrounding statements that provided necessary context. The defense misstatements of fact were so pervasive that at one point the Honorable Judge O'Keefe said something to the effect of: that was not my collection of what was said in chambers. Additionally, defense counsel's misstatements of fact were so pervasive that a jury actually submitted a note that said something to the effect of: What do we do if counsel's statements of fact are not what we remember happening during the trial. This note was marked as Court Exhibit #179. Defense counsel admitted "I don't think we've ever had juror questions during argument, okay?" (Reporter's Transcript: October 4, 2022, Page 3, lines 14-15.) He further admitted that "we may or may not be right about what we said, ok?" (RT: Oct. 4, 2022, page 3, lines 24-25.) On another occasion, counsel attacked the Deputy District Attorney due to purple signs being outside the courthouse. Any review of these signs clearly show they were for victim's rights week and had nothing to do with the trial of People v. Paul Flores. Counsel

repeatedly and unabashedly made assertions that were simply untrue despite being repeatedly called out for doing so.

B. NO PROSECUTORIAL ERROR DURING OPENING STATEMENT

"The purpose of the opening statement is to inform the jury of the evidence the prosecution intends to present, and the manner in which the evidence and reasonable inferences relate to the prosecution's theory of the case." (*People v. Millwee* (1998) 18 Cal.4th 96, 137.) " ' "Nothing prevents the statement from being presented in a story-like manner that holds the attention of lay jurors and ties the facts and governing law together in an understandable way." ' [Citations.]" (*People v. Seumanu* (2015) 61 Cal.4th 1293, 1342.) "[T]he prosecutor is not required to shield the jury from all favorable inferences about the victim's life or to describe relevant events in artificially drab or clinical terms" (*People v. Millwee*, *supra*, 18 Cal.4th at p. 138), no matter how much the defense may wish they would.

Indeed, the California Supreme Court has found no misconduct when prosecutors have identified traits that made the victim particularly vulnerable to attack when those facts bear on the charged crimes and are not otherwise inadmissible on their face. In *People v. Millwee* (1998) 18 Cal.4th 96, the Court held that the prosecutor's remarks about the victim's physical disability, the extent to which she recovered and could move around, and her limited ability to grasp objects were not misconduct because they were relevant to the stolen items being in her immediate presence (significant for a robbery charge) and why the particularly vulnerable victim would not have asked or allowed the defendant inside her home (significant to a burglary charge). (*Id.* at pp. 137-138.) The Court also found that the prosecutor's description of the killing as an "execution" was not misconduct, as it served as a shorthand means of describing an intentional and premeditated murder. (*Id.* at p. 138.)

In *People v. Farnam* (2002) 28 Cal.4th 107, the Court held that the prosecutor's repeated references in her opening statement to the victim being a widow and mother, the victim being murdered on the birthday of her daughter, and the victim's son being

involved with a children's group at his church were not misconduct because they were relevant to issues in the case (possible sources of hair and semen, and the locations of witnesses after they left the victim's apartment). (*Id.* at p. 168.) The Court also found that there was nothing inappropriate about the prosecutor's reference to the defendant as "monstrous," "cold-blooded," vicious, and a "predator," as well as her description of the evidence as "horrifying" and "more horrifying than your worst nightmare," as they were "no more than fair comment on what she anticipated the evidence would show." (*Id.*) "Prosecutors 'are allowed a wide range of descriptive comment and the use of epithets which are reasonably warranted by the evidence" [Citation], as long as the comments are not inflammatory and principally aimed at arousing the passion or prejudice of the jury." (*Id.*)

In *People v. Seumanu* (2015) 61 Cal.4th 1293, the Court found that the prosecutor's reliance on a wedding theme in her opening statement, in which she described the victim as a bridegroom focused on renting tuxedos and preparing for the wedding the following day and his bride's gift as the trophy of a murderer, was not misconduct because they related to evidence in the case that linked the defendant to the crimes. (*Id.* at p. 1330.) Therefore, the argument was fair comment on the evidence and did not amount to an appeal to the passions and prejudices of the jury. (*Id.*)

In this case, all of the statements the defense now challenges were fair comment on the evidence. To the extent that details of the evidence at the three-month trial varied from what was anticipated, it did not rise to the level of misconduct much less prejudicial misconduct and the jury was explicitly instructed that the attorneys' opening statements were not evidence.[4]

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[4] In addition, the defense motion uses the phrase "for instance" when it lists the statements it claims are objectionable. The Court cannot base its ruling on what has not been pleaded, and the People object to any new claims being raised at the hearing on the motion due to a lack of appropriate notice. The defense had approximately four months from the jury verdict to submit their motion—far more than the week the prosecution had to respond to it.

1. Opening Statement Comments about Kristin Smart's Incapacitation

Early in his opening statement, Mr. Peuvrelle described how multiple witnesses observed Kristin Smart to be lying down outside the party, incapacitated. This description was relevant both to her capacity to consent and to impeach Paul Flores's statements to police about how Kristin Smart was able to walk to her dorm alone.

> Toomey says he left the party around 12:00 or 12:30. By this point he saw Kristin Smart face down, incapacitated, in the dirt, like that. He tried to talk to her, Hey, you can't stay here. It's midnight, it's cold, you're not dressed for this kind of weather. Barely unable to move she said, Just leave me here, face down in the dirt.

(7/18 RT 8.) Mr. Peuvrelle showed a photograph of the area and stated, "This is the house next to Crandall Way. The strip of dirt between the car to the right of that house is where she was face down. She didn't make it far. Face down in the dirt." (7/18 RT 9.) When he described anticipated testimony from Tim Davis, Mr. Peuvrelle said,

> Tim Davis and Cheryl Anderson were two more partygoers. Tim Davis saw her earlier fall to the ground after talking with Paul Flores. And as he left the party at two o'clock he was actually sober because it was his role as an upper classman to get a lot of the younger students home that night. And he remembers going up to Kristin and seeing her at 2:00 to 2:30 – so Toomey 12:00 to 12:30, Tim Davis 2:00 to 2:30, in the same spot, face down, incapacitated. And he says, You can't stay here, you got to go. It's 2:00 in the morning, you can't fall asleep here.

(7/18 RT 9.) And finally, Mr. Peuvrelle stated, "Saturday, May 25th, 1996, between 12:00 and 12:30, Toomey find [sic] her face down, incapacitated, in the dirt outside the house." (7/18 RT 12.) Tim Davis described Kristin Smart being face down and Matt Toomey described her as lying on her arm/shoulder area with her face angled downward. These observations are not inconsistent as one person could see it as face down and another as angled down.

2. Comments about Paul Flores Coming Out of the Darkness

Mr. Peuvrelle stated just twice, in the same portion of his opening,

> So he and Cheryl Anderson help Kristin up. She leans up against him, puts her arm around him because she cannot walk on her own. He and Cheryl Anderson have control of Kristin. And Cheryl lives in the dorms, not the same one but nearby, so they're going in the same direction. And Tim Davis says as they're walking up this sidewalk, towards the

> photographer in this one, Paul Flores comes out, in his words, from the darkness right where that tree is, in plain view of where Kristin lay face down in the dirt, incapacitated.
>
> Tim Davis says those three walked about a hundred yards passed [sic] the health center. Another spot of that location where Paul Flores came out of the darkness.

(7/18 RT 9.) This was a fair comment on what the evidence would and did in fact demonstrate.

3. Paul Flores Lying Through His Teeth

In his opening, the prosecutor commented on the statements that Paul Flores made to law enforcement that were clearly contradicted by the evidence:

> MR. PEUVRELLE: Now, while Kristin's friends were doing everything they could to help law enforcement find Kristin, Paul Flores was lying through his teeth to law enforcement.
>
> MR. SANGER: Objection. Argument, your Honor.
>
> THE COURT: Overruled.

(7/18 RT 13.) Mr. Peuvrelle then detailed what Paul Flores told law enforcement (7/18 RT 15-16), which contradicted other evidence he described in his opening statement. This was fair commentary on evidence that was then presented at trial, and far more innocuous than some of the terms ("monstrous," "cold-blooded," "execution") the California Supreme Court has held is not misconduct in opening statements.

4. Karen Hall's Video

The defense claims that the prosecutor "blatantly misrepresented the facts" about the video Karen Hall took with Paul Flores's adoptive admission. (Def. Mot. at p. 15.) Once more, the defense fails to include the specific language used by the prosecutor or a citation to the place in the transcript where the material to which they are objecting is located. When the Court considers the record, the transcript is clear that the prosecutor briefly described the exchange between Karen Hall *and then played the actual video*: "And Ms. Hall asks him, Hey, Paul, what do you know about that missing girl? What did you do to her? And he goes, Nothing, and he hangs his

head in shame, looked back to his friends, and changes the subject. [A video is played but audio is not taken down on the record.]" (7/18 RT 16-17.)

Not only was the prosecutor's statement fair commentary on expected evidence, but he also placed the best evidence of the interaction before the jury immediately after his description of it. The prosecutor described how Paul Flores hung his head in a way that was consistent with how Ms. Hall described it. A prosecutor does not have to describe relevant events in artificially drab or clinical terms. A prosecutor is allowed to be an effective advocate. This is not misconduct.

5. Jennifer Hudson

Once again, the defense motion does not provide the specific portion of the prosecutor's opening statement that it claims is objectionable nor does it provide a citation to where it can be located. And once again, the actual content differs from the defense characterization of the statement:

> She was essentially at a social function and something came on the news about Kristin Smart and her disappearance. It was maybe a – Paul Flores was there and one other person and he tells this other person, That bitch dick tease. I had enough of her shit and I buried her under my place in Huasna. Huasna is a rural area just north of Arroyo Grande on that map. That bitch dick tease, I got sick of her shit and I buried her. Jennifer Hudson was 17 and terrified. She kept this to herself because she was 17. She sees him again later that summer and realizes again what he said, becomes violently ill and leaves, never to see him again.
>
> About eight years later she's hanging out with a friend named Justin Goodwin and they've had a few and she's been holding on to this secret for a long time. With a little bit of liquid courage she tells Justin Goodwin what she heard and Justin Goodwin submits an anonymous tip to the Sheriff's Department almost 18 years ago.

(7/18 RT 21-22.) Not only was this a fair comment on the evidence that was subsequently elicited from Ms. Hudson, but the focus on Paul Flores's words—"that bitch dick tease. I had enough of her shit and I buried her under my place in Huasna"—are admissions and evidence of motive, both of which are highly relevant types of evidence. This was not an appeal to irrational emotion, passions, and

prejudices, but an effective description of anticipated evidence of motive and admissions. And it is not misconduct.

6. Avocado Trees & Angie Carrizel

In his opening statement, the prosecutor discussed the layout of 710 White Court, the proximity of avocado trees to the deck, under which the prosecution's theory was that Kristin Smart was buried for a long time, and efforts by Paul Flores and his father to keep Angie Carrizel away from the general area:

> MR. PEUVRELLE: Around 2003-2004 Paul Flores is dating a woman named Angie Carrizel. Angie is brought back to Arroyo Grande to the house at 710 White Court. This is the back of the house at 710 White Court. She says she went out back by the avocado trees, which are near the stairs off of the deck in that photograph. And as she went to go walk near those avocado trees, between those trees and the deck, which is covered by lattice, both Paul Flores and Ruben Flores immediately intervene and say, you've got to get out of here, you've got to move, redirected her away from that location back to the front of the house and stayed with her until she got up out of that location and went back to the front of the house.
>
> The evidence will show that under that deck, behind that avocado tree is just about the perfect place to hide a body.
>
> Predators are creatures of opportunity.
>
> MR. SANGER: Objection. Argument, your Honor.
>
> THE COURT: Sustained.

(7/18 RT 22.)[5] While the defense may dispute the significance of the evidence, the prosecutor's statements about the anticipated testimony by Ms. Carrizal was a fair comment on the evidence. The standalone comment about a predator, even if it was argumentative, was not misconduct (and was certainly not prejudicial misconduct), as

[5] The defense claims in the motion for a new trial that the Court "sustained some objections but not others" (Def. Mot. at p. 14); however, this is the only objection the defense made during the prosecutor's opening statement that the Court sustained. The Court overruled four other defense objections. (See 7/18 RT 6, 13, 23, 27.) The use of the plural ("the Court sustained some objections"), while fairly minor, is an attempt to bolster the argument of an opening statement rife with misconduct by portraying an opening statement where the Court found multiple statements by the prosecutor to be objectionable when in reality the Court only stained one objection.

it pertained to the prosecution theory of Paul Flores's motive for targeting and pursuing Kristin Smart and the word has not been found to be misconduct when used in an opening statement in the context of the evidence. (*People v. Farnam* (2002) 28 Cal.4th 107, 168.)

Similarly, the prosecutor's discussion of the backyard at 710 White Court in relation to exhibits and anticipated testimony is a fair comment on the evidence:

> Law enforcement kept investigating and on February 5th of 2020 they went to 710 White Court to execute a search warrant. You'll notice a fence in place on February 5th, 2020. This is the side of White Court. Remember the previous photo where we saw the back of the house and the avocado trees? That's to the left of this photo as you get past this house, right next to that deck. February 5th, 2020.
>
> At the back of the house you'll see essentially the perfect hiding spot tucked up the hill in the back, between those avocado trees.

(7/18 RT 26.) The defense is free to dispute the interpretation. But advocacy based on the evidence is not manipulation nor is it misconduct.

7. David Stone

Yet again, the defense neither provides the specific comments that they find objectionable nor provides citations to them, and yet again, reviewing the actual text reveals something very different from what the defense depicts. Mr. Peuvrelle made the following comments regarding Mr. Stone's anticipated testimony:

> You will hear from a roommate of Ruben Flores who overheard Ruben telling someone on the phone that Kristin Smart was a dirty slut. He said he lived there for about ten years and the area underneath the deck was more or less a no go zone. There were some times he saw some dogs in there but otherwise Ruben Flores didn't even let the plumber go down there. At one point this roommate tried to store some 55-gallon drums down there and Ruben Flores ordered him to take them out.

(7/18 RT 25.) As explained above, the jurors were provided numerous photographs of the area underneath the deck that clearly showed the space behind the lattice and clearly showed an entryway into the subfloor that was located *beneath the deck*. This was fair comment on the evidence and not misconduct.

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8. McConville Trailer

The defense motion argues that the prosecutor claimed without evidence that Ruben Flores, Susan Flores, and Mike McConville removed the remains of Kristin Smart in McConville's trailer shortly after a search warrant was executed at 710 White Court and investigators took photographs of the deck. (Def. Mot. at p. 16.) They do not cite nor do they provide the specific portion of the opening to which they are objecting. Nor do they concede that they objected to this at trial and the Court overruled it.

> MR. PEUVRELLE: Five days later something unusual happened. Neighbor near 710 White Court sees a cargo trailer being backed in to that side of the house in that location in that photograph, with the door to the cargo trailer pointed right towards the deck area, and she took a picture of it. You can see the cargo trailer backed in right next to those eaves on the side of the house.
>
> She said this stood out to her because Susan Flores was there and Susan Flores's boyfriend Mike McConville was there and that was very, very rare. And they were yelling and they were agitated, trying to get this cargo trailer back past that fence, into the backyard.
>
> Now, here's a picture taken in 2021 showing that fence had been removed to enable the cargo trailer to get back in there.
>
> Some fathers would do anything for their sons.
>
> MR. SANGER: Argumentative – argument, your Honor, improper.
>
> THE COURT: Overruled.

(7/18 RT 26-27.) The defense was free to argue that this was insufficient evidence, but to claim this was "without evidence" is untrue: the timing (after a search warrant and before a possible dig under the deck), the unusual presence of Susan Flores and Mike McConville, the dismantling of the deck fence, the soil disturbances, the presence of human blood, and the Bluestar positive result in the trailer are all pieces of evidence that are consistent with the removal of a body that had previously been buried underneath the deck at 710 White Court. The prosecutor's opening statement appropriately forecast that evidence, and the brief comment about Ruben Flores's

motivation for removing the body—protecting his son from prosecution—was based on that evidence. There was no misconduct.

9. BlueStar Reaction in McConville Trailer

After discussing the evidence of the McConville trailer, the prosecutor turned to the anticipated evidence related to the McConville trailer:

> Now, after hearing from Jamilyn Holman, law enforcement tested that cargo trailer to see what might be in it. And they sprayed Bluestar in it, which is supposed to react with human blood, and it lit up like a Christmas tree. But when it was sent to the lab, that tested negative for human blood, okay?
>
> You will hear that one of the false positives for this test is a cleaning agent such as chlorine or bleach. And as you can see from part of this picture, only that section right behind the door to that cargo trailer did you find this positive reaction. The rest of the trailer remained dirty because it's a work trailer.

(7/18 RT 30.) The defense lists this under a section on prosecutorial error in opening but does not identify how exactly this was misconduct. In any event, it—like the above examples—was fair comment on the evidence and not misconduct.

C. THE COURT DID NOT ERR IN ITS ADMISSION OF SOIL, BLOOD, BLUESTAR, DNA, AND CADAVER DOG EVIDENCE

The defense contends the court erred in its admission of soil, blood, BlueStar, DNA, and cadaver dog evidence. All of these issues were fully litigated in pretrial motions, often with Evidence Code section 402 hearings that involved witness testimony. The Court's pretrial rulings were correct, and calling the evidence "junk science"—a phrase used by the defense in its motion 29 times (not including the table of contents)—does not make it so.

1. <u>Soil Evidence</u>

The admissibility of the 710 White Court soil evidence was fully litigated before trial, and the defense cites no new case law in its claims. They cite one statute, a proposed amendment to a Federal Rule of Evidence that (1) does not apply to California state courts and (2) was not in effect at the time of the trial in this case. And

they cite several publications but only as support for general concepts regarding the concerns for and limits of expert testimony.

Because the defense claims are the same as those they litigated before the trial, the People attach and incorporate by reference as **Attachment 1** the original pleadings filed by the People in support of the admissibility of the soil evidence. The court summarily rejected these claims and denied the defense request to exclude.

2. Blood Test Evidence

The admissibility of the HemDirect blood test evidence was fully litigated before trial, and the defense cites no new case law in its claims. Furthermore, the Court heard testimony from Angie Butler and Elizabeth Johnson before making its determination as to the admissibility of the evidence. The defense cites no new case law or statutes in support of its claim.

Because the defense claims are the same as those they litigated before the trial, the People attach and incorporate by reference as **Attachment 1** the original pleadings filed by the People in support of the admissibility of the HemDirect blood test evidence. The court summarily rejected these claims and denied the defense request to exclude.

3. BlueStar Trailer Evidence

The admissibility of the BlueStar presumptive test was fully litigated before trial, and the defense cites no new case law in its claims. The People therefore incorporate by reference the arguments made before trial and contained in **Attachment 1**.

4. Cadaver Dog Evidence

The admissibility of the cadaver dog evidence was fully litigated before trial, and the defense cites no new case law in its legal analysis.[6] The People therefore attach

[6] The only new argument is the strange assertion that the evidence that forms the probable cause to search a location is irrelevant and inadmissible at trial. While it is true that there are mechanisms in place to protect some information that contributes to probable cause from disclosure to the defense (see *People v. Hobbs* (1994) 7 Cal.4th 948), evidence that formed probable cause to search a location can be highly relevant to charges related to items seized during the search. (E.g., observations of a defendant regularly accessing a storage locker prior to the search may be evidence of dominion and control of the locker and its contents, high levels of foot traffic and frequent possession of

and incorporate by reference the arguments made before trial and contained in **Attachment 2.**

5. <u>DNA Test Results</u>

The admissibility of the DNA test results of the mattress from Paul Flores's dormitory room was fully litigated before trial. Angie Butler testified that the results were uninformative for inclusion or exclusion. Which is the same way of saying that both Paul Flores and Kristin Smart could neither be included, nor excluded. The irony in the defense's accusation is that this evidence is actually exculpatory and the defense likely would have accused the prosecution of misconduct had it been omitted.

D. THE PROSECUTION DID NOT SUBORN PERJURY

Yet again, the defense motion attempts to denigrate counsel and assign nefarious motives to the presentation of evidence in this case. A prosecutor's presentation of knowingly false testimony, or the failure to correct that testimony after it has been elicited violates a defendant's due process rights. (*People v. Vines* (2011) 51 Cal.4th 830, 873, overruled on other grounds in *People v. Hardy* (2018) 5 Cal.5th 56, 104.) But "[m]ere inconsistencies between a witness's testimony and her prior statements do not prove the falsity of the testimony." (*Id.* at p. 874.) "[A] prosecutor's presentation of conflicting evidence does not necessarily mean that a prosecutor has presented false evidence. So long as impeachment material is not concealed, a prosecutor may present conflicting testimony and let the jury make a determination as to the witnesses' credibility." (*In re Masters* (2019) 7 Cal.5th 1054, 1089; see *People v. Letner and Tobin* (2010) 50 Cal.4th 99, 167 [same].)

Any inconsistencies in testimony, many of which related to events that occurred more than two decades ago, did not amount to the subornation of perjury but mere inconsistencies that do not prove the falsity of the testimony. The jury was properly instructed that it is up to them to consider inconsistencies, if any, in rendering their

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narcotics by persons leaving a location may be evidence of maintaining a place for the purpose of unlawfully selling or using a controlled substance. But the assertion, and its veracity, is far afield from the issues before the Court.

verdict.

1. David Stone

David Stone testified as a former tenant of Ruben Flores. He admitted on the stand that he still had affinity for Ruben Flores. He left on good terms and described items under the deck that were consistent with the photographs shown. There was no reason to disbelieve him and in fact the jury did believe him.

2. Jennifer Hudson

Jennifer Hudson testified at Preliminary Hearing and was honest and credible at Preliminary Hearing. She also testified at trial and was honest and credible at trial. She was extremely emotional during her testimony as she expressed regret for not having come forward sooner. The jury clearly thought she was credible and rejected defense's non-stop personal attacks and unprofessional line of questioning against her.

3. Jamilyn Holman

Jailyn Holman testified at Preliminary Hearing and was honest and credible. She also testified credibly at jury trial. On both occasions she made sure to testify that she did not actually see what occurred in the back of Ruben Flores' house at 710 White court. This fact benefits defense and it is puzzling that defense believes her to be uncredible.

4. Steve Fleming

Steve Fleming testified at Preliminary Hearing and was honest and credible, just as he was at trial. The cross-examination of Mr. Fleming was extraordinarily and unnecessarily hostile, more so than with other witnesses. It should be noted that he was the only African-American witness for the People. The cross-examination lasted hours and was so unprofessional that a juror submitted a note that defense's questions were upsetting and causing significant anxiety. Steve Fleming became visibly emotional at the thought that he did not do enough for his friend. Mr. Fleming is the epitome of credibility as an American War Hero and former law enforcement officer.

5. Tim Davis

Tim Davis testified at Preliminary Hearing and was honest and credible. He also testified credibly at jury trial. Through hostile questioning his demeanor and affect in court was such that he clearly was trying to give accurate testimony.

6. Ronda Doe

Ronda Doe testified honestly and accurately at jury trial. Defense again misstates facts and claims the fact she went to Cal Poly was "concealed." However, it was clearly discovered in Investigator Camp's notes. Nothing was concealed, rather counsel simply did not take the time to fully prepare this witness and instead chooses to attack opposing counsel. Additionally, defense's argument lacks any common sense. If she had recognized Paul Flores at the bar in Los Angeles County she would have run away as fast as she could instead of continuing to speak with him. The fact that she did not recognize Paul Flores actually demonstrates her credibility on the stand. The People filed numerous motions with our discovery log attached showing that these notes were given to defense appropriately and nothing was concealed. An attorney's failure to see the notes in a timely fashion does not mean the prosecutor "concealed them." Rather it indicates counsel should have been more diligent in his preparation.

E. THE COURT DID NOT ERR WHEN IT UTILIZED ITS DISCRETION TO ALLOW TWO OF THE UNCHARGED OFFENSES EVIDENCE SOUGHT TO BE ADMITTED BY THE PEOPLE PURSUANT TO EVIDENCE CODE SECTIONS 1101 AND 1108

The motion to admit evidence of uncharged offenses pursuant to Evidence Code sections 1101, subdivision (b), and 1108 was fully litigated before trial and the court appropriately used its discretion to admit a fraction of the requested uncharged offenses. Because the defense offers no new case law to support its argument, the People attach their original pleadings on the matter as **Attachments 3** and incorporate them by reference.

F. THE COURT APPROPRIATELY EXCLUDED IRRELEVANT AND UNFAIRLY PREJUDICIAL DEFENSE EVIDENCE

"The party offering the evidence has the burden of proving its admissibility." (*People v. Ashmus* (1991) 54 Cal.3d 932, 970, abrogated on other grounds in *People v. Yeoman* (2003) 31 Cal.4th 93, 117.) In general, the weight of the burden for the admissibility of evidence is by a preponderance of the evidence unless otherwise provided by law. (*Id.*; Evid. Code, § 115.)

The defense did not establish during trial nor have they established in their motion for a new trial the relevance of the evidence they present (Evid. Code, § 210) or how it was not unfairly prejudicial (Evid. Code, § 352). Kristin Smart was not a witness in this case, and People's position remains that the alleged conduct described in the defense motion is irrelevant to the legal questions in this case and is offered only to attempt to besmirch her reputation. If true, this would be in violation of her constitutional right as a victim to be treated with fairness and respect for her privacy and dignity. (Cal. Const., Art. 1, § 28, subd. (b)(1).) Several of the allegations would also appear to be in violation of her constitutional right to privacy. (Cal. Const., Art. 1, § 1.)

In addition, as to the psychological evaluation, the defense has not provided any information as to a waiver of the psychotherapist-patient privilege. (Evid. Code, § 1014.) The Court is statutorily required to exclude information subject to a claim of privilege if the person from whom the information is sought is not authorized to claim the privilege, and there is no party to the proceeding who is authorized to claim the privilege. (Evid. Code, § 916.) The privilege extends beyond death. (Evid. Code, § 1013, subd. (c) [holder of privilege is personal representative of patient if patient is dead]; *Boling v. Superior Court* (1980) 105 Cal.App.3d 430, 439-440.) The document would also be hearsay (Evid. Code, § 1200); the defense has not presented any evidence that the author was available to testify or that the information was otherwise admissible.

And finally, to the extent that the defense relies, in their moving papers or at the hearing for their motion, on evidence not previously disclosed to the Court when it made its ruling, the Court should consider that "new evidence." (See Pen. Code, § 1181, subd. (8).) For the Court to grant a new trial based on new evidence, the evidence must be material to the defendant and must be evidence which he could not, with reasonable diligence, have discovered and produced at trial. (*Id.*) The defense has not and cannot demonstrate materiality or diligence.

III

CONCLUSION

Because there was no prejudicial prosecutorial misconduct and no judicial error, the Court should deny the Motion for New Trial.

DATED: March 3, 2023

Respectfully Submitted,

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ATTACHMENT 1

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SUPERIOR COURT OF CALIFORNIA

COUNTY OF MONTEREY

THE PEOPLE OF THE STATE OF CALIFORNIA, Plaintiff, vs. PAUL RUBEN FLORES & RUBEN RICARDO FLORES, Defendants	CASE NOS. 22CR003712 & 22CR003713 OPPOSITION TO MOTION TO EXCLUDE EVIDENCE RELATED TO 710 WHITE COURT INSPECTION, INVESTIGATION, AND SOIL ANALYSIS Date: July 7, 2022 Time: 8:30 AM Dept. 4

I

INTRODUCTION

An archeological team analyzed a specified grid of land underneath the porch at 710 White Court and identified specific possible anomalies with the use of ground-penetrating radar, one of which was of a size consistent with a human burial site. They then excavated the areas of the anomalies to verify their existence and determine their nature. In the area of the largest anomaly, the excavation located an area of staining consistent in size and manner with the decomposition of human remains but with soil disturbance consistent with the removal of a body. Soil samples taken from the stained soil tested positive for hemoglobin in human blood. The floor of a trailer seen in the area of the burial site tested positive in a presumptive luminol-based test for blood.

This evidence is competent, relevant proof that the body of Kristin Smart was previously buried underneath the porch of defendant Ruben Flores and subsequently removed, and was derived by methods that are generally accepted by the scientific community. The People have previously and will again establish the relevance and admissibility of testimony regarding the ground-penetrating radar evidence, the excavation of the largest anomaly that revealed staining consistent with a human burial, the testing of the soil samples that revealed the presence of human blood, and the presumptive luminol-based testing of the trailer observed parked in the area of the burial site that was positive for the presence of blood.[1]

II

STATEMENT OF PERTINENT AND ANTICIPATED FACTS[2]

A. Inspection of Land Grid Underneath the Porch at 710 White Court

Cindy Arrington and Phil Hanes are part of a small company called Natural Investigations Company, Inc., headquartered in Sacramento. Natural Investigations performs a variety of archeology work, and in their work together Ms. Arrington and Mr. Hanes have completed 50 to 100 large-scale excavation and small-scale testing projects. (PH RT 5110, 5226.) In their work on excavation sites, Mr. Hanes operates a ground-penetrating radar machine to look for evidence of a disturbance underneath the ground level, and if the machine detects an anomaly, Ms. Arrington carefully excavates the area of the anomaly to determine if something is there. (PH RT 5188.)

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[1] The defense notes an unrelated complaint regarding the refusal of the prosecution to provide the soil samples in evidence to Technical Associates, Inc., laboratory for testing. While this claim is irrelevant to the motion at hand, the People wish to note in response that they previously made the soil samples available to Wallace Labs in El Segundo at the request of the defense. Technical Associates, Inc., is also not accredited to perform analysis on either DNA or blood evidence.

[2] Statement of pertinent and anticipated facts taken from the preliminary hearing reporter's transcript ("PH RT"), notes by Phil Hanes attached as Exhibit A, notes by Cindy Arrington attached as Exhibit B, Sheriff's Office case number 960610965 supplemental report number 782 attached as Exhibit C, SERI laboratory report number 11034.19 attached as Exhibit D, Sheriff's Office case number 960610965 supplemental report number 823 attached as Exhibit E, SERI HemDirect validation documents attached as Exhibit F, and Sheriff's Office case number 960610965 supplemental report number 565 attached as Exhibit G. All of the attachments are hereby incorporated by reference. The September 8, 2021, preliminary hearing transcript will be referred to as "9/8/21 RT" because it has separate pagination from the rest of the preliminary hearing transcript referenced in this motion.

Mr. Hanes has been an archeologist for fifteen years. (PH RT 5108.) He has a bachelor's degree in anthropology and a master's degree in a subset of archeology called cultural resource management, and his master's degree thesis heavily focused on the use of ground-penetrating radar in archeology. (PH RT 5108, 5131.) He is a registered professional archeologist, membership in an organization that maintains ethical and educational standards for archeologists. (PH RT 5133.) He is a member of the Society for California Archeology, the Society for Historical Archeology, and the Society for American Archeology, and he attends professional conferences and lectures to stay up to date on new developments in his field. (PH RT 5109-5110.) Mr. Hanes specializes in remote sensing, which uses technology to gain a better understanding of what is underground prior to possible excavation. (PH RT 5110-5111.)

One particular technique that Mr. Hanes has specialized in is ground-penetrating radar, which is the transmission of electromagnetic waves into the ground to measure their reflections to determine what may or may not be underground. (PH RT 5111-5112.) Radar technology that forms the base of the machine is a hundred years old, and was developed initially by the military for aerial radar. (PH RT 5141.) It was used for ground-penetrating radar in the 1960s and 1970s for scientific geological research and became more commercially available in the 1970s and 1980s. (PH RT 5141.) Ground-penetrating radar was applied until around the early 1990s with the advent of modern computer processing which provided for better modeling with the data. (PH RT 5141-5142.) Depending on the frequency of the antenna, it can be used for concrete detection, structural determination of bridges, geologic or oil and gas exploration, and more. (PH RT 5142.)

Mr. Hanes uses a machine with an antenna and physical radar connected to a field computer to collect data. (PH RT 5112.) In this process, he is looking for anomalies, or consistency changes to the underground environment that is visible on the radar, which include voids and pipes but are more often soil changes caused by digging/excavation and backfill. (PH RT 5112; Exh. A.) To accomplish this, Mr. Hanes creates a tight grid (typically one-foot transects) on the ground surface then uses the ground-penetrating radar unit to send radar pulses within the ground and receive a signal back to determine buried anomalies. (PH

RT 5111, 5113.) He then reviews the data reflecting horizontal slices across the ground to determine whether there are anomalies in any locations within the grid. (PH RT 5115.)

Ground-penetrating radar has been subject to extensive peer review, and the topic of ground-penetrating radar and human remains is the subject of scholarly articles and books. (Exh. A.) Some of the academic literature included scientific experiments to determine the accuracy and feasibility of ground-penetrating radar on detecting burials. (Exh. A.) The methods used by Mr. Hanes are standard and representative of good data-collecting practice, as described in “Ground Penetrating Radar of Archaeology” by Lawrence Conyers. (Exh. A.)

Mr. Hanes has used ground-penetrating radar machines since his time as an undergraduate, has received trained in it both by his college advisor—one of the preeminent practitioners in the field who assisted in the development of the hardware and its application to archeology—and by the manufacturer, and has taken subsequent classes on the topic. (PH RT 5114, 5128.) He has owned the machine he uses for approximately eleven years, and has used ground-penetrating radar on a site approximately 30 times. (PH RT 5115, 5135.)

On March 15, 2021, Ms. Arrington and Mr. Hanes began work on an evaluation and possible excavation of 710 White Court in Arroyo Grande. (PH RT 5186.) Ms. Arrington and Mr. Hanes examined the requested areas, took soil samples to calibrate the radar unit to determine depth, cleared brush and objects from under the porch to provide access for the machine, calibrated the machine for the specific environment of sand, and set up a specific grid pattern for the analysis. (PH RT 5119-5120, 5186-5187.) Ground-penetrating radar can penetrate most materials except metal, and disturbance from grasses and household weeds do not significantly impact ground-penetrating radar data. (PH RT 5123, Exh. A.)

Ms. Arrington and Mr. Hanes ran approximately six grids at 710 White Court that day and identified four anomalies of interest under the porch, identified in the grid pattern as Grid 1, Grid 3 and Grid 10. (PH RT 5148, 5189.) The largest anomaly was approximately four feet by six feet in Grid 1, a size that was large enough to fit human remains, and began at the surface or close to it and went approximately three and a half or four feet deep. (PH RT 5149, 5153,

5189.) Grid 1 was relatively flat and easy to work with, without much surface obstruction. (PH RT 5126.)

B. <u>Excavation of Grid 1 Underneath the Porch at 710 White Court</u>

Ms. Arrington is an archeologist. (PH RT 5182.) She has a bachelor's degree in anthropology and a master's degree in historical archeology with an emphasis on human remains. (PH RT 5182.) She has worked in the field of archeology since the 1980s, and approximately 25 percent of that work has dealt with human remains. (PH RT 5183-5184.) She has evaluated hundreds of sites with possible human remains. (PH RT 5184.) Ms. Arrington has been a Registered Professional Archeologist since 2004. (PH RT 5184-5185.)

As a body decomposes it begins to liquify, and this liquification creates a very distinct stain in soil in which a body has been buried. (PH RT 5195.) When a burial has never been disturbed, archeologists typically find a large ring around it where the body has decomposed and liquefaction has slowly spready out, and this staining can remain there. (PH RT 5195, 5202.) Ms. Arrington has personally observed similar staining in an excavation of prehistoric remains that were 3,500 years old. (PH RT 5202.) This staining did not match the stratigraphy in the soil surrounding the anomaly. (PH RT 5200.)

Prior to excavating Grid 1, Ms. Arrington and Mr. Hanes took specific steps to ensure the integrity of the excavation, including ensuring the ground surface was clear and setting up tarps and buckets to isolate and hold any soil removed from the anomaly. (PH RT 5191:26-5192:8.) With the assistance of Sheriff's Office personnel, Ms. Arrington excavated the large Grid 1 anomaly and located what she referred to as a thin "bathtub ring" where the stain ran along the sides of the hole in the location of the identified anomaly. (PH RT 5193.) This staining is consistent with fluid having permeated that strata or layer of soil. (PH RT 5194.)

Based on Ms. Arrington's experience excavating human remains, the stain was consistent with that of a decomposition stain also referred to as a cadaver-soaked stain. (PH RT 5195.) The soil appeared to have been disturbed between the staining and the March 2021 excavation because it had no defined stratigraphy and the staining lacked a definitive, continuous bottom or "basement layer" where the fluid congregated that is typically seen when

a burial has not been disturbed. (PH RT 5202-5204, 5269-5270.)[3] Ms. Arrington did not locate any possible source for the leaked fluid, which suggested, in conjunction with the evidence of disturbance post-staining, that the hole had been previously excavated and the source of the leaked fluid had been removed. (PH RT 5202-5204.) Ms. Arrington did not locate any bones in the area of the staining, which—given the staining that was consistent with a decomposition stain from a human burial—would be consistent with a body having been wrapped in a semi permeable material that allowed some fluids to leak out but kept the bones contained. (Exh. B, C.)

The staining was inconsistent with staining from a plumbing issue, as Ms. Arrington would expect to see a feathering stain and not a bathtub ring. (PH RT 5204.)

Excavation of the areas of the anomalies in Grid 3 and Grid 10 did not locate anything of significance. (PH RT 5166-5167.) Ms. Arrington assisted Sheriff's Office personnel in the collection of soil samples from the excavation. (PH RT 5261.)

C. <u>Testing of Soil Samples Taken from Staining in Soil at 710 White Court</u>

Angela Butler is a forensic serologist at SERI and specializes in the identification of body fluids and the performance of DNA analysis. (9/8/21 RT 4.) She earned a bachelor's degree of science in biology from the University of San Francisco in 1998, spent several years after graduating in the biotechnology industry working with DNA in a research setting that involved sequencing the human genome in search of drug targets to help with diabetes, and has been a forensic serologist at SERI since 2001. (9/8/21 RT 4-6.) She began as an assistant forensic serologist and is currently the senior analyst and the lab supervisor. (9/8/21 RT 6.)

Along with her college degree, Ms. Butler has taken all of the upper-level coursework required by the FBI to be a forensic DNA analyst. (9/8/21 RT 5-6.) She received extensive on-

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[3] Shelby Liddell testified that the staining that *was* located did not appear to have been disturbed. (PH RT 5758.) Contrary to the defense claims but consistent with the magistrate's holding order at the preliminary hearing, this is not inconsistent with Ms. Arrington's testimony, which noted that portions of the staining that would have comprised the bottom layer appeared to be missing. The magistrate specifically noted that "[b]oth Ms. Arrington and Shelby Liddell testified that the staining had been disturbed in areas and was discontinuous. And when questioned closely about the photographs of the soil staining by Mr. Sanger, Liddell was careful to say that the staining in the photographs had not been disturbed." (PH RT 6308.)

the-job training at SERI over the last 20 years, goes to continuing education as required for accreditation standards, and stays current up to date on the forensic literature in her field. (9/8/21 RT 5.) As part of her duties, Ms. Butler works with human blood and tests for the presence of DNA as well as the presence of human blood. (9/8/21 RT 10.)

The process of testing for the presence of human blood at SERI involves two steps. The first step is an orthotolidine presumptive test, used by SERI since it was founded in 1978, where an analyst touches a small piece of filter paper to the suspected blood stain or stain of interest, adds a drop of one chemical then a second drop, and inspects the filter for a color metric change. (9/8/21 RT 10-11.) If there is a reaction, the filter paper turns blue. (9/8/21 RT 11.) Iron can cause a very slow and very weak false positive result. (9/8/21 RT 11.) Ms. Butler was trained in the orthotolidine test, has performed the test tens of thousands of times, has trained others in the orthotolidine test, and does technical reviews of the orthotolidine test. (9/8/21 RT 11-12, 17.) The small portion of a sample that is used in the orthotolidine test is not placed back in the original sample. (9/8/21 RT 53.)

The second step is a SERATEC HemDirect confirmatory test that is a very sensitive test that detects the presence of hemoglobin, which is the red pigment found in red blood cells, on a variety of forensic samples. (9/8/21 RT 13, 44.) The test kit is a plastic cartridge with a membrane, and the analyst adds a sample to the well on the membrane for an antigen-antibody interaction. (9/8/21 RT 13.) During a test, the test membrane should show a pink band in the control section to confirm the test is working properly and a second pink band after ten minutes if there is a positive result. (9/8/21 RT 13.) The test is human-specific, though it can show positive tests for the blood of higher primates like chimpanzees and gorillas. (9/8/21 RT 13-14.) The literature and SERI's own validation study tested cross-reactivity with a number of animals, including dogs, cats, sheep, pigs, cows, and ferrets, and all were negative except the ferret, which showed a slight positive reaction. (9/8/21 RT 14.) SERI's validation study also determined that the test can detect weak positive results for hemoglobin in other bodily fluids like saliva, semen, and urine, all of which have trace numbers of red blood cells. (9/8/21 RT 80.) The SERATEC HemDirect test is generally accepted in the courts and

scientific community and has been validated by numerous labs across the country. (9/8/21 RT 63.) Ms. Butler is not aware of any false positive results from the test in the literature and is not personally aware of any false positives in her experience. (9/8/21 RT 93.)

SERI has been using the HemDirect test for almost ten years, and Ms. Butler has been trained on its use. (9/8/21 RT 16.) Ms. Butler had to pass an internal competency examination using the test on a number of stains in order to administer the test, and every six months she is required to perform proficiency examinations for every test she has been trained to do, including the SERATEC HemDirect test. (9/8/21 RT 16.) Ms. Butler's lab has used the SERATEC HemDirect test at least one thousand times in casework, she has trained other analysts how to use it, and she does technical reviews for the tests. (9/8/21 RT 16.) Ms. Butler has utilized the HemDirect test with soil three times prior to this case, and other analysts in her lab have used the HemDirect test on soil as well. (9/8/21 RT 49, 74.) Validation studies on the HemDirect test exist for a variety of substances. (9/8/21 RT 44; Exh. E.) Between 75 and 100 laboratories in the United States utilize the HemDirect test, and multiple labs have used the HemDirect test can detective hemoglobin on samples over 30 years old, and these results are consistent with the literature. (Exh. E.)

Testing for the presence of DNA occurs after testing for the presence of human blood, in part because testing for the presence of DNA involves the extraction of any potential DNA by mechanically opening the cells to release the DNA by chemical means, the purification of the sample to remove all extra cellular material, the measurement of the amount of DNA recovered, and the subsequent DNA analysis. (9/8/21 RT 17-18.) Ms. Butler has tested for the presence of human DNA tens of thousands of times. (9/8/21 RT 18.)

On March 17, 2021, the Sheriff's Office delivered two containers of soil samples (Evidence Items 775 and 776) to the Serological Research Institute (SERI) in Richmond, California, for analysis. (9/8/21 RT 21.) Ms. Butler weighed and photographed the soil samples and placed them in sterile plastic containers. (9/8/21 RT 23.) She administered orthotolidine presumptive tests on one sample of material from Evidence Item 775 and six samples of material from Evidence Item 776 and all seven reflected weak positive results for blood.

(9/8/21 RT 24-26.) Ms. Butler then visually inspected the samples and collected samples using a stereomicroscope. (9/8/21 RT 47.) She administered the HemDirect confirmatory test to each sample by dissolving it into a special buffer solution to neutralize the PH to avoid the possibility of a false negative test and placing the resulting liquid onto the HemDirect test card. (9/8/21 RT 24-26, 45.) The confirmatory test was negative for Evidence Item 775, negative for one sample from Evidence Item 776, weak positive for two samples from Evidence Item 776, and positive for three samples from Evidence Item 776. (9/8/21 RT 26-27.)

On April 27, 2021, the Sheriff's Office delivered Evidence Items 898, 831, 847, 849, 863, and 859 to SERI for analysis. (9/8/21 RT 28.) Ms. Butler administered presumptive and confirmatory tests to samples from all six evidence items with the following results:

Item No.	Location	Presumptive Test	Confirmatory Test
859	Soil Probe, Area E (4 samples)	Positive Positive Positive Positive	Weak Positive Weak Positive Negative Negative
831	Control Sample, Northwest Corner (2 samples)	Negative Negative	Negative Negative
847	Stained Soil, Area A2 (3 samples)	Weak Positive Weak Positive Weak Positive	Weak Positive Weak Positive Positive
849	Soil Stain, Area B4 (2 samples)	Weak Positive Weak Positive	Negative Weak Positive
863	Soil Sample, Area A2	Weak Positive Weak Positive Weak Positive	Positive Positive Not tested

(9/8/21 RT 28-34.) The control pink band in the test, the testing of control soil samples that yielded negative results, and the fact that not all separate samples from individual items of evidence tested positive are consistent with the test working properly. (Exh. E.)

Ms. Butler also attempted to extract DNA from all of the samples tested for the presence of hemoglobin but did not detect any DNA in the samples. (9/8/21 RT 33-34.) Receiving a positive test for the presence of hemoglobin and no detection of DNA is not inconsistent because red blood cells break down differently than DNA double helixes. (9/8/21 RT 83.) Soil is not a solid material from which DNA can be directly extracted, while the test for the presence

of human blood can detect one part in ten million, and the hemoglobin test detects for the presence of red blood cells, which do not contain DNA. (9/8/21 RT 34-35.) DNA is degraded over time by heat, moisture, and microbes that exist in soil, and the soil samples in question were damp. (9/8/21 RT 20, 34-35, 73.) Liquid blood may have DNA and red blood cells in it, but blood poured into the dirt would be broken down over time by enzymes, the blood would start to decay, and the protein would start to denature. (9/8/21 RT 79-80.) Microorganisms that live in soil are attracted to biological material and would begin to break it down. (9/8/21 RT 80.) When protein is denatured, it ruptures the cell membrane and the nucleus where DNA resides, which releases the DNA into the soil where it is broken up into fragments. (9/8/21 RT 81-82.) Humic acid, found in soil, also chews up DNA fragments and affects the quantity and quality of DNA recovery. (9/8/21 RT 84.) At that point, the DNA may not be usable but other things, like red blood cells, may still be detectable. (9/8/21 RT 83.) Studies regarding the aging of blood on the surface of objects and likelihood that hemoglobin will no longer exist over time are not the same as soil samples covered by three to four feet of soil. (Exh. E.)

D. <u>Testing of Trailer Seen at 710 White Court</u>

Bluestar is a luminol-based technique used to enhance potential blood evidence using a chemical that reacts to hemoglobin in blood, creating a chemical luminescence that glows blue and is visible in the dark. (PH RT 4954-4955; Bluestar Forensic, "The Chemistry of Bluestar Forensic," < https://www.bluestar-forensic.com/the-chemistry-of-bluestar-forensic/> [as of June 22, 2022].) It is a presumptive reagent for the presence of blood. (Exh. G.) Household cleaners that contain chlorine with bleach, some vegetables and foods, paints and varnishes have shown false positives. (PH RT 4955, 4960.) Blood tends to glow very slowly and shows bright blue, whereas false positives typically flash and sometimes glow white instead of blue. (PH RT 4955.)

Shelby Liddell, a Forensic Specialist for the San Luis Obispo County Sheriff's Department, received training on the Bluestar technique on the job, in a Field Evidence Technician course, and Advanced Crime Scene investigation course on luminol techniques and Bluestar application. (PH RT 4954.)

On April 21, 2021, Ms. Liddell was present at 710 White Court when a white Haulmark Passport Cargo trailer was located and towed to the Crime Lab. (PH RT 4958, 4956).) She was present for the initial search of the trailer, which was pretty full of items including tools, files, and paperwork, and photographed items of note identified by detectives. (PH RT 4955-4956.) After the initial search of the trailer, Ms. Liddell photographed the area she would be applying Bluestar to with a flash and normal light and applied Bluestar in spray bottle form. (PH RT 4959-4960.) She captured the slow luminescence of the Bluestar reaction and glow with a camera in manual setting with an open shutter over the course of 30 seconds. (PH RT 4950-4960.) The Bluestar application had a reaction on the floor inside the side door entrance to the trailer. (Exh. G.) The composite photograph of the Bluestar reaction was approximately a foot and a half to two feet in width and two and a half to three feet in length. (PH RT 4962.) The area where the reaction was observed was cut out of the floor and booked into evidence. (Exh. G.)

Ms. Butler also performed a presumptive orthotolidine test on Evidence Item 898, plywood from the trailer, and received a very weak positive result. (9/8/21 RT 36.) She did not perform a confirmatory test on it due to the nature of the presumptive result, the lack of visible stains, and the desire to use the entire sample for possible DNA extraction. (9/8/21 RT 36.) Ms. Butler did not locate any DNA from Kristin Smart, Paul Flores, or Ruben Flores on the plywood from the trailer. (9/8/21 RT 36-37.)

III

LAW AND ARGUMENT

The People must prove its case to a jury beyond a reasonable doubt, but that standard does not apply to the admissibility of evidence. (Pen. Code, § 115.) Subject to foundational requirements, evidence is relevant when it has "*any tendency in reason* to prove or disprove any disputed fact that is of consequence to the determination of the action." (Evid. Code, § 210, emphasis added.) The party offering expert testimony has the burden of proving its admissibility by a preponderance of the evidence. (*People v. Nieves* (2021) 11 Cal.5th 404, 444 (*Nieves*).)

Expert opinion testimony is relevant when it is related to a subject that is sufficiently beyond common experience that the opinion of an expert would assist the trier of fact, and it is based on matter, including special knowledge, skills, experience, training, and/or education, that is reasonably relied upon by an expert in forming an opinion on the subject. (Evid. Code, § 801.) The challenged ground-penetrating radar evidence of an anomaly of a size consistent with a human burial, the soil stratification and staining evidence consistent with a previous human burial that has since been disturbed, the hemoglobin test evidence of the stained soil samples that was positive for human blood, and the luminol-based presumptive test of the trailer observed at the burial site that was positive for blood are relevant evidence that Kristin Smart's body was previously buried under 710 White Court, are not based on new or novel scientific techniques, are not clearly invalid and unreliable, and are therefore admissible.

A. THE ADMISSIBILITY OF EXPERT TESTIMONY

The court serves two separate but related gatekeeping functions for scientific evidence and expert testimony: the *Kelly* rule of admissibility of expert testimony based on a new or novel scientific technique, and the *Sargon* test that requires expert testimony have a sufficient basis to merit a jury's consideration. (*People v. Lund* (2021) 64 Cal.App.5th 1119, 1136-1138.)

1. <u>The *Kelly* Rule on the Admissibility of New Scientific Techniques</u>

The admissibility of expert testimony based on a new or novel scientific technique is governed by rules adopted in the leading cases of *Frye v. United States* (D.C. Cir. 1923) 293 Fed. 1013 (*Frye*) and *People v. Kelly* (1976) 17 Cal.3d 24 (*Kelly*) (abrogated by statute on another point as explained in *People v. Wilkinson* (2004) 33 Cal.4th 821, 845-848). Federal courts have since abandoned *Frye* (*Daubert v. Merrell Dow Pharmaceuticals, Inc.* (1993) 509 U.S. 579; *People v. Cowan* (2010) 50 Cal.4th 401, 469, fn. 22); however, California has retained the *Kelly* test. (*People v. Leahy* (1994) 8 Cal.4th 587, 598-604, 612; see also *Sargon Enterprises, Inc. v. University of Southern California* (2012) 55 Cal.4th 747, 772, fn. 9 (*Sargon*).)

Under the *Kelly* test, the proponent of evidence derived from a "new scientific technique" must show " '(1) "the technique is generally accepted as reliable in the relevant

scientific community"; (2) "the witness testifying about the technique and its application is a properly qualified expert on the subject"; and (3) "the person performing in the test in the particular case used correct scientific procedures." [Citation.]' " (*People v. Nieves* (2021) 11 Cal.5th 404, 444 (*Nieves*).) "The first and third prongs can be confused; the *Kelly* first-prong analysis applies only to a new technique or procedure, whereas the third prong is case specific." (*People v. Stevey* (2012) 209 Cal.App.4th 1400, 1410.) "In determining whether there has been 'general acceptance,' '[t]he goal is not to decide the actual reliability of the new technique, but simply to determine whether the technique is generally accepted in the relevant scientific community.' [Citation.]" (*People v. Morganti* (1996) 43 Cal.App.4th 643, 656.) The party offering the evidence has the burden of proving its admissibility by a preponderance of the evidence. (*Nieves*, *supra*, 11 Cal.5th at p. 444.)

Not all new scientific testing procedures or instruments are subject to the *Kelly* test. "The *Kelly* rule is frequently inapplicable to expert testimony because the testimony is often neither based on a new scientific technique nor likely to convey an aura of certainty. '[A]bsent some special feature which effectively blindsides the jury, expert opinion testimony is not subject to *Kelly*.' [Citation.]" (*In re O.D.* (2013) 221 Cal.App.4th 1001, 1006-1007.)

2. The *Sargon* Rule for Expert Testimony

Evidence Code section 801 mandates that expert witness testimony be based on matter, including the witness's special knowledge, skill, experience, training, and education, "that is of a type that reasonably may be relied upon by an expert in forming an opinion on the subject." (*Id.*, subd. (b).) Under section 801 and 802, "the trial court acts as a gatekeeper to exclude expert opinion testimony that is (1) based on matter of a type on which an expert may not reasonably rely, (2) based on reasons unsupported by the material on which the expert relies, or (3) speculative." (*Sargon*, *supra*, 55 Cal.4th at pp. 771-772.)

The California Supreme Court warned trial courts to be cautious in excluding expert testimony, as the goal of trial court gatekeeping is "simply to exclude 'clearly invalid and unreliable' expert opinion." (*Id.* at p. 772.)

> The court must not weigh an opinion's probative value or substitute its own opinion for the expert's opinion. Rather, the court must simply determine whether the matter relied on can provide a reasonable basis for the opinion or whether the opinion is based on a leap of logic or conjecture. The court does not resolve scientific controversies. Rather, it conducts a 'circumscribed inquiry' to 'determine whether, as a matter of logic, the studies and other information cited by experts adequately support the conclusion that the expert's general theory or technique is valid.' [Citation.]

(*Id.*) "In short, the gatekeeper's role 'is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.' " (*Id.*)

"The trial court has broad discretion in deciding whether to admit or exclude expert testimony [citation], and its decision as to whether expert testimony meets the standard for admissibility is subject to review for abuse of discretion." (*People v. McDowell* (2012) 54 Cal.4th 395, 426.) Unless the expert testimony is inadmissible under the *Kelly* or *Sargon* tests, arguments regarding its persuasiveness go to the weight and not the admissibility of the evidence. The defense is entitled to present their own expert as a defense witness on the issues and to challenge the persuasive value of the expert's opinion through cross-examination, but "questions regarding the validity or the credibility of an expert's knowledge are matters for the jury to decide" and do not provide a basis for excluding the expert's testimony. (*People v. Morales* (2020) 10 Cal.5th 76, 101.)

A. <u>Phil Hanes' Testimony About Ground-Penetrating Radar</u>

Phil Hanes provided a sufficient foundation for his use of ground-penetrating radar technology in his role in the search of 710 White Court. His education and career have focused on the use of ground-penetrating radar, he trained under one of the preeminent practitioners in the field who assisted in the application of the technology to archeology, and the use of ground-penetrating radar—which has been subject to extensive peer review—in the detection of human remains has been the subject of scholarly articles and books. Mr. Hanes has also

received training from the manufacturer of the device, has owned the machine for approximately eleven years, and has used the technology on a site approximately 30 times.

Furthermore, Mr. Hanes deployed the ground-penetrating radar technology in the manner in which he was trained in an environment conducive for the science.

And finally, the use of ground-penetrating radar was an initial approach to the soil and anomalies identified in its use were then subject to "ground-truthing" or verification by excavation. The defense would have the court believe this is a weakness in the evidence, but rather, it is one step in a complete investigation of the soil and its results are also admissible to explain the subsequent excavations. It is not only admissible on its face, but its reliability was subject to validation in this case by excavation.

Based on the foundational evidence provided to the court through preliminary hearing testimony, the attached exhibits, and anticipated testimony at the contested hearing on this motion, the concerns raised by the defense may be the appropriate subject of cross-examination, subject to appropriate objections, but they go only to the weight of the testimony and not its admissibility.

B. <u>A Scientific Basis Exists to Assert the "Bathtub Ring" Soil Staining is Consistent with a Human Burial</u>

The defense would have the court believe that the staining in Grid 1 at 710 White Court, identified by ground-penetrating radar, confirmed by excavation, the size of a human body burial site, consistent with staining patterns observed at human burial sites, and whose soil tested positive for the presence of hemoglobin, is "not probative" to whether the son of its occupant murdered Kristin Smart and its occupant assisted in hiding the murder. This evidence is relevant and highly probative evidence of whether and how the defendants initially disposed of the body of Kristin Smart.

1. Staining Pattern Consistent with Human Burial

Cindy Arrington has worked in the field of archeology since the 1980s and both her education and her professional experience has included a focus on human remains. She has evaluated hundreds of sites with possible human remains, and has personally observed a

large ring of staining in the soil around a burial site that occurs when a body decomposes and liquifies. In this case, Ms. Arrington personally assisted in the excavation of Grid 1, took steps in accordance with her training to ensure its integrity, and observed evidence of the type of "bathtub ring" staining that she has seen at human burial sites over the course of her career. The difference between the human burial sites Ms. Arrington has worked where a body has been discovered and this site is that the staining appeared to have been disturbed since it occurred: the soil in the area did not exhibit the sort of stratification consistent with that around it and the bottom layer was interrupted. Ms. Arrington assisted in obtaining soil samples of the stained areas for testing to determine whether they contained hemoglobin consistent with human blood and, therefore, consistent with a human burial.

Not only are Ms. Arrington's observations based on training and experience that is more than sufficient for their interpretation, but the defense contention that the lack of human remains renders them unreliable is directly contradicted by Ms. Arrington's testimony and observations. The fact that the soil appeared to have been disturbed after the staining occurred combined with the fact that a body wrapped in a semipermeable material would have resulted in bodily fluids and liquified remains leaking out to create the staining but bones remaining contained within the material is consistent with and highly probative of the prosecution theory that the body of Kristin Smart was buried under Grid 1 for some time but was subsequently removed.[4]

Like Mr. Hanes' testimony, the concerns raised by the defense related to the excavation and staining of the soil may be the appropriate subject of cross-examination, subject to appropriate objections, but they go only to the weight of the testimony and not its admissibility.

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[4] The fact that a tenant who moved into the residence in 2010 did not notice an odor coming from the deck almost 15 years after Kristin Smart was murdered does not diminish the relevance of this evidence. Indeed, Ms. Arrington testified that the first four stages of the decomposition of a body occur within the first 24 days and include fresh decomposition, bloat, decay, and active decay. (PH RT 5232.) The final stage, called skeletonization, can occur from 24 days to 10 years, and would have concluded almost five years before the tenant moved in. (PH RT 5232.)

2. Positive Results in Forensic Analysis of Soil are Admissible

Ms. Butler has spent almost twenty years working as a forensic serologist, testing samples for the presence of hemoglobin and DNA and analyzing DNA samples. Both the presumptive orthotolidine test and the confirmatory HemDirect test are tests that Ms. Butler is trained to do, has conducted many times, has trained other analysts to conduct, and are generally accepted in the scientific community.[5] At least 75 laboratories in the United States alone utilize the HemDirect test, which has been the subject of validation tests at SERI and which has been documented detecting hemoglobin in samples at least 30 years old and detecting hemoglobin in bodily fluids other than blood. Ms. Butler conducted the tests in this case in accordance with her training.

While the issues before the court in this motion are primarily case-specific and evidence-based, some of the issues have an historical underpinning documented in case law. More than 30 years ago, the California Supreme Court noted that

"presumptive tests for blood are generally accepted by California courts, and have been used by criminologists and admitted into evidence in this state for over 40 years." (*People v. Coleman* (1988) 46 Cal.3d 749, 775.) The documented history of the use of

tests of substances for the presence of hemoglobin in blood, combined with the information provided to the court regarding the specific tests used in this case, provides more than a sufficient foundation for the admissibility of its results.

The evidence demonstrates that the testing of substances for hemoglobin is not a "new scientific technique" under *Kelly*, but even assuming arguendo that this court finds the HemDirect hemoglobin test is a new scientific technique, it meets all three prongs of the *Kelly* test. The defense has not challenged the first prong of *Kelly* (Def. Mot. at p. 10), but the widespread use of the test in laboratories throughout the country and Ms. Butler's testimony

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[5] The defense has not explicitly challenged the orthotolidine test in their motion. If they raise that issue after the filing of this response, the People respectfully refer the court to the case law and analysis contained in section III, subdivision (C) of this opposition and request the opportunity to more fully address any claims not made at the time of the filing of this opposition.

demonstrates the test is generally accepted as reliable in the relevant scientific community.[6] Ms. Butler's education, training, and experience in the field in general and with the tests in particular render her a properly qualified expert. And Ms. Butler's testimony establishes she used correct scientific procedures in her testing process.

Similarly, a *Sargon* gatekeeping analysis also demonstrates that the use of HemDirect testing is valid and reliable. The HemDirect test is made to test a variety of substances for the presence of hemoglobin, and includes a buffer—used by Ms. Butler in her tests—that neutralizes the Ph of the substance to avoid false negative results. It has been used in soil tests by labs including but not limited to Ms. Butler's. The results in this case demonstrate that the test was working as expected because the control portion of the test functioned properly and because the control soil samples taken from areas that did not contain the staining tested negative. The soil sample analysis, done with a commonly used test in an approved manner, is not the "clearly invalid and unreliable" nature that requires exclusion under *Sargon*, and any defense concerns do not affect the admissibility of this evidence but only its probative weight.

C. Testimony About Forensic Analysis of Trailer is Admissible

The defense claims that the presumptive results of the Bluestar chemical used on the trailer are irrelevant and inadmissible, but fails to provide legal authority for their specific claim, likely because the claim that luminol-based presumptive tests for blood are inadmissible has been explicitly rejected by the California Supreme Court in *People v. Alexander* (2010) 49 Cal.4th 846 (*Alexander*). (*Id.* at p. 904.)

In *People v. Burgener* (1986) 41 Cal.3d 505, the California Supreme Court specifically considered the question of a presumptive test for the presence of blood that could not determine whether the blood was human or blood at all, because the test could also produce positive results for animal blood, some vegetable enzymes, and fecal material. (*Id.* at pp. 526-

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[6] Courts have generally held that a new product for a test is not a prong one issue in the *Kelly* analysis. (See, e.g., *People v. Hill* (2001) 89 Cal.App.4th 48 [new kit for PCR DNA testing not a prong one issue].) Hemoglobin tests have been utilized by the scientific community in forensics since at least 1958. (See *People v. Schiers* (1958) 160 Cal.App.2d 364, 374-375 [addressing propriety of court questioning of expert witness about test for the presence of hemoglobin on substances].)

527, disapproved of on other grounds by *People v. Reyes* (1998) 19 Cal.4th 743.) Relying on the definition of relevant evidence in Evidence Code section 210, the Court stated,

> [i]t is difficult to view the presence of a substance which might be blood on the seat of a car in which a murder victim was seen shortly before her death as having *no* tendency in reason to prove that the car's owner might have killed her. Similarly, as here, the presence of a substance which might be blood on defendant's shoes certainly has *some* tendency in reason to prove he might have been present at the scene of a bloody shooting the night before his arrest.

(*Id.* at p. 527, emphasis in original.)

The Court echoed this language in *Alexander*:

> The factors raised in defendant's challenge to this evidence—that the presumptive tests could not confirm the substance tested was human blood, that confirmatory tests failed to confirm the presence of blood, and that it is unknown when the jacket might have been exposed to the substance that created the positive results—do not mean the test results have *no* tendency in reason to establish that defendant shot Agent Cross. Those issues affect the probative weight of the evidence, not whether the test results meet the threshold requirement of relevancy.

(*Alexander*, *supra*, 49 Cal.4th at p. 904.)

In this case, the floor inside the side door entrance of the trailer showed a reaction with the Bluestar application. The section of that trailer showed a weak positive result in a presumptive orthotolidine test by Ms. Butler but Ms. Butler did not locate the presence of DNA of either defendant or Kristin Smart. Pursuant to the rulings in *Burgener* and *Alexander*, the Bluestar presumptive test results on the trailer, as well as the orthotolidine presumptive test results, are relevant to whether Kristin Smart's body was moved from a burial site at 710 White Court in the trailer because they tend to show the presence of human blood. They are also relevant because another possible reason for the positive reaction—household cleaners that contain chlorine with bleach—are relevant to both a recent cleaning of the area of the trailer where a body was placed and to explain the lack of DNA of Kristin Smart. The admission of this evidence does not preclude the defense from exploring the limits of its interpretation.

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IV

CONCLUSION

All of the challenged evidence has at least some tendency in reason to establish the defendants buried the body of Kristin Smart at 710 White Court and removed it before the March 2021 excavation. Phil Hanes, Cindy Arrington, Angela Butler, and Shelby Liddell are highly trained and qualified in their respective fields and used methods which the evidence establishes are generally accepted in their scientific communities. Their testimony, alone and together, more than meets the requirements of relevance and scientific rigor for admissibility.

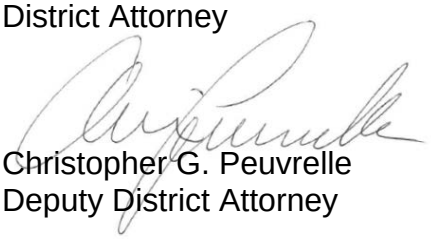
Furthermore, each piece of evidence is relevant not only in and of itself but also to explain the subsequent steps taken in the investigation of the soil at 710 White Court to attempt to determine what that evidence means: Phil Hanes observed suspicious anomalies with his ground-penetrating radar, which led to Cindy Arrington excavating the largest anomaly and observing a staining pattern consistent with a human burial, which led to Ms. Arrington and Ms. Liddell taking samples of the stained soil, which led to Ms. Butler testing the soil and determining that some samples of the stained soil were positive for hemoglobin, and Ms. Liddell tested the trailer seen parked near the suspected burial site and received a presumptive positive test for blood.

Any defense concerns with the evidence can be addressed—if appropriate—on cross-examination or through defense witnesses: “[t]he court may find an expert qualified to give an opinion, and that the opinion is founded on sound logic and reliable theory or technique. Yet an opponent may argue that the jury should not accept it.” (*People v. Cottone* (2013) 57 Cal.4th 269, 290; see also Evid. Code, §§ 720 et seq, 801, 802.)

Date: June 23, 2022

Respectfully submitted,

Dan Dow
District Attorney

By: 

Christopher G. Peuvrelle
Deputy District Attorney

EXHIBIT A

TO THE CLERK OF THE COURT AND TO THE DISTRICT ATTORNEY OF THE COUNTY OF SAN LUIS OBISPO AND DEPUTY DISTRICT ATTORNEY CHRISTOPHER PEUVRELLE:

PLEASE TAKE NOTICE that on June 6, 2022 at 8:30 a.m., or as soon thereafter as the case may be heard in the above-entitled Court, Defendant Paul Flores, will move the Court to proceed to a hearing under Evidence Code sections 402 and 403 and to issue an order to exclude evidence pertaining to the inspection, excavation or analysis of ground configurations or soil, including ground penetrating radar, purported staining or the analysis or composition of any soils, purported stains or deposits or the results of any tests thereon on the grounds that the prosecution has the burden of establishing foundational facts sufficient to support said testimony and evidence. This motion is submitted in anticipation of the evidence to be proffered by the prosecution based on the testimony presented at the preliminary hearing in this matter and the Defense reserves the right to augment its response, by way of evidence or argument, at such time as the prosecution's proffer is made at the hearing on this motion.

At the chambers conference held yesterday, May 31, 2022, the prosecution stated that it did not intend to surrender soil samples to Technical Associates, Inc. laboratory for HemDirect testing. In light of the fact that the Defendant does not wish to waive additional time for trial and the fact that the prosecution's discovery relating to the SERI lab results and underlying documentation has been delayed, the defense will proceed with the pre-trial motions relating to the soils and White Court matters even though the prosecution is not in compliance.

The expert opinions and curricula vitae of Dr. David Carter and Dr. Elizabeth Johnson are attached as Exhibits A and B. These opinions are offered reserving the right to augment any opinions in light of further

developments. The defense is requesting that Dr. Johnson and Dr. Carter be permitted to appear by Zoom for the purpose of the pre-trial hearings only. Dr. Johnson is located in Southern California, however, Dr. Carter is located in Hawaii.

This motion is made to protect Mr. Flores' rights to due process and a fair trial pursuant to the Fifth, Sixth and Fourteenth Amendments to the United States Constitution, article I, §§ 7 and 15 of the California Constitution, relevant statutory and case law.

The motion will be based on this Notice of Motion, the Memorandum of Points and Authorities served and filed herewith, such supplemental memoranda of points and authorities as hereafter may be filed with the Court, the transcript of the preliminary hearing, all pleadings and documents heretofore filed with the Court and such evidence and oral argument as may be presented at the hearing on the motion.

Dated: June 1, 2022

Respectfully submitted,

SANGER SWYSEN & DUNKLE
Robert M. Sanger
Sarah S. Sanger

By: 
Robert M. Sanger
Attorneys for Defendant
Paul Ruben Flores

MEMORANDUM OF POINTS AND AUTHORITIES

STATEMENT OF RELEVANT FACTS

The defense anticipates that the prosecution will intend to attempt to introduce evidence related to the search of the property belonging to Ruben Flores located at 710 White Court, Arroyo Grande, CA. It is anticipated that this evidence may include testimony regarding ground penetrating radar, excavation of certain sites, observations of purported staining and the analysis of certain soil samples. Under Evidence Code sections 402 and 403, the prosecution has the burden of proffering the evidence and the burden of producing evidence as to the existence of the preliminary facts necessary for the admissibility of said facts.

In order to provide the Court with briefing in advance of the hearing, the defense will refer to the testimony offered by the prosecution in the preliminary hearing. The defense is not conceding the validity or sufficiency of any of the preliminary hearing testimony but simply anticipates that it will be part of the prosecution's proffer regarding its burden to prove the preliminary facts.

Any proffer of evidence by the prosecution would by necessity disclose that over a period of 25 years there were numerous suspected burial sites and numerous excavations on and around the Cal Poly campus and in other areas of San Luis Obispo County including remote locations in Huasna. Some of the excavations were the result of psychics, dog alerts and ground penetrating radar, none of which resulted in the discovery of human remains.

A. The Testimony of Philip Hanes is Inadmissible at Trial

Philip Hanes' testimony regarding the ground penetrating radar device does not meet the criteria for admissibility of scientific evidence in California. The admissibility of expert testimony in California is governed by the California Supreme Court decision in *Sargon Enterprises, Inc. v. University of*

Southern California (2012) 55 Cal.4th 747, 770-772 (*Sargon*). The Court expressly acknowledged that judges are the "gatekeepers" with regard to a determination of the admissibility of expert testimony under *Daubert v. Merrell Dow Pharmaceuticals, Inc.* (1993) 509 U.S. 579 (*Daubert*). The California Supreme Court set forth three criteria to determine the admissibility of this kind of testimony:

> "[U]nder Evidence Code sections 801, subdivision (b), and 802, the trial court acts as a gatekeeper to exclude expert opinion testimony that is (1) based on matter of a type on which an expert may not reasonably rely, (2) based on reasons unsupported by the material on which the expert relies, or (3) speculative." (*Sargon, supra,* 55 Cal.4th at pp. 771-772.)

The Court also observed that "[o]ther provisions of law, including decisional law, may also provide reasons for excluding expert opinion testimony." (*Id.* at p. 772.)

As gatekeepers, courts must focus on the "'principles and methodology'" asserted by the proposed expert and not "'on the conclusions that they generate.'" (*Sargon, supra,* 55 Cal.4th at 772, quoting *Daubert, supra,* 509 U.S. at p. 595.) Thus, the "gatekeeper's role 'is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.'" (*Sargon, supra,* 55 Cal.4th at p. 772, quoting *Kumho Tire Co. v. Carmichael* (1999) 526 U.S. 137, 152 (*Kumho Tire*).) These requirements apply to both scientific testimony as well as non-scientific expert testimony. (*Kumho Tire, supra,* 526 U.S. 137.)

The California Supreme Court in *Sargon* relied on the Evidence Code itself but also incorporated the *Kelly/Frye* analysis. Under *People v. Kelly* (1976) 17 Cal.3d 24 (*Kelly*), there are three prongs: "First, there must be proof

that the technique is considered reliable in the scientific community. Second, the witness testifying about the technique must be a qualified expert on the subject. Third, there must be proof that the person performing the test used correct scientific procedures." (*People v. Willis* (2004) 115 Cal.App.4th 379, 385 (*Willis*).) Therefore, under *Sargon,* Evidence Code sections 801 and *Kelly,* the court is the gatekeeper charged with the duty to exclude expert evidence unless a foundation is laid demonstrating that there is foundational validity to the technique employed and that it is valid as applied by a qualified expert using correct scientific procedures. This is consistent with the view of the scientific community as set forth in the PCAST report and other current scientific studies. (See President's Counsel of Advisors on Science and Technology (PCAST), *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods* (2016).)

Here, there is no foundation for the admissibility of results of ground penetrating radar as evidence of a burial site. Hanes did not establish the validity of the "'principles and methodology'" on which he based his conclusions as they would pertain to evidence that a body had been buried in a place where an anomaly was detected. (*Sargon, supra,* 55 Cal.4th at 772, quoting *Daubert, supra,* 509 U.S. at p. 595.)

His device is typically used for finding buried pipes and other artifacts and the fact that the device registers an anomaly, it is just that and not evidence of what caused the anomaly. In other words, even though it is not designed to find human remains or burial sites and has not been subject to scientific testing or approval for that purpose, at best it is an investigative tool that may or may not lead to the discovery of actual evidence.

At the preliminary hearing, Philip Hanes testified that ground penetrating radar is a device used to find anomalies but is not capable of determining the nature or the cause of the anomaly. In other words, it is of

not evidentiary value but is simply a tool to attempt to locate an area that might be of evidentiary value. The device he used is not subject to proficiency testing and does not claim to have the ability to define what is being observed. He testified that an anomaly is "a consistency change to the underground environment that is visible on the radar, but may or may not be specifically defined until we excavate or ground truth that anomaly to determine what it actually is." (18RT 5112.)

When Mr. Hanes received the equipment, he had some "initial over-the-phone training in its operation" with the manufacturer. (18RT 5129.) Mr. Hanes was not aware of any peer-reviewed journals where this technology was reviewed for proficiency in detecting human remains. (18RT 5129.) The typical use of ground-penetrating radar is to find voids due to things like buried pipes or use in ice research and commercial uses such as finding structural damage on bridges or oil and gas exploration. (18RT 5136, 5142.) The ground-penetrating radar at 710 White Court was not used for any of those purposes and no voids were found. (18RT 5145.) The radar is just used to screen for anomalies that then have to be confirmed by "ground truthing" or actually digging up the area. (18RT 5146-5147.)

Mr. Hanes found a number of areas at White Court that seemed to be anomalies, one of which was located under the porch. (18RT 5126.) On the wall of the house near Grid 1 there was a sewer clean-out and a dryer vent. (18RT 5162.) Before using the machine on Grid 1, vegetation was cleared from under the deck and it looked "pretty heavily vegetated." (18RT 5176, 5178.)

The evidence technician who excavated at Grid 1 did not find a burial site in the area of the purported anomaly. Instead, she found in the soil stains that continued down through the soil from two-and-a-half feet on down. (20RT 5755.) Ms. Liddell testified that in Grid 1, "[i]n the area of

staining it does not appear that after the stain was there that the stain had been disturbed." (20RT 5758.) When going through the specific photographs relating to the excavations, Ms. Liddell concluded as to each that any stain that was deposited would have been deposited after the soil was disturbed, if it had been disturbed. (20RT 5780-5781.)

Therefore, the anomalies had nothing to do with burial sites. The stains, whatever they were, were deposited on top of the anomaly areas not under them. The fact that there were several anomalies in the soil at the White Court property is meaningless at the Grid 1 location or elsewhere. The anomalies are not evidence and are not probative of anything.

B. There is no Scientific Basis to Assert that the Staining Observed by Arrington and Liddell is Human Blood

First, the staining was located within two feet of the surface of the ground and travelled down through undisturbed soil and set forth above. Second, archeologist Cindy Arrington, business partner of Mr. Hanes, the owner of the ground penetrating radar device, testified "that there's a stain there and it looks like it could have come from human remains, but you don't know." (18RT 5213.) As Ms. Liddell testified, once a person dies, they stop bleeding because there is no blood pumping. (17RT 4969-4970.)

However, Ms. Arrington testified that, if there had been a body there under the deck, it would have emitted a "very strong odor" at one point. (18RT 5217.) She also testified that the staining could have been decomposing plant material. (18RT 5274.) Ms. Arrington testified that she has never excavated a human grave and not found some physical evidence of human remains. (18RT 5275.) Ms. Arrington testified that if a body had been deposited under the deck with a 25-year span, one would expect to find bones or fibers. (18RT 5235.) Ms. Arrington did not see any of that during the excavation. (18RT 5235.)

EXHIBIT B

TO THE CLERK OF THE COURT AND TO THE DISTRICT ATTORNEY OF THE COUNTY OF SAN LUIS OBISPO AND DEPUTY DISTRICT ATTORNEY CHRISTOPHER PEUVRELLE:

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Dated: June 1, 2022

Respectfully submitted,

SANGER SWYSEN & DUNKLE
Robert M. Sanger
Sarah S. Sanger

By: 
Robert M. Sanger
Attorneys for Defendant
Paul Ruben Flores

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EXHIBIT C

SAN LUIS OBISPO COUNTY SHERIFF

1585 KANSAS AVE.
SAN LUIS OBISPO, CA 93405

SUPPLEMENTAL INCIDENT REPORT

CASE NUMBER	SUPPLEMENT NUMBER
960610965	782
CASE TYPE	CAD EVENT NUMBER
HOMICIDE	
REPORTING OFFICER	REPORT DATE
SLDA6061 - CAMP, JAMES	03/14/2022

INCIDENT

LOCATION				DATE	TIME
, CA				03/14/2022	11:12
PREMISE NAME					
C ARRINGTON INT 03 07 2022					
STATION	BEAT	RESP AREA		JURISDICTION	
ST24				SLSO	

ADDITIONAL INFORMATION

☐ INC SUPP 1

INC SUPP 1

INC SUPP 4

☐ INC SUPP 3

INC SUPP 6

RESTRICTED

STATUS

CASE STATUS	CASE STATUS DATE	DISPOSITION	DISPOSITION DATE	APPROVAL	APPROVAL DATE
FIL	11/08/2021	AA	04/08/2021	SLSO1138 - MENGHRAJANI, D	03/14/2022

03/22/2022
150:055768

PROPERTY

ENTRY NO	INVOLVEMENT	TYPE	MAKE	MODEL
1115	E	53		

SERIAL NUMBER	QUANTITY	COLOR	COLOR	OAN	REF NO	EVIDENCE
						N

DESCRIPTION	CUSTODY STATUS
DISC AND HARD COPIES OF DOCUMENTS FROM C. ARRINGTON (FROM INT ON 03 07 2022)	SUBMITTED

COMMENT

NARRATIVE

REPORT DATE: 3/10/2022

REPORT PURPOSE: Document interview with Cindy Arrington on 3/7/2022

On 3/7/2022 at about 1001 hours, DDA C. Peuvrelle and I met with Cindy Arrington for purposes of a pretrial interview. We initially spoke generally about the case status and the April 2021 dig. At one point, Arrington indicated that there are 206 bones in the human body, and as such indicated that she did not see how all of the bones (of Kristin Smart) could have been collected. She said that in her opinion, Kristin Smart was put in something " semi permeable" and that the wrapping was not watertight. As a result, some fluids would have leaked out and that was where the staining came from. Further, she stated in that situation, the bones would remain contained. She said that there was deformation/disruption of the soil, and it was not uniform.

Regarding the staining, it was not an oval pattern and there was a discontinuous staining pattern. She said that the deformation of the soil was caused by multiple digs. Arrington stated that the burial was " amateur" .

We discussed general testimony from the preliminary hearing as well as expected trial testimony. Arrington indicated that she would be sending us some graphics that could be used and referred to at trial. These images/files depict issues surrounding stratigraphy and may be used to assist in gaining an understanding of the topics Arrington is expected to testify to.

DDA Peuvrelle showed Arrington preliminary hearing exhibit #179. Arrington indicted that her opinion was that the bottom portion depicted in the image is decomposition - the " bathtub" staining is decomposition. She added that decomposition fluid leaked out and was dug up which is why the presentation is " messy" . She indicated that soil and stratigraphy will tell a story as to what happened and added that there was no way a bone would not have been left behind. Arrington went on to say that because of this, Kristin Smart would' ve been wrapped up, fluids leaked but the bones remained in the wrapping material. She said that Kristin Smart had to have been wrapped in something.

Regarding the initiation of decomposition, there are variables such as weather, climate, soil, and the environment. She said there are a lot of different variables, and you can estimate, but it is localized.

Regarding the second dig (in April) and looking at the first and second dig, the April dig confirmed what was seen in March.
We discussed how there was no soil soap seen, which is different from bathtub stain decomposition.

RESTRICTED

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We discussed the general anticipated trial testimony direction.

Arrington eventually provided a series of documents to the District Attorney' s Office for use in this case. I attached photocopies of the documents to this supplemental report for reference. I also booked hard copies of the documents along with digital copies into property at the Sheriff' s Detective Division (See RMS # 1115).

CLOSING STATEMENT:

Case status cleared by Adult Arrest.

DA Investigator JT Camp #6061

JTC/sw 03/14/2022

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Supp#782

What is the process of decomposition?

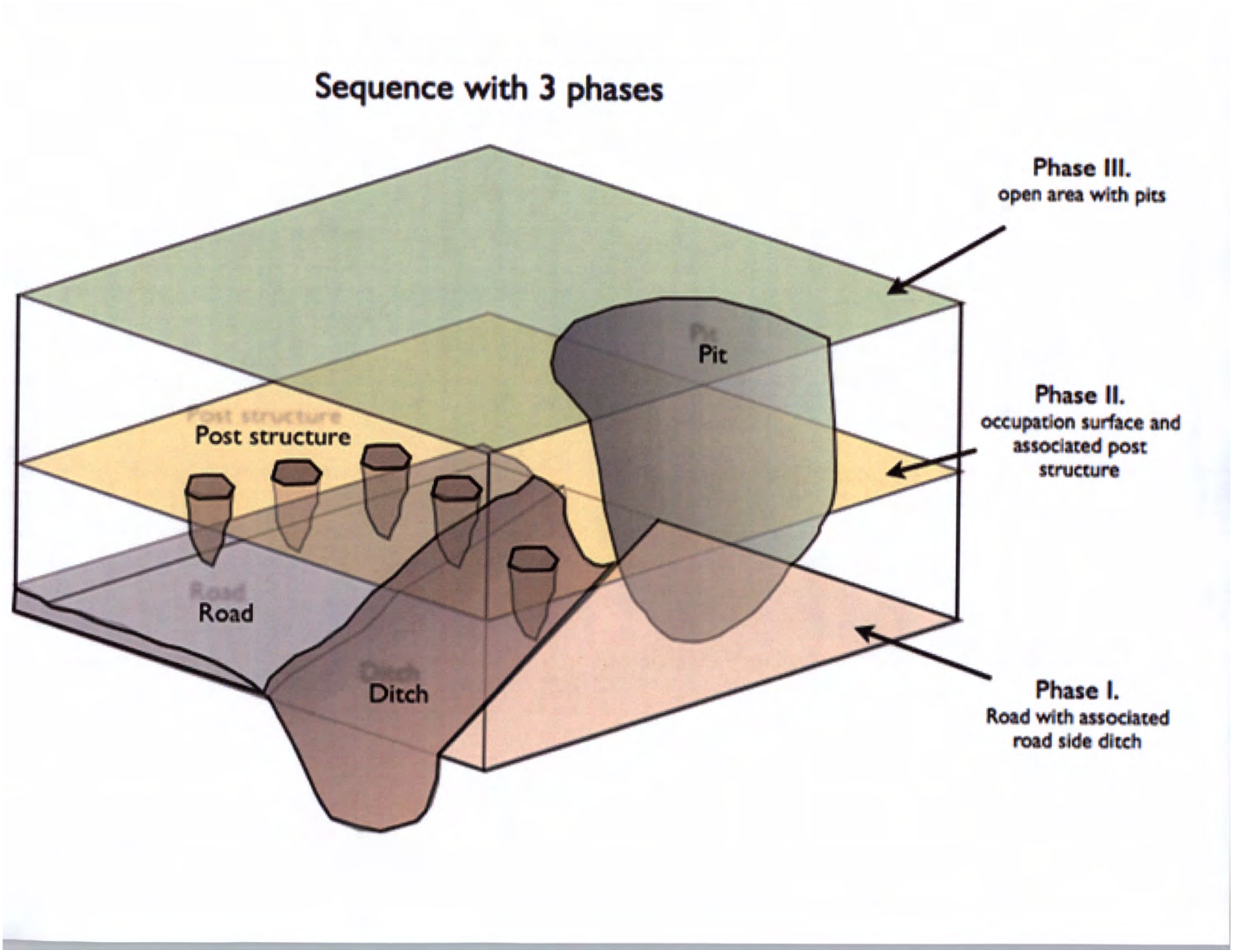
A corpse generally progresses through five stages of decomposition—fresh (1-2 days), bloat (2-6 days), active decay (5-11 days), advanced decay (10-24 days) and skeletonization (24days +). Again, this is highly subjective to environment, weather, soil type, and body disposal.

Specific Factors Affecting the Decomposition Process

- Temperature.
- Oxygen availability.
- Embalming.
- Cause of death.
- Burial conditions.
- Access by scavengers.
- Trauma.
- Humidity.

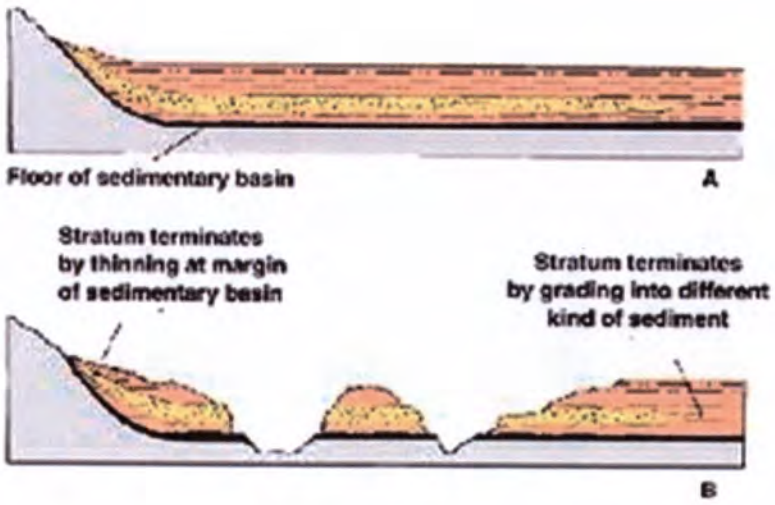
A number of factors affect the rate of decomposition of organic matter: **climate, substrate quality, and soil type**.

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Principle of lateral continuity

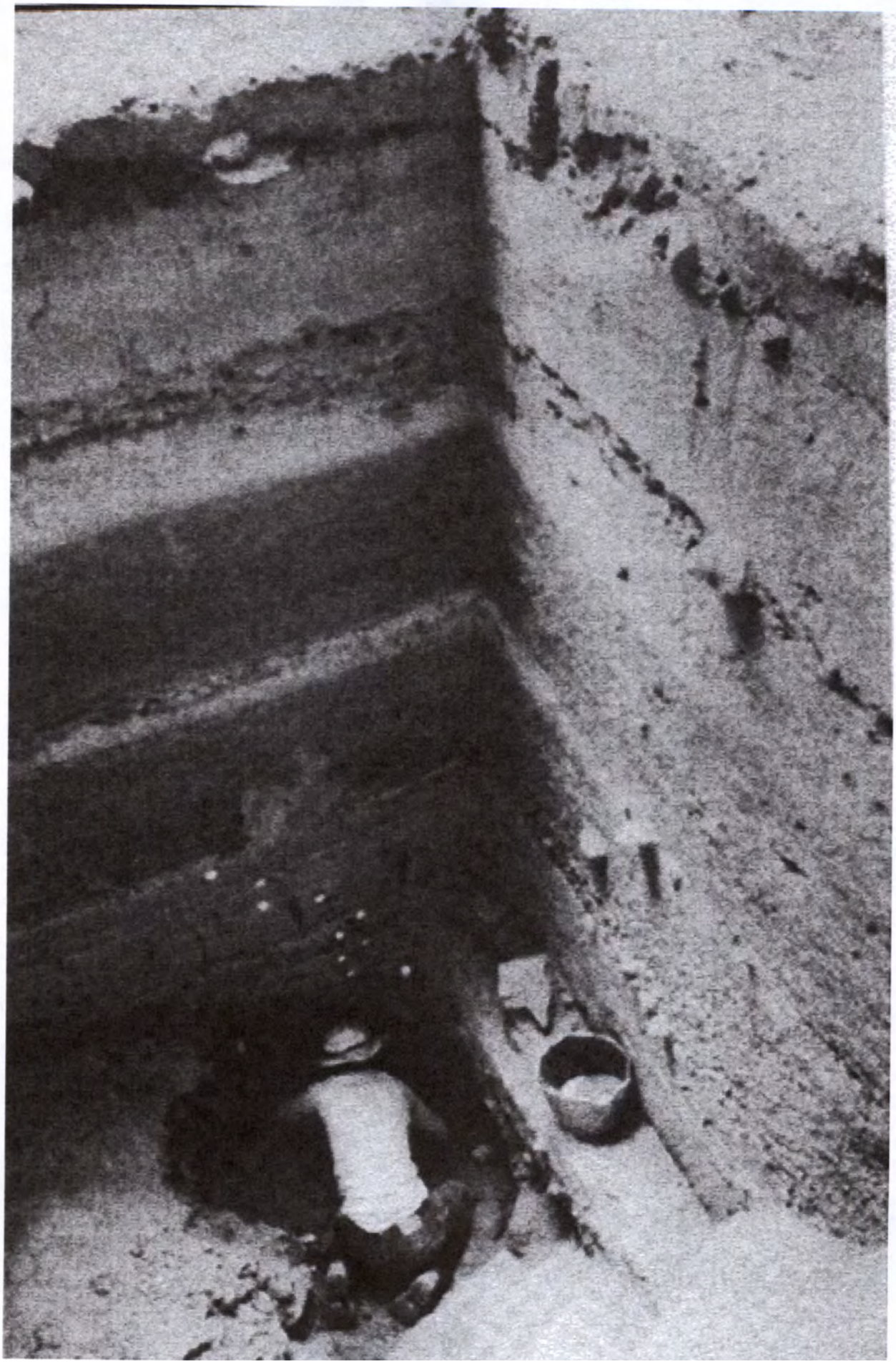


- Strata are deposited in a basin and thus will be continuous from end to end
- Any breaks are due to erosion or deformation *after* deposition

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Cross-sectional view of clandestine grave

03/22/2022
150:055774



03/22/2022
150:055775

03/22/2022
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EXHIBIT D

Quality Forensics since 1978

March 25, 2021

Senior Deputy Clinton Cole
San Luis Obispo County Sheriff's Office
1585 Kansas Avenue
San Luis Obispo, CA 93401

SERI Case No. 11034.19
Agency Case No. 9606-10965
Victim: Kristin Smart
Suspect: Paul Flores

ANALYTICAL REPORT

On May 9th 2019, nine items of evidence were received at the Serological Research Institute (SERI) from the San Luis Obispo County Sheriff's Office via OnTrac (B10318478284). On May 14th 2019, one item of evidence was received at SERI from the San Luis Obispo County Sheriff's Office via OnTrac (B10318478319). On November 14th 2019, nine items of evidence were received at SERI from Deputy Cole. On December 31st 2020, five items of evidence were received at SERI from Deputy Cole. On January 25th 2021, one item of evidence was received at SERI from Deputy Cole. On December 31st 2020, five items of evidence were received at SERI from Deputy Cole. On March 17th 2021, two items of evidence were received at SERI from Deputy Cole. Body fluid screening, DNA analysis using the Polymerase Chain Reaction (PCR), and comparison were requested.

The results of the testing from the following items will be issued in a subsequent analytical report:

ITEM 1 CLOTH (22)
ITEM 2 HAIR FROM BED (26)
ITEM 3 SLIDE WITH HAIRS (27)
ITEM 4 CORNER MATTRESS (81)
ITEM 5 CORNER MATTRESS CONTROL (82)
ITEM 6 BLOOD – STAN AND DENISE SMART (200)
ITEM 7 SWAB 55 A1 MATTRESS (13)
ITEM 8 SWAB 55 A2 MATTRESS (14)
ITEM 9 BLOOD – PAUL FLORES (7)
ITEM 10 SMART'S PANTIES (51)
ITEM 11 CANVAS MATTRESS PAD (8)
ITEM 12 TRUCK CARPET CUT OUT (600)
ITEM 13 SWAB: UNDER CARPET STAIN (593)
ITEM 14 SWAB: DRIVER'S SIDE CARPET (594)
ITEM 15 SWAB: REAR PASSENGER SEAT (595)
ITEM 16 SWAB: UNDER SEAT NEAR ASSEMBLY (596)
ITEM 17 SWAB: BACKSIDE OF DRIVER SEAT (597)
ITEM 18 SWAB: CONTROL BACKSIDE OF DRIVER SEAT (598)

ITEM 19 SWAB: CONTROL BACKSIDE OF DRIVER SEAT (599)
ITEM 20 SWAB OF ITEM 58 (58A)
ITEM 21 SWAB OF ITEM 58 (58B)
ITEM 22 CONTROL FOR ITEM 58 (58 CONTROL)
ITEM 23 SWAB OF BOX SPRING COVER STAIN (58C)
ITEM 24 SWAB OF CONTROL CORNER OF MATTRESS (55BSC)
ITEM 25 DNA EXTRACTS (758)

ITEM 26 UPPER SOIL SAMPLE UPPER (775)

This item consisted of a plastic tube containing approximately 43 grams of brown sand with some clusters of dark brown colored material. A small cluster of the dark brown colored material (item 26-1) was tested for the presence of human blood. The results are tabulated below.

ITEM 27 DEEPER SOIL SAMPLE (776)

This item consisted of a plastic tube containing approximately 42 grams of brown sand with several different sized clusters of dark brown colored material. Two small quantities of the dark brown colored material was sampled (item 27-1 and item 27-2) and directly tested for the presence of human blood. Under microscopic examination, four additional clusters of the dark brown colored material were sampled (items 27-3 through 27-6), tested for the presence of human blood, extracted for DNA content, and quantified. The results are tabulated below.

BODY FLUID RESULTS

Item	Description	o-Tol	HemDirect
26-1	Upper Soil Sample	WK+	-
27-1	Deeper Soil Sample	WK+	-
27-2	Deeper Soil Sample	WK+	WK+
27-3	Deeper Soil Sample	WK+	+
27-4	Deeper Soil Sample	WK+	+
27-5	Deeper Soil Sample	WK+	+
27-6	Deeper Soil Sample	WK+	WK+

Key:
+ = Positive
- = Negative
WK = Weak Positive
o-Tol = ortho-Tolidine, presumptive test for blood
HemDirect = Human hemoglobin, confirmatory test for human blood.

EXPLANATIONS

Blood of any species can appear as a red to brown stain in the dried form and will react positively with the chemicals ortho-tolidine/peroxide. This two-step test is used as a presumptive test for the presence of blood. Other substances are also known to react with ortho-tolidine; therefore, the test is not confirmatory for blood.

EXPLANATIONS (continued)

Blood contains a red pigment, known as hemoglobin (Hb), which is located in the erythrocytes, or red blood cells of vertebrate animal species. Hemoglobin is one of the most abundant proteins found in blood, and can be detected using a specific antigen/antibody reaction. The Seratec HemDirect Hemoglobin Assay is a test that is specific for human hemoglobin and is highly sensitive. The HemDirect Assay is capable of detecting hemoglobin at a concentration as low as 40 ng/ml, or a 1 in 1,000,000 dilution of fresh human blood. Although there is cross-reactivity with other primates and domestic ferret, a positive result with this test on a blood sample or stain is considered most likely to be blood of human origin.

Deoxyribonucleic acid or DNA is found in nucleated cells, e.g., white blood cells, salivary, vaginal and tissue epithelial cells and spermatozoa. It is possible to obtain a profile from DNA deposited by touching an item. An individual may, at any time, contain biological material on his or her hands. This can originate from saliva, perspiration; trace amounts of blood, tears, etc. These DNA-containing fluids can be potentially transferred to an object (i.e. gun grip, steering wheel, tools, clothing) when handling or touching the object. Items can be swabbed, cut, or scraped to obtain the biological material left behind. The DNA can be extracted, and the amount obtained is proportional to the number of DNA-containing cells present.

CONCLUSIONS

1. No human blood was detected in upper soil sample (item 26-1).

2. No human blood was detected in the deeper soil sample (item 27-1).

3. Human blood was detected in the deeper soil (item 27-2 through item 27-6).

4. No human DNA was detected by quantification in the deeper soil samples (item 27-3 through item 27-6).

EVIDENCE DISPOSITION

SERI item 3 was returned to Deputy Cole on January 25th 2021. The remaining submitted evidence will be retained at SERI pending instructions from Deputy Cole. Any remaining case extracts will be retained at SERI.

SERI REPORT REVIEWED AP DATE MAR 25 2021

SEROLOGICAL RESEARCH INSTITUTE

Angela P. Butler

Angela P. Butler
Senior Forensic Serologist

04/27/2021
15:002393

SERI

EXHIBIT SHEET

SERI CASE NO.: 11034/9 **DATE:** 4/20/22 **PERFORMED/ TESTED BY:** [illegible] **CASE ANALYST:** [illegible]

EXHIBIT NO.: 57 **EXHIBIT NAME:** Soil Sample Area (840)

PACKAGING small brown paper bag TIS specimen cup screw top

B#1

LABELING See photos

RESULTS

Otol: QC ✓ see exh 64 lot#

DESCRIPTION

~90g of sandy soil (dump)
few small clusters of brown [illegible] material disintegrated w/ forceps when trying to examine further.

EXAMINATION

Otol -ve no fibers observed or other material of interest.
no further testing

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW [illegible]	DATE MAY 0 6 2022

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SERI

EXHIBIT SHEET

SERI CASE NO.: 110319 **DATE:** 4/21/22 **PERFORMED/ TESTED BY:** AS **CASE ANALYST:** AS

EXHIBIT NO.: 58 **EXHIBIT NAME:** Soil Sample Area A #1 (841)

PACKAGING small brown paper bag TS → Specimen cup - screw cap

LABELING See photos

DESCRIPTION

sandy soil dark colored (~105g) slightly damp

EXAMINATION

1 possible
several small fibers, dark, white colored. several small pieces of possible plant material orange colored.
several reddish brown clusters removed to 1.5mL tube. otol wt tvp

58-1

RESULTS

otol QCV Lot# See CX 64

Hmdirect (See exh 64 lot#

58-1 (-)

4/21/22

DNA Ext

58-1	77574
BC1	77593
BC2	77594
BC3	77595
BC4	77596
	77597

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW	DATE
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SERI

EXHIBIT SHEET

SERI CASE NO.: 11034/9 **DATE:** 4/22/22 **PERFORMED/TESTED BY:** [illegible] **CASE ANALYST:** [illegible]

EXHIBIT NO.: 59 **EXHIBIT NAME:** Soil Sample D1 (842)

PACKAGING small brown paper bag TS → specimen cup screwcap

LABELING see photos

RESULTS

6tol QC ✓

see exh 64 Lot#

DESCRIPTION ~119g of sandy ↑ brown soil, damp [illegible] 6tol -ve

EXAMINATION nothing observed microscopically to remove into 1.5ml tubes

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW	DATE
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SERI

EXHIBIT SHEET

SERI CASE NO.: 1103414 **DATE:** 4/22/22 **PERFORMED/ TESTED BY:** AB **CASE ANALYST:** AB

EXHIBIT NO.: 60 **EXHIBIT NAME:** Soil Sump C# 1 (843)

PACKAGING small brown paper bag T/S → specimen cup screw cap

LABELING See photos

DESCRIPTION ~85g brown slightly damp sandy soil

EXAMINATION

numerous small pieces of material w/ brownish material w/ embedded apparent fibers. Only observed when soil AB dried. Collected, oto (only wk +)

red, Black clear/white ↓ AB 2 x 1.5mL tubes 6 ext for DNA

RESULTS

Otol QC ✓ See ext 60 lot #

DNA ext 4/27/22

60-1	77575
60-2	77576
60-3	77577
60-4	77578
60-5	77579
60-6	77580
BC1	77593
BC2	77594
BC3	77595
BC4	77596
BC5	77597

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW	DATE
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SERI

EXHIBIT SHEET

SERI CASE NO.: 1103419 **DATE:** 4/26/22 **PERFORMED/ TESTED BY:** AS **CASE ANALYST:** AS

EXHIBIT NO.: 61 **EXHIBIT NAME:** Soil sample C#2 (844)

PACKAGING small brown paper bag
T/S → specimen cup
screw cap

LABELING See photos

DESCRIPTION See Below

EXAMINATION

~118g sandy soil | slightly damp
small clusters of dark brown material
some have reddish brown appearance
under microscope. Removed very
small pieces wk otol twp
ext. for DNA.
61-1

RESULTS

OTOL QCV
see exh 64 lot #

DNA EXT 4/27/22

61-1	77581
BC1	77593
BC2	77594
BC3	77595
BC4	77596
BC5	77597

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW AJ	DATE MAY 06 2022

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SERI

EXHIBIT SHEET

SERI CASE NO.: ~~1130419~~ 1103419 DATE: 4/20/22 PERFORMED/ TESTED BY: ~~FB~~ CASE ANALYST: AM

EXHIBIT NO.: 62 EXHIBIT NAME: Soil Sample B#2 (846)

PACKAGING small brown paper bag T/S → specimen cup - screw cap

LABELING
See photos

DESCRIPTION
~120g sandy soil (~~tan~~ damp clusters of brown material few clear possible fibers. few pieces of possible plant material.

EXAMINATION
several pieces of reddish brown dirt. one very small piece of unknown solid material with a clear fiber adhering to it. Removed to a gel lift, for further inspection clumps/ clusters of dirt otol tve. sampled ~~2 tubes of~~ ~~FB~~ colored dirt pieces into 2 1.5mL tubes for Hemdirect. EXT in 200uL dH2O. Material on gel lift placed into 62-1 and 62-1 & 62-2 EXT. for DNA.
Remaining gel lift material placed into manila env. "Soil samples Trace"

RESULTS
otol QC ✓ see exh 64 lot #
Hemdirect (see exh 64 lot #)

62-1 (-)
62-2 ~~FB~~ (-)

DNA EXT 4/27/22

62-1	77582
62-2	77583
BC1	77593
BC2	77594
BC3	77595
BC4	77596
BC5	77597

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW	DATE
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SERI

EXHIBIT SHEET

SERI CASE NO.: 1103419 **DATE:** 4/19/22 **PERFORMED/ TESTED BY:** AS **CASE ANALYST:** AS

EXHIBIT NO.: 63 **EXHIBIT NAME:** Soil Sample (848)

PACKAGING Small brown paper bag t/s specimen cup screw top

LABELING see photos

DESCRIPTION

~~3~~ 85g of sandy soil, slightly damp

EXAMINATION

one ~~possible~~ apparent ~~HB~~ red colored fiber, blue fibers clumps/clusters of dark material removed several pieces of and fibers. to 1.5 mL tubes (5 tubes) AS ext in dH2O

dark material in soil wk otol +ve (slow)

B#3

RESULTS

otol: see exh 64 QC ✓

Hemdirect see exh 64 lot #

63-1 ⊖ neg
63-2
63-3
63-4

DNA EXT 4/27/22

63-1	77584
63-2	77585
63-3	77586
63-4	77587
BC1	77593
BC2	77594
BC3	77595
BC4	77596
BC5	77597

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW AJT	DATE MAY 06 2022

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SERI

EXHIBIT SHEET

SERI CASE NO.: 1103419 **DATE:** 4/15/22 **PERFORMED/ TESTED BY:** AB **CASE ANALYST:** AB

EXHIBIT NO.: 4/AB 64 **EXHIBIT NAME:** Soil Sample Area B Probe 4+ (850)

PACKAGING small brown paper bag TS
specimen cup
screw top

LABELING see photos

DESCRIPTION Slightly damp
~8cc of sandy soil light brown.
many "clumps" of dark brown
/clusters of material

EXAMINATION several dark possible fibers, red observed
several possible pieces of plant material
removed dark colored pieces and fibers with adhering dark colored material to a 1.5mL tube (2 tubes)
ext. in dH2O for HemDirect (200uL)
dark pieces of soil wk (+) (slow)

RESULTS

Oto 1: 9732/9733 exp 8/11/22
QC ✓

Hemdirect Lot 210079 exp 1/2024
Buffer B210079 exp 1/2024

64-1 } (-) Neg
64-2 }

DNA Ext AB 4/27/22

64-1	77588
64-2	77589
BC1	77593
BC2	77594
BC3	77595
BC4	77596
BC5	77597

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW	DATE
AJH	MAY 06 2022

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SERI

EXHIBIT SHEET

SERI CASE NO.: ~~#130419~~ #1103419 DATE: 4/20/22 PERFORMED/ TESTED BY: AS CASE ANALYST: AS

EXHIBIT NO.: C5 EXHIBIT NAME: Soil Sample Area E #1 (8556)

PACKAGING small brown paper bag T/S → specimen cup screw top

LABELING see photos

DESCRIPTION ~110g damp brown sandy soil
otol -ve
no material of interest

EXAMINATION no further exam

RESULTS

otol QC ✓ see exh C4 lot #

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW	DATE
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SERI

EXHIBIT SHEET

SERI CASE NO.: 1103119 **DATE:** 4/21/22 **PERFORMED/ TESTED BY:** AES **CASE ANALYST:** AES

EXHIBIT NO.: 66 **EXHIBIT NAME:** Soil Sample Area G#1 (860)

PACKAGING

LABELING

See photos

DESCRIPTION

~117g sandy soil, slightly damp, small clusters of sand.

EXAMINATION

no material of interest

no further exam

OTOL - VP

RESULTS

OTOL QC ✓

See exh 64 Lot #

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW AJT	DATE MAY 06 2022

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SERI

EXHIBIT SHEET

SERI CASE NO.: 1103419 **DATE:** 4/20/22 **PERFORMED/ TESTED BY:** AES **CASE ANALYST:** AES

EXHIBIT NO.: 67 **EXHIBIT NAME:** Soil Sample Stain Probe Area G

PACKAGING small brown paper bag t/s → specimen cup screw top

LABELING

see photos

DESCRIPTION

~57g of slightly damp sandy soil some clusters of brown material several dark colored fibers (apparent)

EXAMINATION < lamong possible fiber? Hair? (no identifiable root) removed to gel lifter to observe several reddish brown, very small flakes/grains removed to 1.5mL tube alongw small pces of soil evt. in loan dH2O 67-1

wc otol tve

* several fibers + unknown fiber/poss hair removed to gel lifter and packaged in manila envelope "soil samples Trace"

RESULTS (8ez)

otol QC ✓ see eth log Lot#

Hemdirect see eth log Lot#

67-1 (-)

DNA Ext 4/27/22

67-1	77590
BC1	77593
BC2	77594
BC3	77595
BC4	77596
BC5	77597

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW	DATE
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SERI

EXHIBIT SHEET

SERI CASE NO.: 1103419 **DATE:** 4/21/22 **PERFORMED/ TESTED BY:** AB **CASE ANALYST:** AB

EXHIBIT NO.: 68 **EXHIBIT NAME:** Soil Sample Beneath House (880)

PACKAGING Small brown Paper bag T/S
Specimen Cup Screw Cap T/S

LABELING
See photos

DESCRIPTION ~90g
Fine AB Textured Brown dirt small pebbles Fine w/ Sand plant debris (stems, apparent root material)

EXAMINATION many blue, black, AB red, clear, apparent fibers
Some in small clusters
could not remove all
Some were stained w/ dark material.
Removed some to a 1.5mL tube w/ debris. wk sol+ext in 150uL H_2O
2 apparent insects (dead)
of unknown species - several legs

RESULTS

See exh 64 Lot #
Hemdirect 4/27/22

68-1 (-)

DNA EXT 4/27/22

68-1	77591
BC1	77593
BC2	77594
BC3	77595
BC4	77596
BC5	77597

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW AJH	DATE MAY 06 2022

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SERI

EXHIBIT SHEET

SERI CASE NO.: 1103419 DATE: 4/20/22 PERFORMED/ TESTED BY: ~~AS~~ CASE ANALYST: ~~AS~~

EXHIBIT NO.: 69, 70 EXHIBIT NAME: Soil Sample of Interest #1 / #2 (337/338)

PACKAGING 5"x8" T/S white env.

LABELING see photos

RESULTS

Otol QC ✓ Lot 9732/9733
exp 8/11/22

DESCRIPTION

69% ~18g light brown dirt fine texture w/ some stems, pieces of plant material, small rocks.

EXAMINATION small ~~pieces~~ pieces of reddish Brown material - rusty
3 long fiber like strands
(wlc otol +ve Brown material (slow) no further testing
slow
consistent w/ rust rxn ~~collected 1+ smc tube~~)
(strands → gel lifter)
plant material, returned to package

70% ~15g see above
NO material of interest.
Nothing collected
Otol -ve

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW AJH	DATE MAY 06 2022

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175:057423

SERI

EXHIBIT SHEET

SERI CASE NO.: 1103419 **DATE:** 4/20/22 **PERFORMED/ TESTED BY:** AG **CASE ANALYST:** AG

EXHIBIT NO.: 71, 72 **EXHIBIT NAME:** Soil sample of interest #3, #4

PACKAGING 5"x8" Tyvek white env.

LABELING See Photos

RESULTS (339,340)

otol QC ✓

See exh 69

DESCRIPTION

#71 ~62g light brown dirt w/ some rocks

#72 ~38g " " " "

EXAMINATION

otol -ve #71 + #72

nothing collected

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW AJH	DATE MAY 06 2022

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SERI

EXHIBIT SHEET

SERI CASE NO.: 1103419 **DATE:** 4/20/22 **PERFORMED/ TESTED BY:** ~~AS~~ **CASE ANALYST:** ~~AS~~

EXHIBIT NO.: 73, 74 **EXHIBIT NAME:** Soil Sample of interest ~~#5~~ #6, ~~#5~~

PACKAGING 5"x8" TS white env.

LABELING see photos

RESULTS (342, 343)

obol QC ✓
see exh 69

DESCRIPTION

#73 ~35g light brown soil w/ rocks

#74 ~30g light brown soil w/ rocks

EXAMINATION

obol - VL
notary collected

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW AJL	DATE MAY 06 2022

05/25/2022
175:057425

SERI

EXHIBIT SHEET

SERI CASE NO.: 1103419 DATE: 4/27/22 PERFORMED/ TESTED BY: AB CASE ANALYST: AB

EXHIBIT NO.: 75, 76, 77 EXHIBIT NAME: Soil Sample of Inkrost #7,8,9 (343, 344, 345)

PACKAGING 5"x8" TS white env

LABELING see photos

DESCRIPTION

#75 ~26g light brown dirt w/ white rocks → no rocks

#76 ~35g " glue fabric pieces w/ rusty staining + rusty pieces of rocks (in 77)

#77 ~80g

EXAMINATION

nothing of interest in 75 or 76, nothing collected

ext in 15mL dH2O 4/27/22

otol -ve fabric + rusty rock slow otol +ve

RESULTS

otol QC see ex 69

Lot 210679 exp 1/2024
Buffer B210079 exp 1/2024

Hem direct 4/27/22

77-1 (-)

DNA ext 4/27/22

77-1	77592
BC1	77593
BC2	77594
BC3	77595
BC4	77596
BC5	77597

Tape Sealed (TS), Manila Envelope (ME) Glue Sealed (GS), Heat Sealed (HS), Not Sealed (NS) Brown Paper Bag (BPB), Filter Paper (FP) Standard Swab Wrapper (SSW) Standard Swab Box (SSB). Swabs considered intact unless noted otherwise.

TECHNICAL REVIEW	DATE
AW	MAY 06 2022

05/25/2022
175:057426

EXHIBIT E

SAN LUIS OBISPO COUNTY SHERIFF

1585 KANSAS AVE.
SAN LUIS OBISPO, CA 93405

SUPPLEMENTAL INCIDENT REPORT

CASE NUMBER	SUPPLEMENT NUMBER
960610965	823
CASE TYPE	CAD EVENT NUMBER
HOMICIDE	
REPORTING OFFICER	REPORT DATE
SLSO0588 - COLE, CLINTON	06/09/2022

INCIDENT

LOCATION	DATE	TIME
6-9-22 ANGIE BUTLER , CA US	06/09/2022	11:54
PREMISE NAME		

STATION	BEAT	RESP AREA		JURISDICTION
ST24				SLSO

ADDITIONAL INFORMATION

☐ INC SUPP 1

INC SUPP 1

INC SUPP 4

☐ INC SUPP 3

INC SUPP 6

STATUS

CASE STATUS	CASE STATUS DATE	DISPOSITION	DISPOSITION DATE	APPROVAL	APPROVAL DATE
FIL	11/08/2021	AA	04/08/2021	SLSO1138 - MENGHRAJANI, D	06/14/2022

INCIDENT REPORT	SAN LUIS OBISPO COUNTY SHERIFF	CASE NUMBER	SUP NO
		960610965	823

PROPERTY

ENTRY NO	INVOLVEMENT	TYPE	MAKE	MODEL
1158	E	53		

SERIAL NUMBER	QUANTITY	COLOR	COLOR	OAN	REF NO	EVIDENCE
						N

DESCRIPTION	CUSTODY STATUS
INTERVIEW ANGIE BUTLER	CUSTODY

COMMENT

NARRATIVE

DATE OF REPORT: 06/09/2022

PURPOSE OF REPORT: Document Speaking With Angie Butler.

On 06/09/2022 at 1102 hours Assistant Chief Investigator Camp and I spoke to Angie Butler from the Serological Institute Lab in Richmond, CA. I previously provided Butler with information provided to DDA Peuvrelle by Elizabeth Johnson a Defense expert witness. This information was regarding the Seratec HemDirect human blood test. I recorded this conversation and booked it in to the Sheriff's Office Property ref RMS # 1158, the following is a synopsis of the conversation.

Butler said there is not a validation study for the HemDirect test for soil but according to SWGDAM you can not and should not validate every sample. SWGDAM is the Scientific Working Group on DNA analysis methods guidelines for the collection and Serological Examination of Biological Evidence. SWGDAM sets the guidelines for Federal, State and local Labs in the United States. In Johnson's report she referenced PCAST, however PCAST does not set the guidelines SWGDAM does. Butler said she believes soil could degrade a sample for DNA testing but she was unaware of the mechanism of how soil could degrade a sample to invalidate the results of HemDirect testing itself. Butler said her lab has a validation study from testing they did in their Lab using a variety of body samples of blood of humans and animals.

Johnson's report showed validation studies of blood that was exposed to the elements such as a garbage can and other items but there was no validation shown for soil in Johnson's report. Butler said the HemDirect test meets all the requirements of forensic evidence. I asked Butler what the information meant to her since she had 12 soil samples that were positive for blood and 24 samples tested negative for blood. Butler said the HemDirect test has its own internal controls that shows the test is working properly and she never had a test where the internal control failed in any of our samples. Butler said it means the tests were valid because she got more negative results than positive ones and if she had a positive in our control samples that would mean something isn't right. Butler only got positive blood results from some of the samples in our excavation site. Butler said if all the samples were positive for human blood it would be a serious red flag.

Butler said it was her opinion the soil samples we provided to her that were 3-4 feet down in a previously dug hole would be protected and less chance of contamination than if the samples were at ground level where they would have more contact with weather and human contamination. Butler used sterile water and the buffer provided by HemDirect in her samples following the manufacturer instructions. This is important to control the PH of the sample otherwise you can get a false negative tests not false positive results. Soil high in iron can have a positive to human blood result with the presumptive test but then you use the confirmatory test which is the HemDirect test. The HemDirect test will not provide a false positive only a false negative due to any chemicals in the soil. The

HemDirect test has a binding agent that attracts to human hemoglobin.

Butler said the HemDirect test can get positive results on samples over 30 years old. The Hem Direct test has a broad sensitivity range for detecting varying hemoglobin. The results of the Seratec aged blood study shoe the HemDirect hemoglobin assay is an applicable test kit for the determination of human blood in the Forensic field.

Butler said many Labs use the HemDirect test and they are not the only Lab that is in detecting aged blood samples at least 30 years old and consistently yields the same results. Butler said she has used the HemDirect card over 100 times and her lab has used it over 1000 times.

CLOSING STATEMENT
Case status cleared by Adult Arrest. Forward to the District Attorney's Office for inclusion with the original report.

Detective C. Cole #0588

CC/mc 06/14/2022

EXHIBIT F

VALIDATION FOR THE USE OF THE SERATEC® HEMDIRECT HEMOGLOBIN ASSAY IN THE IDENTIFICATION OF HUMAN BLOOD

INTRODUCTION

Human hemoglobin (hHb), the red blood pigment located in erythrocytes, is one of the major proteins found in blood. The Seratec® HemDirect Hemoglobin Assay for the forensic identification of human blood is a membrane immuno-assay that qualitatively detects human hemoglobin.

The principle of the test is that the hHb will interact with a gold labeled monoclonal murine anti-hHb-antibody to form a mobile antigen antibody complex. The complex migrates down the membrane via capillary action and is captured by a second immobile monoclonal murine anti-hHb-antibody (sandwich complex). If there is sufficient hHb (> 40 ng hHb/ml) in the test sample, then a red line forms where the immobile anti-PSA antibody is located ("T" area).

If the sample has a very high amount of hemoglobin (>500 ng/ml), the hemoglobin will not only bind to the mobile gold-labeled rabbit anti-hHb antibody, but too much free hHB will bind with the immobile anti-hHb antibody in the test region. The bound hemoglobin prevents the immobile antibody from capturing the labeled antibody-antigen complex. The result obtained is a false negative result, referred to as the high dose hook effect.

A positive test is indicated by the presence of two pink lines (at the test and the control areas). A negative result is indicated by the presence one pink line at the control area. An inconclusive result is obtained if there is no line formed in the control area. The test is time sensitive and the results should be read within 10 minutes.

SUMMARY OF VALIDATION STUDY

1. SENSITIVITY

The HemDirect card provides a sensitive method for the identification of blood. Using the provided kit buffer, a very weak positive result was attainable at a one in 20 million dilution of whole blood. When sterile dH2O was used, a weak positive result was obtained at a one in 100 thousand dilution of whole blood.

The HemDirect card was at least ten times more sensitive than ortho-tolidine in reacting with dilutions of whole blood. HemDirect was at least ten times more sensitive than species-crossover.

Comparisons were made between extractions of a Nist bloodstain in the kit buffer, PBS, and sterile water. Positive results were achieved from all three extracts. However, it should be noted that the PBS extract resulted in the weakest test area band.

2. SPECIFICITY

The HemDirect card is known to react with domestic ferret blood. Using the provided kit buffer, a weak positive result was attainable at a one in 100 thousand dilution of whole ferret blood. However, when two distinct ferret blood stains were extracted, negative results were obtained.

The HemDirect card also crossreacted with higher primates. Very weak positive results were obtained with gorilla and chimpanzee bloodstains.

HemDirect did not crossreact with rabbit, sheep, guinea pig, goat, and squirrel bloodstains.

Hemoglobin can be found in trace amounts in other body fluids. Consequently, because the HemDirect card is so sensitive, positive results may occasionally be obtained from other body fluids. In this study, positive results were obtained from semen, saliva, and vaginal fluid.

REFERENCES

Seratec® HemDirect Hemoglobin Assay information insert. Seratec Diagnostica®.

Hochmeister et al. (1999) Validation Studies of an Immunochromatographic 1-Step Test for the Forensic Identification of Human Blood. J Forensic Sci Vol 44: 597-601

Hermon et al. (2003) The Use of the Hexagon OBTI Test for Detection of Human Blood at Crime Scenes and on Items of Evidence. Part I: Validation Studies and Implementation. J Forensic Identification Vol 53, 566-575

http://mafs.net/fallmeeting2005/meetingcd1.pdf **Validation Study of the Seratec HemDirect Hemoglobin Assay for the Forensic Identification of Human Blood,** Dale L. Laux, Ohio Bureau of Criminal Identification & Investigation, MAFS 34th Annual Meeting, St. Louis, MO, October 07, 2005

Validation Study of the *Seratec HemDirect Hemoglobin Assay* for the Forensic Identification of Human Blood

Amanda Misencik

Defiance College

Dale L. Laux, M.S.

Ohio BCI

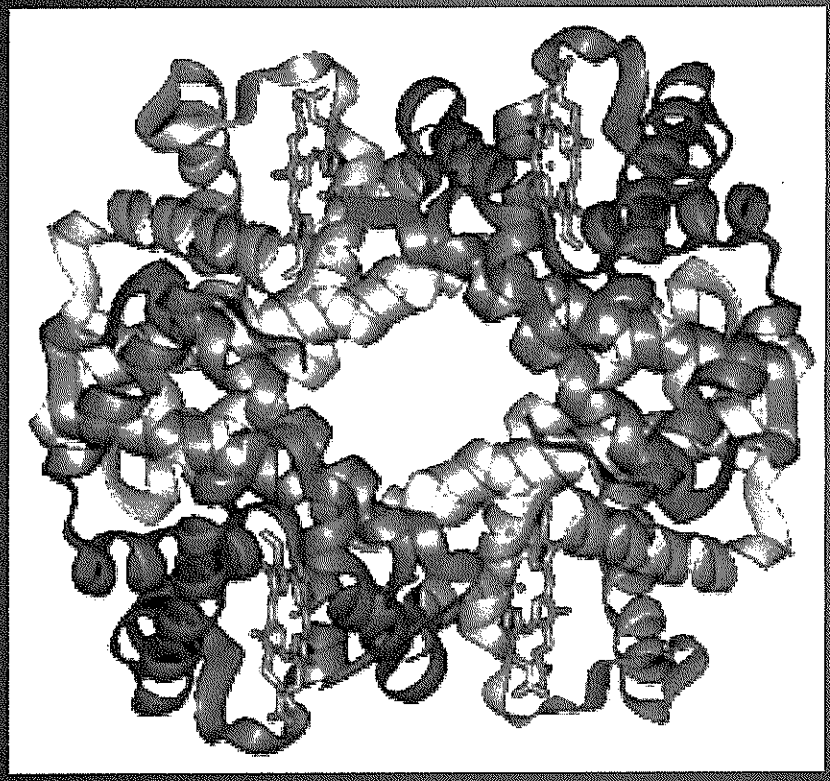
http://en.wikipedia.org/wiki/Image:Redbloodcells.jpg

About the *HemDirect* Test Kit

- The *Seratec HemDirect Hemoglobin Assay* is a one-step chromatographic immunoassay test for the detection of hemoglobin

- First developed for the determination of occult blood in stool samples and in the early detection of colon cancer

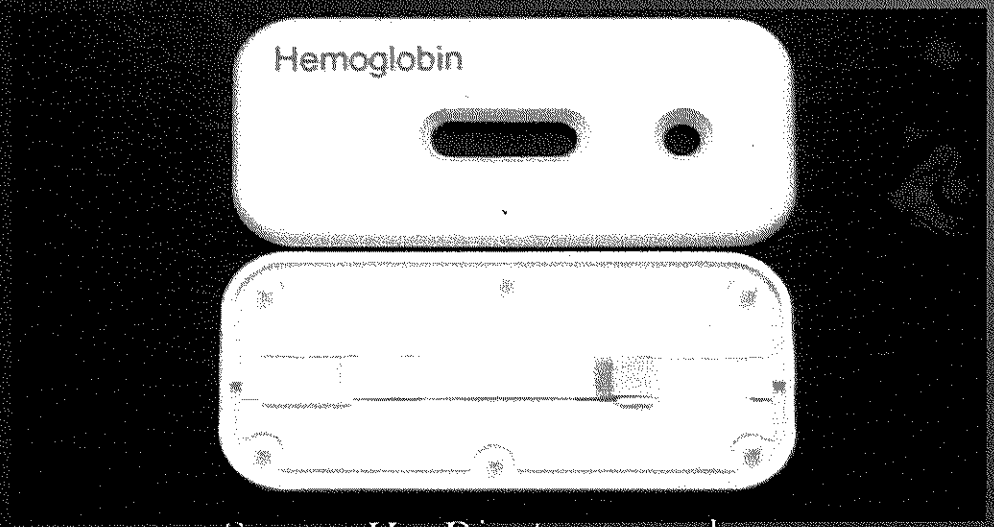
- For the forensic application the kit has been utilized for the identification of traces of human blood in forensic material



3-dimensional structure of hemoglobin
http://en.wikipedia.org/wiki/Hemoglobin

How It Works

- Uses 2 murine monoclonal anti-human hemoglobin antibodies as active components
- When hemoglobin is present, a red line will appear in the test region for a positive
- Internal control results in a red line in the control region for a valid test



Seratec *HemDirect* test membrane

Methods for Validation

- Specificity and Sensitivity
- Degradation
- Aged Blood Stains
- Reproducibility

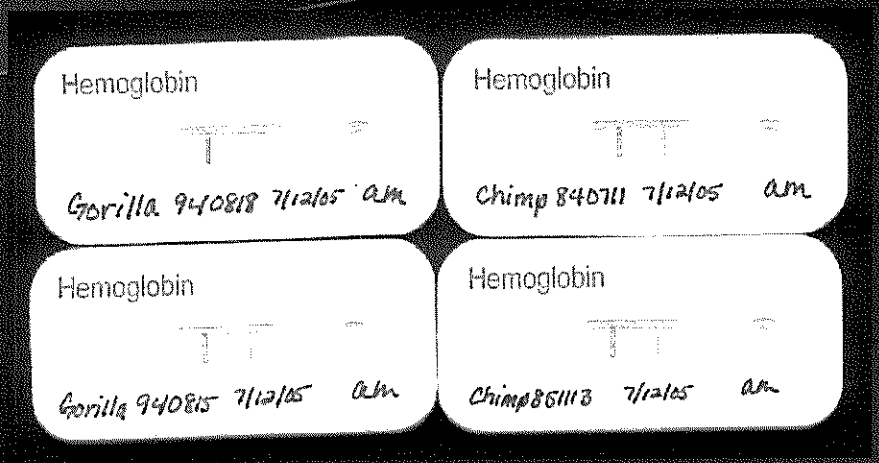


Seratec HemDirect test kit

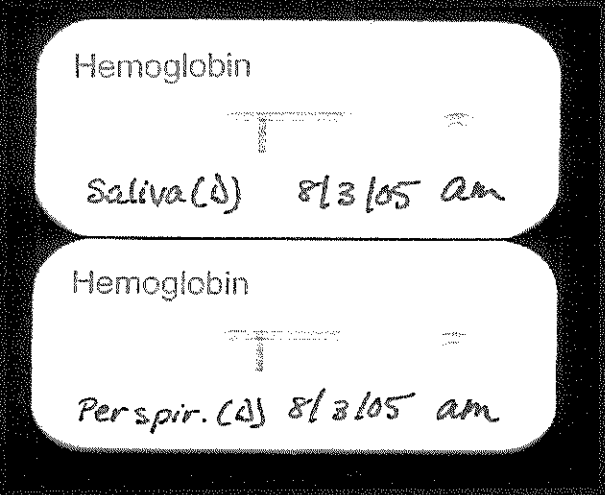
Specificity and Sensitivity

- Samples
  - Hemoglobin (Sigma H7379-1G, Lot 039H7605) at a concentration of 1 mg/mL
  - Whole blood (EDTA tube)
  - Animal blood (glass slides)
  - Urine
  - Semen
  - Saliva
  - Perspiration
- Tests
  - Hemoglobin and dilutions
  - Whole blood dilutions on clothing
  - Whole blood swab with dilutions
  - Animal Blood
  - Body Fluids

Results



Results from Gorillas and Chimpanzees



Negative results from body fluids

- Specific to human blood, with some cross reactivity in higher primates and the domestic ferret
- Trace amounts of hemoglobin were found in saliva and semen
- Samples containing a minimum of 40 ng hemoglobin/mL did show weak positives and dilutions of whole blood down to 1/9600 tested positive

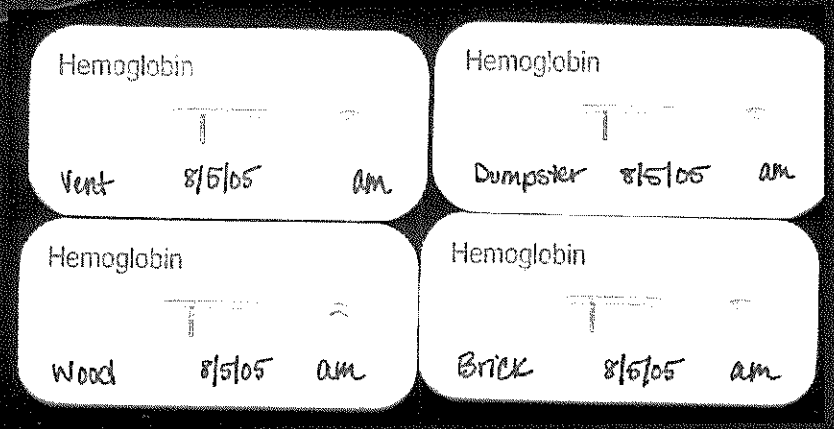
Degradation

- Samples
  - –Blood smears
  - –Whole blood stains
- Locations
  - –Blood smears on
    - (1) Dumpster
    - (2) Hot air vent
    - (3) Metal doorframe
    - (4) Brick on building
    - (5) Wood frame
  - –Whole blood stains on clothing were composed of four cloth strips set on a metal air vent
- Testing
  - –Blood smears collected weekly over a four week period with swabs
  - –Quarter portion of stains removed weekly over a four week period

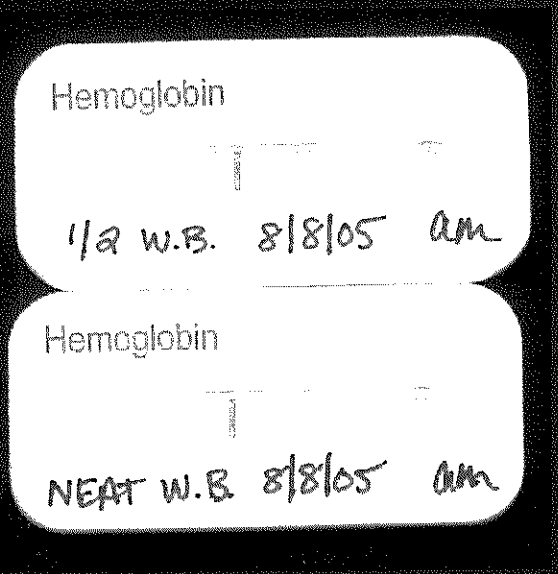




Results



Environment swabs after four weeks



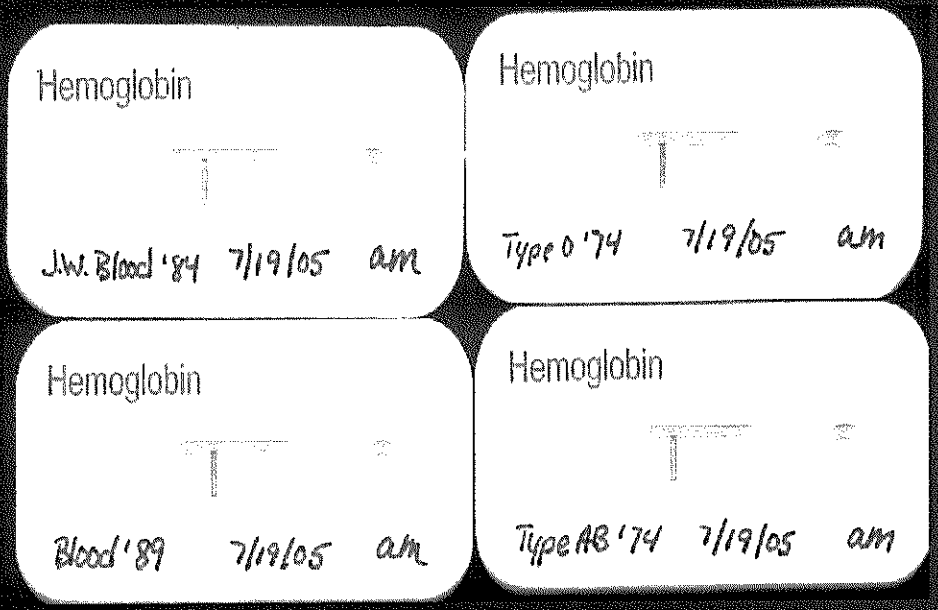
Stain results after four weeks of exposure

- Blood samples exposed to heat, rain, sunlight, and other environmental conditions showed significant degradation after four weeks
- Wood and brick substrates yielded continuous positive results
- On clothing, only the whole blood (EDTA) stain was positive after four weeks

Aged Blood Stains

- Samples
  - Type O 1974
  - Type AB 1974
  - 1984
  - 1989
    - * All samples were stored at room temperature
- Testing
  - Samples extracted over a 24 hour period

Results



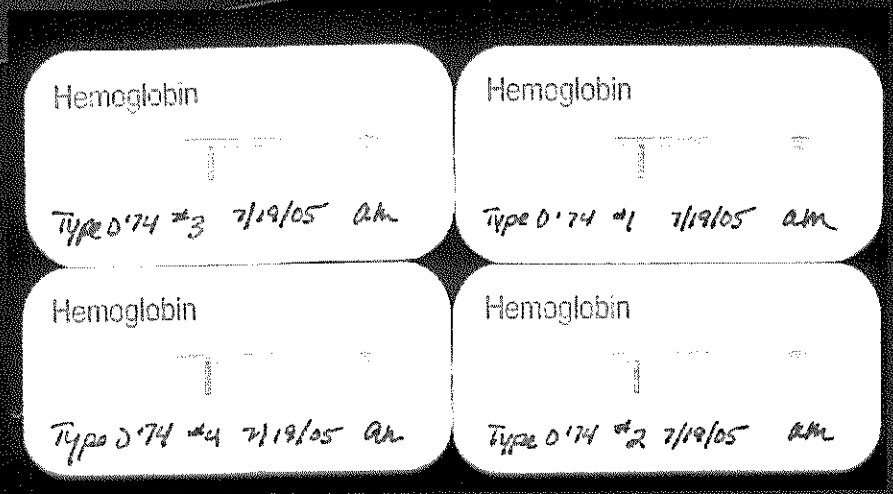
Aged blood results from all samples

- All aged samples tested positive using the *HemDirect* kit
- Blood 30 years or possibly older can be tested using a sufficient extraction method

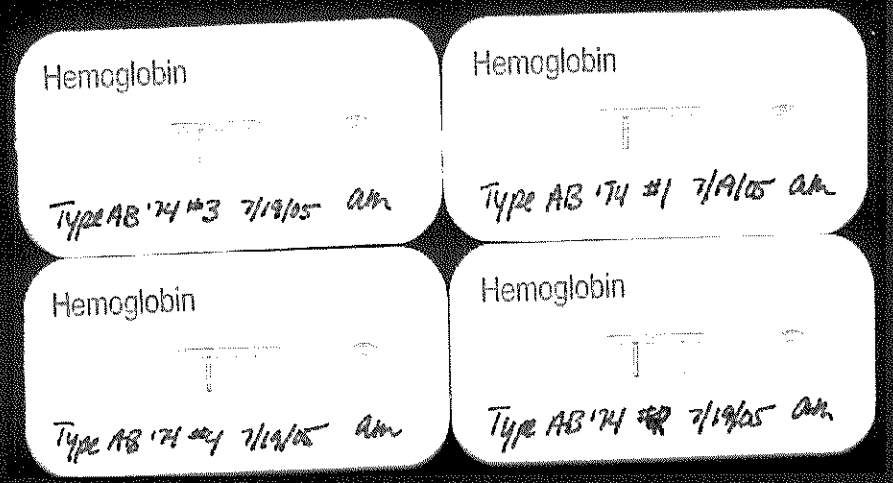
Reproducibility

- Samples
  - Type O 1974
  - Type AB 1974
- Testing
  - Each blood sample tested four times in separate test devices

Results



Type O 1974 Samples 1–4



Type AB 1974 Samples 1–4

- The *HemDirect* kit is consistent with test results in replicated studies
- The kit shows no signs of design flaws within test or buffer lots

Conclusions

- The *Seratec HemDirect Hemoglobin Assay* is an efficient and consistent kit for the determination of human blood in the forensic field

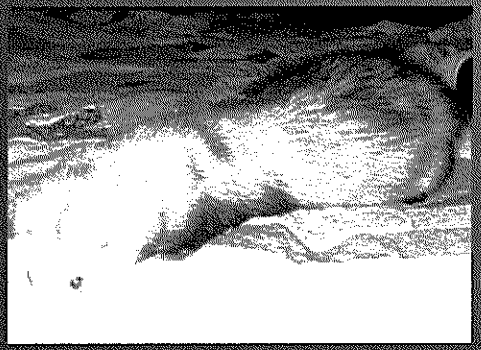
- Kit is specific to human blood* and sensitivity levels are true to the product literature

- Amino acid sequence of TNAVAHV on the alpha chain responsible for cross reactivity

- Separate species of ferret differ in hemoglobin



European Polecat
http://en.wikipedia.org/wiki/European_polecat



Domestic ferret
http://en.wikipedia.org/wiki/Ferret

- **Domestic Ferret**

1 * 10 * 20 * 30 * 40 * 50
1 VLSPADKTNVKSTWDKIGGHAGEYGGEALERTFASFPTTKTYFPHFDLSH
51 GSAQVKAHGKKVADALTNAVAHVDDLPGALSALSDLHAYKLRVDPVNFKL
101 LSHCLLVTLACHHPAEFTPAVHASLDKFFSAVSTVLTSKYR

- **European polecat**

- 1 * 10 * 20 * 30 * 40 * 50
- 1 VLSPADKTNVKSTWDKIGGHAGEYGGEALERTFASFPTTKTYFPHFDLH
- 51 GSAQVKAHGKKVADALTNAVAHMDDLPGALSALSDLHAYKLRVDPVNFKL
- 101 LSHCLLVTLACHHPAEFTPAVHASLDKFFSAVSTVLTSKYR

- See Rowley, JFS, 1999; 44:597-602.
- http://prowl.rockefeller.edu/

Thank you

- Cleveland Metroparks Zoo
  - Linda DeHoss
- BCI Richfield Staff



Questions?

Validation Study of the SeratecHemDirect Hemoglobin Assayfor the Forensic Identification of Human Blood

http://en.wikipedia.org/wiki/Image:Redbloodcells.jpg

Amanda Misencik, Defiance College
Dale L. Laux, M.S., Ohio BCI

About the HemDirectTest Kit

•The Seratec HemDirect Hemoglobin Assayis a one-step chromatographic immunoassay test for the detection of hemoglobin
•First developed for the determination of occult blood in stool samples and in the early detection of colon cancer
•For the forensic application the kit has been utilized for the identification of traces of human blood in forensic material

(3-dimensional structure of hemoglobin http://en.wikipedia.org/wiki/Hemoglobin)

How It Works

•Uses 2 murine monoclonal anti-human hemoglobin antibodies as active components
•When hemoglobin is present, a red line will appear in the test region for a positive
•Internal control results in a red line in the control region for a valid test

Methods for Validation

•Specificity and Sensitivity
•Degradation
•Aged Blood Stains
•Reproducibility

Specificity and Sensitivity

•Samples
–Hemoglobin (Sigma H7379-1G, Lot 039H7605) at a concentration of 1 mg/mL
–Whole blood (EDTA tube)
–Animal blood (glass slides)
–Urine
–Semen
–Saliva
–Perspiration

•Tests
–Hemoglobin and dilutions
–Whole blood dilutions on clothing
–Whole blood swab with dilutions
–Animal Blood
–Body Fluids

Results

- Specific to human blood, with some cross reactivity in higher primates and the domestic ferret
- Trace amounts of hemoglobin were found in saliva and semen
- Samples containing a minimum of 40 ng hemoglobin/mL did show weak positives and dilutions of whole blood down to 1/9600 tested positive
- Negative results from body fluids

Degradation

•Samples
–Blood smears
–Whole blood stains

•Locations
–Blood smears on
1. Dumpster
2. Hot air vent
3. Metal doorframe
4. Brick on building
5. Wood frame

–Whole blood stains on clothing were composed of four cloth strips set on a metal air vent

•Testing
–Blood smears collected weekly over a four week period with swabs
–Quarter portion of stains removed weekly over a four week period

Results

•Blood samples exposed to heat, rain, sunlight, and other environmental conditions showed significant degradation after four weeks
•Wood and brick substrates yielded continuous positive results
•On clothing, only the whole blood (EDTA) stain was positive after four weeks

Aged Blood Stains

•Samples
–Type O 1974
–Type AB 1974
–1984
–1989
All samples were stored at room temperature

•Testing
–Samples extracted over a 24 hour period

Results

•All aged samples tested positive using the HemDirect kit
•Blood 30 years or possibly older can be tested using a sufficient extraction method

Reproducibility

•Samples
–Type O 1974
–Type AB 1974

•Testing
–Each blood sample tested four times in separate test devices

Results

•The HemDirect kit is consistent with test results in replicated studies
•The kit shows no signs of design flaws within test or buffer lots

Conclusions

•The Seratec HemDirect Hemoglobin Assay is an efficient and consistent kit for the determination of human blood in the forensic field
•Kit is specific to human blood* and sensitivity levels are true to the product literature
•Amino acid sequence of TNAVAHV on the alpha chain responsible for cross reactivity
•Separate species of ferret differ in hemoglobin

•Domestic Ferret1 * 10 * 20 * 30 * 40 * 50
1 VLSPADKTNVKSTWDKIGGHAGEYGGEALERTFASFPTTKTYFPHFDLSH51
GSAQVKAHGKKVADALTNAVAHVDDLPGALSALSDLHAYKLRVDPVNFKL101
LSHCLLVTLACHHPAEFTPAVHASLDKFFSAVSTVLTSKYR

•European polecat•1 * 10 * 20 * 30 * 40 * 50
1 VLSPADKTNVKSTWDKIGGHAGEYGGEALERTFASFPTTKTYFPHFDLH
51GSAQVKAHGKKVADALTNAVAHMDDLPGALSALSDLHAYKLRVDPVNFKL1
01 LSHCLLVTLACHHPAEFTPAVHASLDKFFSAVSTVLTSKYR

•See Rowley, JFS, 1999; 44:597-602.
•http://prowl.rockefeller.edu/

TECHNICAL NOTE

Manfred N. Hochmeister,[1] M.D.; Bruce Budowle,[2] Ph.D.; Rebecca Sparkes,[3] Ph.D.; Oskar Rudin;[1] Christian Gehrig,[1] B.S.; Michael Thali,[1] M.D.; Lars Schmidt,[4] B.S.; Adrien Cordier,[5] and Richard Dirnhofer,[1] M.D.

Validation Studies of an Immunochromatographic 1-Step Test for the Forensic Identification of Human Blood*

REFERENCE: Hochmeister MN, Budowle B, Sparkes R, Rudin O, Gehrig C, Thali M, Schmidt L, Cordier A, Dirnhofer R. Validation studies of an immunochromatographic 1-step test for the forensic identification of human blood. J Forensic Sci 1999;44(3): 597–602.

ABSTRACT: An immunochromatographic 1-step test for the detection of fecal occult blood was evaluated for applicability for the forensic identification of human blood in stained material. The following experiments were conducted: 1) determination of the sensitivity and specificity of the assay; 2) evaluation of different extraction media for bloodstains (sterile water, Tris buffer pH 7.5 provided in the test kit, 5% ammonia); 3) analysis of biological samples subjected to a variety of environmental insults; and 4) evaluation of casework samples.

This immunochromatographic 1-step occult blood test is specific for human (primate) hemoglobin and is at least an order of magnitude more sensitive than previous methods for detecting human hemoglobin in bloodstains. The antigen is insensitive to a variety of environmental insults, except for exposure to certain detergents and household bleaches and prolonged exposure to certain preparations of luminol.

The entire assay can be conducted in field testing conditions within minutes. When in the laboratory the supernatant from a DNA extraction is used for the assay, there is essentially no consumption of DNA for determining the presence of human hemoglobin in a forensic sample. The data demonstrate that this test is robust and suitable for forensic analyses.

KEYWORDS: forensic science, hemoglobin, identification, human blood, bloodstains, luminol, species identification, DNA typing, validation studies

* Presented at the 50th Annual Meeting, American Academy of Forensic Sciences San Francisco, CA, Feb. 1998.

[1] Forensic scientists and director, respectively, Institute of Legal Medicine, University of Bern, Switzerland.

[2] Program manager for DNA Research, FSRTC, FBI Academy, Quantico, VA.

[3] Senior forensic scientist, Forensic Science Service, Birmingham, England.

[4] Police Forensic Laboratory Bern, Switzerland.

[5] Commander, Police Forensic Laboratory Aarau, Switzerland.

Names of commercial manufacturers are provided for identification only, and inclusion does not imply endorsement by the authors.

Received 11 June 1998; and in revised form 4 Sept. 1998; accepted 8 Sept. 1998.

When biological samples are obtained from a crime scene, at times it may be important to determine if the material is blood and if so, if it is human in origin. The two most often used confirmatory tests for the presence of hemoglobin are the Takayama test (1) and spectrophotometric methods (2). However, these methods can not determine whether or not bloodstains are human in origin and additional tests must be performed. Human specificity assays include immunological tests (2) or DNA-based hybridization assays (3). Therefore, it would be desirable to implement a single simple assay for the detection of human hemoglobin.

An anti-human hemoglobin antibody based system can provide information both on the presence of hemoglobin and human specificity. An overview of immunological tests is provided by Gaensslen (2). In 1994, Spear and Binkley applied an immunochemical fecal occult blood test (HemeSelect™; SmithKline Diagnostics, San Jose, CA) to detect the presence of human hemoglobin in forensic samples (4). The test was able to detect hemoglobin in bloodstain extracts diluted to 1:100 000 and was primate specific. Although effective and scientifically sound, this assay has not gained wide use in the forensic community.

Recently, the Hexagon OBTI Test (5), a test for the detection of fecal occult blood, has been introduced to a few police laboratories in Germany and Switzerland. The test is designed to detect the presence of human hemoglobin in stool samples through the use of an anti-human hemoglobin antibody in an immunochromatographic procedure. The assay offers several advantages compared with the test described by Spear and Binkley. These are: 1) the test is a 1-step immunographic assay, 2) there is no manipulation of the reagents, 3) the test does not rely on an antibody coated cell reagent, 4) the assay takes no more than 10 min, and 5) the assay is at least an order of magnitude more sensitive. Thus, this anti-human Hb assay may prove useful as a confirmatory test for the presence of human hemoglobin in forensic casework analyses. This paper presents the results from a forensic validation study of the Hexagon OBTI test.

Materials and Methods

Immunochromatographic 1-Step Test for the Detection of Fecal Occult Blood

The Hexagon OBTI test was purchased from Human Gesellschaft fuer Biochemica und Diagnostica mbH, Silberbach-

strasse 9, D-65232 Taunusstein, Germany, (Tel. ++49 6128 8750, Fax ++49 6128 875 100). The test kit consists of an all inclusive single test device, a sample tube with Tris-buffer pH 7.5 (containing a mild detergent) as a transport medium for the stool sample and an applicator stick for manipulating the stool sample. The test utilizes mobile monoclonal anti-human hemoglobin antibodies, which are conjugated to blue dye particles and can bind hemoglobin (Fig. 1). The resulting antigen-antibody complexes migrate on the membrane of the test device to a reaction zone, where immobilized polyclonal antihuman Hb antibodies reside. An antigen-antibody-antigen sandwich concentrates the dye particles resulting in the formation of a blue line, indicating the presence of human hemoglobin. Unbound mobile monoclonal antihuman hemoglobin antibodies migrate on the membrane to a control zone, where immobilized anti-Ig antibodies reside (Fig. 1). A complex is formed concentrating dye particles also resulting in the formation of a blue line. The test is considered valid when one blue line in the control zone is observed. With a positive test result, two blue lines will appear; with a negative result, only the control line will be visible (Fig. 1). From all samples used in this study, 100 μL of an extract were placed in the round opening at the end of the device. The test results were read after 10 min.

Determination of Sensitivity and Specificity

Whole blood from 10 individuals and whole blood from Chimpanzee (*Pan troglodytes*), Gorilla (*Gorilla gorilla*), Orangutan (*Pongo pygmaeus*); Celebes black ape (*Cynopithecus niger*) and Spider monkey (*Ateles sp*) were serial diluted to 1:10 000 000 with either sterile water or the Tris-buffer pH 7.5, provided in the kit. Ten μL of whole blood from 10 individuals were placed on cotton cloth, air dried for 24 h, extracted with either sterile water or the Tris-buffer, pH 7.5, provided in the kit, for 2 h at room temperature on a shaker and then serially diluted to 1:10 000 000. Negative controls (sterile water and Tris-buffer pH 7.5) also were prepared and analyzed.

Saliva, perspiration, urine, stool, vaginal secretions, and semen samples were recovered on cotton swabs from 5 male and 5 female volunteers. Each swab was cut in half and extracted in 0.5 mL of the Tris-buffer, pH 7.5, provided in the kit, as well as in sterile water for 2 h at room temperature on a shaker. After centrifugation for 3 min at 13 000 rpm the supernatant was removed and serial diluted to 1:10 000.

The pH-dependency of the test was evaluated using whole blood diluted to 1:1000 with sterile water and the pH adjusted to 1–14 using either acetic acid or NaOH.

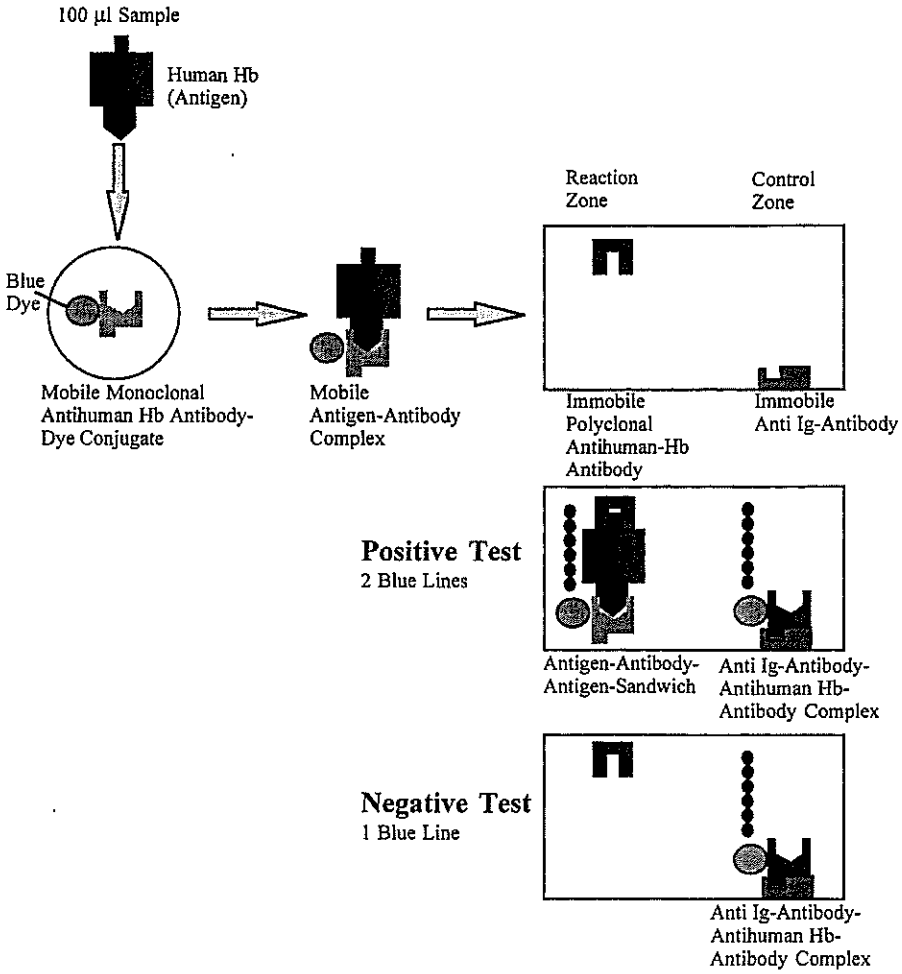


FIG. 1—*Unbound mobile monoclonal anti-human hemoglobin antibodies migrate on the membrane to a control zone, where immobilized anti-Ig antibodies reside.*

Microorganisms (*Bacillus Clostridium, Pseudomonas, Escherichia coli, Streptococcus, Staphylococcus, Candida albicans*) and 5 × 5 mm bloodstains from different animal species: Herring (*Clupea harengus*), Sea trout (*Salmo trutta*); Pigeon (*Columba livia*), Goose (*Anser anser*), Chicken (*Gallus gallus*); Toad (*Xenopus laevis*), Rat (*Rattus rattus*), Guinea pig (*Cavia cutleri*), Rabbit (*Oryctolagus cuniculus*), Cat (*Felis Catus*), Dog (*Canis familiaris*), Badger (*Meles meles*), Lamb (*Ovis aries*), Pig (*Sus scrofa*), Sika deer (*Cervus sika*), Red deer (*Cervus elaphus*), Horse (*Equus caballus*), Cow (*Bos taurus*), Elephant (*Loxodonta africana*); Chimpanzee (*Pan troglodytes*), Gorilla (*Gorilla gorilla*), Orangutan (*Pongo pygmaeus*); Celebes black ape (*Cynopithecus niger*) and Spider monkey (*Ateles sp*) prepared on Schleicher & Schuell paper were extracted in 0.5 mL of the Tris-buffer, pH 7.5, provided in the kit, as well as in sterile water for 2 h at room temperature on a shaker. After centrifugation for 3 min at 13 000 rpm the supernatant was removed and serial diluted to 1:10 000.

Extraction of Aged Blood Stains from Forensic Casework Samples

Eight stains of human blood on clothing from different forensic cases that have been stored at room temperature under ambient conditions for 2–15 years were tested. Extraction was performed using either 0.5 mL of the Tris-buffer, pH 7.5, provided in the kit, or 0.5 mL sterile water. From each stain two 5 × 5 mm pieces were removed, each placed into a separate 2 mL plastic tube and extracted for 2 h at room temperature on a shaker. After centrifugation for 3 min at 13 000 rpm, 100 μL of each supernatant were recovered and tested.

In five of the eight aged blood stains the hemoglobin was insoluble, when sterile water or Tris-buffer was used for extraction. Therefore, from all stains an additional 5 × 5 mm cutting was placed in a microtiter plate and extracted with 0.5 mL of 5% (v/v) ammonia (6,7). The ammonia was allowed to evaporate completely (approx. 30 min) and then 100 μL of the Tris buffer provided in the kit was used to resolubilize the extract.

In addition, 100 human blood stains from recent forensic cases, which tested positive for the presence of hemoglobin using the Sangur® presumptive test for blood (8) and a spectrophotometric method (2) were extracted using 0.5 mL of the Tris-buffer supplied in the kit. In addition, a human (*primate*) specific DNA hybridization assay (3) was performed. The age of the stains was between 1 day and 6 months. All stains were removed from a variety of substrates either by scraping or swabing and ranged from very small particles or flakes to large reddish brown stains. Nine stains, that would not dissolve in the Tris-buffer, were extracted in 5% ammonia as described above.

Degradation Study

Fifty μL aliquots of human blood from 10 individuals were placed on cotton cloth and air dried for 24 h. Samples of deep muscle tissue (50 g) from 10 recently deceased individuals were obtained. All samples were subjected to different environmental conditions for 1 month: (a) frozen at −20°C (control samples), (b) exposed to ambient outdoor conditions during the summer months (rain, sunlight, an average temperature of 25°C), (c) wrapped in plastic wrap and stored under the same conditions as (b), (d) immersed in water taken from a river and maintained at a temperature of 25°C, and (e) buried in soil at a depth of 50 cm.

From each stain two 5 × 5 mm pieces were removed and placed into separate 2 mL plastic tubes and each extracted with 0.5 mL Tris-buffer, supplied in the kit, or sterile water for 2 h at room temperature on a shaker. In addition, from each stain a 5 × 5 mm piece was placed in a microtiter plate and extracted with 0.5 mL of 5% (v/v) ammonia as described above. 100 mg of muscle tissue were extracted using 0.5 mL of the Tris-buffer supplied in the kit, sterile water, or 5% ammonia as described above and the supernatant was used for the assay.

DNA Compatible Assay

Ten μL of whole blood from 10 individuals were placed on cotton cloth, air dried for 24 h and extracted with stain extraction buffer (9), that did not contain detergent or Proteinase K, or extracted with 5% Chelex solution (10), and the supernatant was tested as described above. An additional 100 μL of supernatant was removed to verify the absence of DNA in the supernatant using a DNA hybridization assay specific for human DNA (3). Then detergent and proteinase K were added to the original extract and DNA extraction was continued (9).

Contamination with Detergents

Whole blood from 10 individuals was serially diluted to 1:1000 with sterile water and mixed with a variety of detergents including SDS, sarcosyl, stain extraction buffer used for organic DNA extraction (9) with and without SDS or sarcosyl, Triton X-100, and different brands of soaps and household-bleaches (final concentration of all contaminants in the samples 2%) and kept at room temperature for 1 h. Before testing, the pH of all extracts was determined using litmus paper and adjusted to approximately pH 7.

Contamination with Luminol

Three replicates of 50 μL aliquots of human blood from 10 individuals were placed on cotton cloth and air dried for 24 h. Each aliquot was exposed to a different preparation of luminol. Preparation one and two both used 0.1 g of luminol and 5 g of sodium carbonate dissolved in 100 and 90 mL, respectively, of distilled water (final luminol concentration, 0.1%). In the first protocol, 0.7 g of sodium perborate was added immediately prior to use, while in the second, 10 mL of 3% hydrogen peroxide were added immediately prior to use (2,11). In preparation three, 70 mL distilled water was mixed with a 10 mL solution of 8 g of sodium hydroxide dissolved in 500 mL of distilled water, 10 mL solution of 10 mL of 30% hydrogen peroxide in 490 mL of distilled water, and 10 mL solution of 0.354 g luminol dissolved in 62.5 mL of 0.4 N sodium hydroxide to a final volume of 500 mL distilled water (12). Using an aerosol sprayer each test reagent was added to the stains to produce a strong positive result. Special care was taken to ensure that the entire surface of the stains was covered with the reagent. From each luminol-exposed stain 5 × 5 mm pieces were removed and extracted as described above.

In addition, 50 μL of whole blood from 10 individuals diluted 1:1000 and 1:10 000 were mixed with 50 μL aliquots of the three different preparations of luminol and kept at room temperature for 1, 12 and 72 h. Before testing the pH of all extracts was determined using litmus paper and adjusted to approx. pH 7.

TABLE 1—*Results with various samples.*

Samples	Result
Liquid human blood/Fresh human blood stains	Diluted with water: pos. to 1:100 000 Diluted with Kit-Buffer: pos. to 1:1 000 000
Microorganisms/Different animal species	Neg.
Various human body fluids	Some body fluids tested pos.
pH-dependency of test	Pos. pH 1- 12, Neg. pH >12
High dose hook effect (false negative test)	Not observed when >1:100 fold dilution of whole blood was used
Aged bloodstains from forensic casework	Pos. (up to 15 years of room temperature storage)
Human bloodstains/Human muscle tissue exposed to various outdoor conditions	Pos.
DNA compatible assay	Pos.
Fresh human bloodstains contaminated with soaps, detergents, and household bleaches	Pos./Neg. (depending on brand, concentration, time)
Liquid human blood/Fresh human blood stains contaminated with luminol (3 preparations)	Pos./Neg. (depending on preparation, dilution of blood, time)

Results and Discussion

A summary of the results is presented in Table 1.

Determination of the Sensitivity and Specificity

All whole blood samples from human donors and blood samples from Chimpanzee (*Pan troglodytes*), Gorilla (*Gorilla gorilla*), Orangutan (*Pongo pygmaeus*); Celebes black ape (*Cynopithecus niger*) and Spider monkey (*Ateles sp*) tested positive for human hemoglobin to a dilution of 1: 100 000 when sterile water was used to dilute the sample. However, when Tris-buffer provided in the kit was used to dilute the whole blood, dilutions up to 1:1 000 000 tested positive. Therefore, as little as 500 total erythrocytes are required for a positive result. Additional components, in the Tris buffer provided in the kit, such as a mild detergent, may enhance the sensitivity of the assay. Only a few positive reactions were observed for blood samples diluted more than 1: 1 000 000. Similiar results were obtained from fresh bloodstains. For the negative control samples only the control line was visible.

In the species specificity experiments only human and primate blood tested positive with the assay. These data suggest that the assay is primate specific. Serial dilutions of human and primate blood revealed no difference in the reactivity.

Similiar to the findings of Spera and Binkley some of the extracts of saliva, urine, stool, vaginal secretions, and semen yielded a positive reaction with the assay. Perspiration tested negative in all cases. These results were anticipated since hemoglobin may be present at low concentration in various body fluids.

When the pH-dependency of the test was evaluated, a positive test result was obtained when the pH of the supernatant ranged from 1–12. At a pH > 12 the test was always negative, but if the pH was adjusted to approximately pH 7 the very same samples tested positive.

High Dose Hook Effect

When performing immunoassays the concentration of the antigen and the titer of the antibody have to be considered. Obviously, an antigen concentration in a sample below the sensitivity of detion of the assay will yield a negative result. A negative result also may be obtained when too high a concentration of antigen is assayed. The latter situation is known as high dose hook effect. In the Hexagon OBTI test excess hemoglobin will overwhelm the mobile monoclonal antihuman Hb antibodies and unbound hemoglobin will migrate towards the reaction zone, where the immobilized polyclonal antihuman Hb antibodies reside. Free unbound hemoglobin binds to the immobilized antibodies and prevents these antibodies from reacting with the antigen-mobile antibody complexes (Figs. 2, 3). The result will be a false negative. The manufacturer of the Hexagon OBTI test states a high dose hook effect has been observed at concentrations of hemoglobin of 2 μg/μL. We confirmed this observation and recommend that a dilution of blood at least 1:100 should be used to avoid the high dose hook effect. This can be achieved either by extracting a smaller portion of a sample, by increasing the extraction volume, or by diluting the extract prior to assay. Hemoglobin loses its visible color at whole blood dilutions greater than about 1:1000 (approximately 0.2 μg Hb/μL). This may be used as a guide for avoiding the high dosis hook effect.

Extraction of Aged Blood Stains from Forensic Casework

Out of 108 human blood stains, 14 were insoluble in either Tris buffer or water. These stains were extracted using 5% ammonia (6,7). All aged blood stains yielded positive results for human hemoglobin and a positive signal when using a human (*primate*) specific DNA hybridization assay (3). These results demonstrate, that ammonia does not appear to have a deleterious effect on the immunological reaction of this assay.

Degradation Study

All samples of the degradation study, even heavily putrified human muscle tissue, yielded positive results. Thus hemoglobin appears to persist in samples exposed to extreme conditions. This demonstrates the usefulness of the test for the identification of the origin of recovered remains, such as putrified soft tissue.

DNA Compatible Assay

All human blood samples yielded positive results. In the aliquots that were removed to determine the quantity of DNA present in the portion of the extract used for the detection of human hemoglobin there was no detectable DNA. Therefore, no DNA is consumed when assaying for human hemoglobin during a DNA extraction.

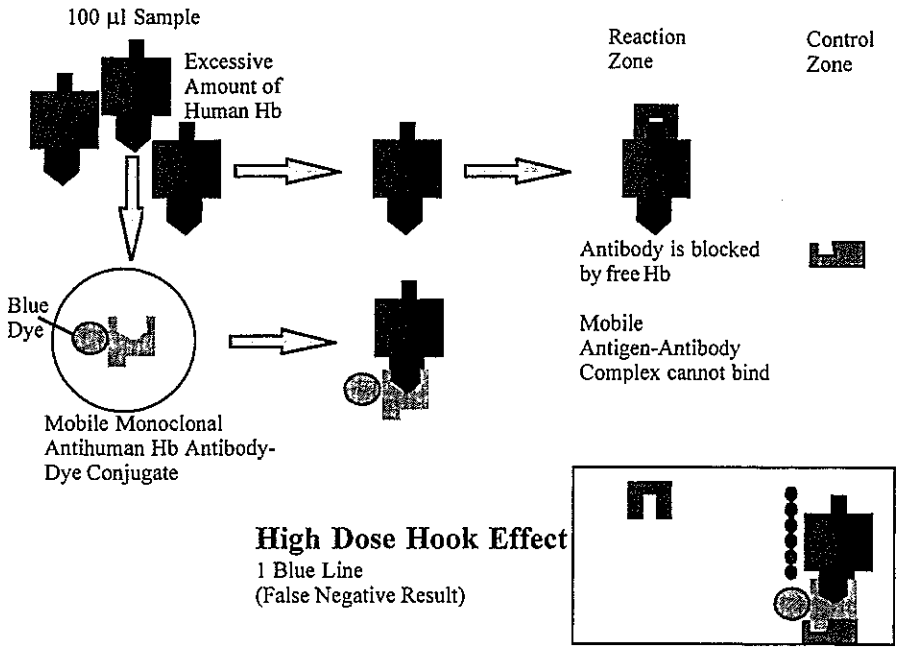


FIG. 2—*Free unbound hemoglobin binds to the immobilized antibodies and prevents these antibodies from reacting with the antigen-mobile antibody complexes.*

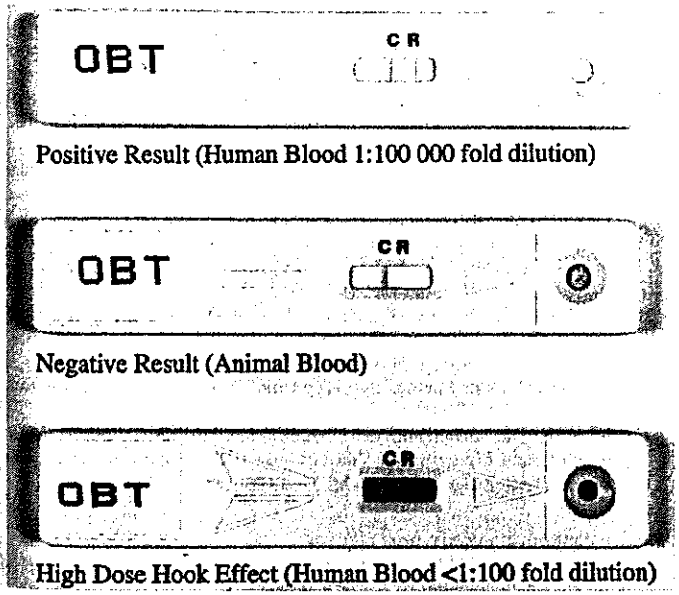


FIG. 3—*Immunochromatographic 1-step test for the identification of human blood. One hundred µL of the extract were placed in the round opening at the end of the device. A positive result is indicated by the formation of a blue line in the reaction zone (R) and in the control zone (C). A negative result is indicated by the formation of a blue line in the control zone. The high dose hook effect is a false negative result due to excess hemoglobin in the sample and indicated by the formation of a blue line in the control zone only.*

Contamination with Detergents

When human blood was mixed with SDS or sarcosyl (ionic detergents), at a final concentration of 2%, no human hemoglobin was detected in the assay, presumably due to denaturation of proteins and/or interference with protein-protein interactions. Triton X-100 (a non-ionic detergent) at the same concentration yielded a weak positive signal. The mixture of blood with stain extraction buffer without SDS or sarcosyl yielded a strong positive result, whereas stain extraction buffer with SDS or sarcosyl yielded a negative result. Therefore the use of a detergent to improve the DNA extraction should be avoided, if an anti-Hb assay is intended to be performed.

It could be anticipated that an individual might attempt to clean bloodstained items. Contamination of blood with different brands of soap at a final concentration of 2% yielded positive results. However, contamination with various household bleaches in the same concentration yielded either an extremely weak positive signal or a negative result, presumably due to the denaturation of proteins and/or inhibition of the immunoassay (data not shown). When the pH of the supernatant was adjusted to pH 7 before testing, the samples still yielded a negative result.

Contamination with Luminol

Luminol is often used in crime scene investigations to presumptively detect blood. Therefore, stains that arrive at the forensic laboratory for analysis may be contaminated with luminol and related reagents. Of the luminol preparations tested, only preparation one and two yielded detection of hemoglobin in all contaminated blood samples throughout a 72 h period. However, it was necessary to adjust the pH of the supernatant to <12 in order to obtain a positive result. Blood mixed with luminol preparation three tested positive only at a 1:1000 fold dilution of blood up to 1 h of exposure. Presumably certain components of the third luminol preparation, such as sodium hydroxide have deleterious effects on the immunoassay, depending on the dilution of blood and time of exposure. Therefore, preparation one and two may be considered the most desirable of the three preparations for the detection of blood at crime scenes. Furthermore, if samples were exposed to luminol, it is necessary to check and adjust the pH of the extract prior to testing to <12.

TABLE 2—*Test procedure. Test of suspected blood stains for the presence of human hemoglobin (field testing/laboratory testing).*

Apparently Fresh Stains	Aged Stains	Stains Exposed to Luminol
Extract a small portion of the stain in a microfuge tube or a microtiter plate with an appropriate amount of the Tris-buffer provided in kit, water, 5% Chelex solution, or any other suitable buffer that does not contain SDS/Sarcosyl or Proteinase K	If insoluble, extract with an appropriate amount of 5% ammonia. Let ammonia evaporate. Resolubilize with buffer provided in kit, water, or any other suitable buffer that does not contain SDS/Sarcosyl/Proteinase K	Extract with one of the described methods. Check and adjust pH before testing.
Use 100 μL of supernatant for confirmatory test		

TABLE 3—*Confirmatory testing. Confirmatory test for the presence of human hemoglobin during DNA-extraction.*

Depending on age and condition of the stain use one of the methods described above to resolubilize the stain
Centrifuge briefly
Use 100 μL of supernatant for confirmatory test
Continue DNA extraction

Conclusions

The Hexagon OBTI test has been demonstrated to be a powerful and robust tool as a confirmatory test for human blood, because it is human specific (or at least primate specific) and is suitable for use with both aged and degraded material. It can be a useful tool for either field testing or laboratory testing (Table 2). The antigen is insensitive to a variety of environmental insults, except for exposure to certain detergents and household bleaches and prolonged exposure to certain preparations of luminol. This immunoassay is compatible with highly solubilizing extraction procedures, such as those that use ammonia, that may be needed for the extraction of aged blood stains.

While this assay is specific for primate hemoglobin, it is not specific solely for blood. Body fluids other than blood may contain trace amounts of hemoglobin and yield a positive result. However, this observation should not be a problem for the detection of human blood in the large bulk of cases.

Most forensic laboratories characterize human blood stains using DNA-based procedures. This assay is compatible with the current DNA extraction procedures with slight modifications (Table 3). It enables the analysis of human hemoglobin and DNA comparable to results that would be obtained if each test was done individually and has the ancillary benefit of not consuming any DNA in the sample.

This test is simple to perform, requires a minimum amount of equipment, produces results that are easy to interpret and is relatively rapid to perform. Furthermore, the test was found to be at least one order of magnitude more sensitive than current presumptive or confirmatory tests described in the literature. The procedure can be easily implemented in the forensic laboratory.

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SERATEC® HemDirect Hemoglobin Assay

REF HbF07

A visual one-step immunoassay for the rapid identification of human blood in forensic samples by the determination of hemoglobin. In-vitro diagnostic device for professional use only.

Intended use

The SERATEC® HemDirect test serves the rapid identification of human blood for forensic purposes. The detection is based on the determination of human hemoglobin in the sample by a specific antigen/antibody reaction. The result is interpreted visually by the appearance of a red test result line in hemoglobin positive samples. The test is easy to perform (no training necessary) and can be used directly at the crime scene, if required.

Introduction

The red blood pigment, hemoglobin (Hb), is located in the erythrocytes and predominantly serves the transport of oxygen and carbon dioxide within the body. Hemoglobin has a molecular weight of 64.5 kDa. It is composed of 4 amino acid chains, two of which are identical. Each chain is associated with a hem group that contributes to around 4 % of the total weight of the molecule. With concentrations between 120-160 mg/ml and 140-180 mg/ml for women and men, respectively, hemoglobin is one of the most abundant proteins in blood.

For the examination of a crime it might be essential to know if biological samples contain blood and/or if the blood is of human origin. Various confirmatory tests for the identification of blood are based on the detection of hemoglobin but do not allow to differentiate if the blood is human. In order to analyze this, additional testing is required. Frequently immunological tests or DNA-based hybridization assays are performed. As these assays are time consuming and work intense, it is generally not possible to perform them directly at the crime scene.

The use of one-step immunoassays may eliminate these problems. In these tests human hemoglobin is generally detected by a specific antibody pair. Originally developed for an early detection of colon carcinoma by the determination of occult blood in stool samples, the SERATEC® HemDirect test combines a high specificity with an excellent sensitivity and can be used for the identification of traces of human blood in forensic samples. Employing the test has the following advantages over the conventional methods:

- The generation of the result does not require any difficult manipulations of the sample and can be performed directly at the crime scene.
- The result is generated rapidly. 5 minutes after the addition of the sample the result can be read and interpreted visually without the aid of further equipment.
- The sensitivity of the test is very high. Samples containing only 40 ng/ml human hemoglobin are detected easily by the test. Fresh human blood diluted in the extraction buffer up to 10^{-6} shows clear positive test results. Even 10^{-7} dilutions are generally detected by the SERATEC® HemDirect test.
- The test is specific for human hemoglobin. A cross reactivity is observed for blood of primates. Therefore a positive test results allows the conclusion that the sample tested most probably contained blood of human origin.

Studies[1,2] show, that immunoassays are also suited for the detection of old blood stains. 2-15 year old blood stains on clothing, that had been extracted in the laboratory, reacted positive when tested. Dried blood stains and muscle tissue stored at different environmental conditions for one month, also gave positive test results following an extraction. In contrast, the addition of detergents like SDS or sarcosyl or bleach to the sample led to negative or only weak positive results. This was probably due to the denaturation of hemoglobin.

The test result of immunoassays will be affected in its evidence by two facts. First, hemoglobin may also be present in other body fluids (e.g. urine, stool, seminal fluid, vaginal fluid or saliva) in trace amounts yielding positive test results. However, this observation should not be a problem for the detection of human blood in the large bulk of cases. Second it must be kept in mind that very high concentrations of human hemoglobin in the sample may lead to negative test results – a phenomenon known as high dose hook effect (prozone effect). The high dose hook effect can be avoided by testing different dilutions of a sample. As the visible color caused by the hemoglobin vanishes between a 10^{-3} and a 10^{-4} dilution, the color of the sample might be a guide for the user. At these concentrations no high dose hook effect is expected.

Description of the test

Originally the SERATEC® HemDirect test was developed for the determination of occult blood in stool samples and was used for the early detection of colon cancer. In the forensic use, the test is employed for the detection of human hemoglobin with the aim to identify traces of human blood in forensic material obtained at a crime scene.

Principle of the test

The SERATEC® HemDirect test is a chromatographic immunoassay (CIA). It contains two monoclonal murine anti-hHb (human hemoglobin) antibodies as active compounds. One of these antibodies is immobilized at the test region on the membrane as a line. The upstream control region contains immobilized polyclonal goat anti-rabbit antibodies that are also fixed on the membrane as a line. A glass fiber pad downstream of the membrane is used for sample loading and transmission to a second fiber pad that contains the dried and gold-labeled second monoclonal murine anti-hHb antibody that will bind the hemoglobin present in the sample. Additionally the pad contains gold-labeled rabbit antibodies.

Through the capillary effect of the membrane, the reaction mixture moves across the membrane towards the test and the control region. In any case the colored gold-labeled rabbit-antibodies will bind to the anti-rabbit-antibody at the control region resulting in the formation of the red control line in the upper part of the result well. This line indicates the correct performance of the test.

If the sample contains hHb, the hHb-gold-labeled anti-hHb-antibody complex will bind to the immobilized monoclonal antibody of the test region that recognizes another epitope on the hemoglobin molecule (sandwich complex). The binding is indicated by the formation of an additional line in the test result region.

A **high dose hook effect** can be observed, if too much free hemoglobin that is not bound to the gold-labeled antibody reaches the test result region. If the amount of hemoglobin is high, the antibody fixed at the test result region becomes saturated with free hemoglobin. This prevents the binding of the hemoglobin complexed with the gold-labeled antibody, thus repressing the formation of the test result line. The test result appears negative in spite of the presence of hemoglobin in the sample.

Materials

Materials provided: 40 individually wrapped tests, tubes with 2 ml extraction buffer for extracting the sample material

Materials required but not provided: Timer

Storage and Stability

The test is stable up to the expiry date stated on the sealed pouch. The tests can be stored at room temperature or refrigerated at +2 to +30°C (38-86 °F). The test must remain in the sealed pouch until use.

Qualitative Characteristics

Sensitivity

The test is capable of detecting hemoglobin in a concentration range of at least 40 ng/mL to 500 µg/ml. At higher concentrations a beginning high dose hook effect can be observed resulting in a continuous decrease of the color intensity of the test result line.

Reference Material

The qualitative characteristics of the test are confirmed in a final QC testing using human hemoglobin purchased form SIGMA. Using the extraction buffer as solvent the amount of hemoglobin is adjusted to the concentrations needed to confirm the performance characteristics of the test.

Performance Characteristics

For the detection of 40 ng/ml hemoglobin in sample buffer (indicated by the appearance of the test result line) the SERATEC® HemDirect test showed the following performance characteristics:

Diagnostic sensitivity:	100 %
Diagnostic specificity:	100 %
Positive predictive value:	100 %
Negative predictive value:	100 %
Reproducibility:	100 %

Specificity
The SERATEC® HemDirect Test shows no cross reactivity with bovine, dog, rabbit, cat, pig, wild boar, horse, chicken, sheep, mule, goat or red deer hemoglobin.
Blood of primates and blood of ferret reacted positive in the test.

Test procedure

For your safety
Samples containing human blood and all materials coming in contact with them should be handled and disposed of as if capable of transmitting infection. Avoid contact with skin by wearing gloves and proper laboratory attire.

- Test for single *in-vitro* diagnostic use only.
- Do not use the test after the expiration date or if the pouch has been damaged.
- Do not open pouch until ready to perform the assay.
- The test and all materials coming in contact with the sample should be autoclaved before their disposal. They contain potentially infectious material.
- The test consists of potentially infectious materials (e.g. antibodies). These materials do not cause any danger if the device is used according to the instructions.

Specimen collection/specimen preparation
Hold collection tube upright down and unscrew the blue cap. Collect some sample material (e.g. dried blood, blood stained thread of clothing) with the applicator stick attached at the cap. Re-insert the stick into the tube, thus transferring the sample material into the extraction buffer. Screw the cap tightly and extract the blood by shaking thoroughly. At this stage the specimen is stable at room temperature for at least 2 days.
The extraction of old bloodstains may be difficult. If necessary the extraction can be done in the laboratory using the provided buffer (transfer buffer into a different reaction tube, add sample material, extract for two hours on a shaker, centrifuge briefly, and test supernatant).
As solvent we recommend using the extraction buffer provided in the kit. However, other buffers at a neutral pH range (e.g. Phosphate, HEPES or TRIS buffered saline) might be used as well. The addition of pure water for the extraction is not recommended since it leads to a decrease in sensitivity of the test. No detergents like SDS or Sarcosyl should be added to the extraction buffer. If you feel unsure, if an unknown buffer is suitable for the extraction, it might be useful to test a serial dilution of fresh human blood in the buffer to check, if $10^{-6}/10^{-7}$ dilutions show positive test results. The first dilution step should be carried out in distilled water to ensure a complete lysis of the erythrocytes. Alternatively, a solution with 40 ng/ml hemoglobin can be used.

Note:

High Dose Hook Effect
Due to their high content of hemoglobin, fresh bloodstains should be diluted prior to testing to avoid a high a dose hook effect. As a guide for a suitable dilution, you may want to use the color of the sample. The visual detectable color caused by hemoglobin vanishes between a 10^{-3} and a 10^{-4} dilution. At this concentration range there is no danger of a high dose hook effect. Samples that exhibit an obvious color due to hemoglobin might cause negative test results because of the high dose hook effect.

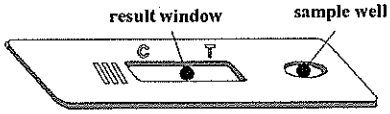
pH value of the Sample
If possible the pH value of the sample should be close to the neutral range. Samples with a pH less than 5 might cause false positive test results. At the alkaline range, the sensitivity of the test is slightly decreased between pH 9 and 11. At pH values of 12 or more the test is no longer functional. Generally no drastic changes in the pH are expected after the extraction of small amounts of sample material, because the extraction buffer exhibits a sufficient buffer capacity.

Influence of the temperature
The sensitivity of the test is only guaranteed if the test is carried out at room temperature. A drop of the temperature to 8 °C leads to a decrease of the sensitivity to approximately 400 ng/mL

Extraction Buffer
The extraction buffer is composed of the following ingredients:
12.1 g TRIS; 8.8 g Na_3Citrate; 0.2 g NaN_3 →adjust pH auf 6.8 with HCl
0.5 g Tween 20; 5.0 g BSA → fill with distilled water to 1000 ml

Assay Procedure

- Bring test device and sample to room temperature prior to the testing. Remove the test from the protective pouch when ready to start the assay. Label the device for identification purposes if necessary.



- Add 3 drops of the sample (approximately 100 µl) into the round opening (sample well). If the extraction was carried out in the collection tube, remove the white conic cap at the lower end of the tube. Using a piece of paper (danger of splattering), break the seal of the tube by a twisting motion. Hold the tube upright down and dispense three drops of liquid into the round sample well by exerting a light pressure on the walls of the tube. Start the timer. Keep remaining liquid in case it might be necessary to test additional dilutions.
- Wait for 5 minutes. During this time one or two red lines appear in the result window. **Negative results should be confirmed after 10 minutes.**

Interpretation of results

Negative result (no hemoglobin in the sample or hemoglobin beyond the detection limit)

Only one *red colored line appears in the* ***control region (C)****. The* ***absence*** *of a line in the test result region T indicates a negative test result.*

In this case the sample most likely does not contain human blood or human hemoglobin.

Note:
Make sure that the dilution of the sample is within the detectable range Hemoglobin concentrations that are too low e.g. due to an insufficient extraction or hemoglobin concentrations that are too high e.g. due to an unsuitable dilution (also see high dose hook effect) interfere with the formation of the test result line.

Positive result (human hemoglobin present in the sample)

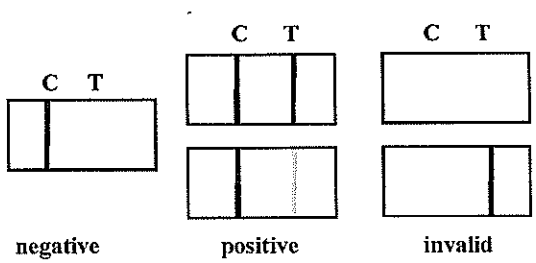
Two red colored lines appear in the result window, one at the ***control region (C)*** *and one in the* ***test result region (T)****. The color intensities of the two lines may vary. Even a weak test result line indicates a positive test result.*

In this case it is very likely that the sample contains human hemoglobin.

Invalid result

The control line (C) does not appear.

In this case the test is invalid and should be repeated with a new cassette.



Further Reading

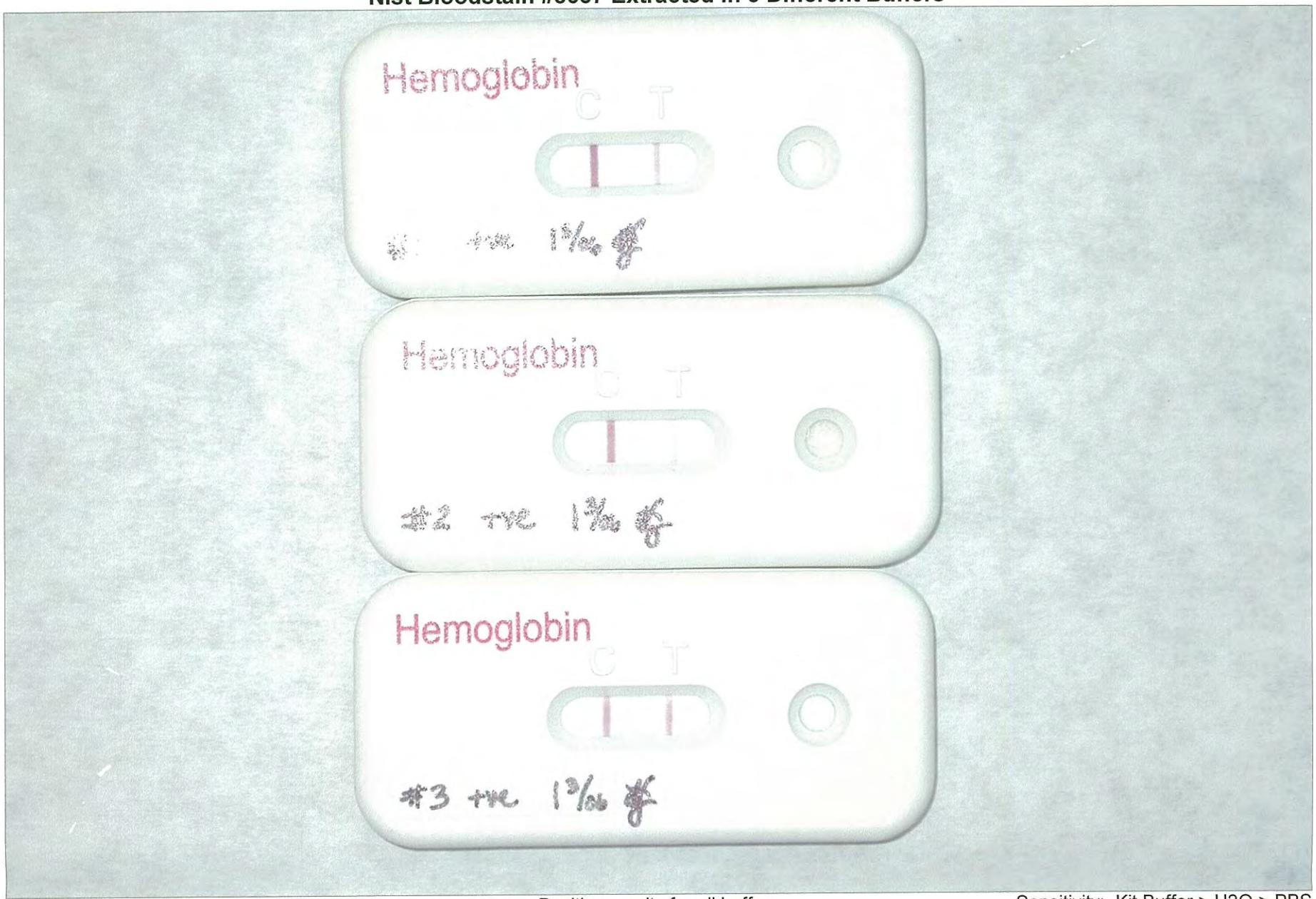
[1]Hochmeister et al. (1999) Validation Studies of an Immunochromatographic 1-Step Test for the Forensic Identification of Human Blood. J Forensic Sci Vol 44: 597-601

[2]Hermon et al. (2003) The Use of the Hexagon OBTI Test for Detection of Human Blood at Crime Scenes and on Items of Evidence. Part I: Validation Studies and Implementation. J Forensic Sci Vol 53, 2003

October 2004

HemDirect Validation - Extraction Buffer Comparison

Nist Bloodstain #8657 Extracted in 3 Different Buffers



#1 Kit Buffer; #2 PBS; #3 Sterile Water

Positive results for all buffers

Sensitivity: Kit Buffer > H2O > PBS

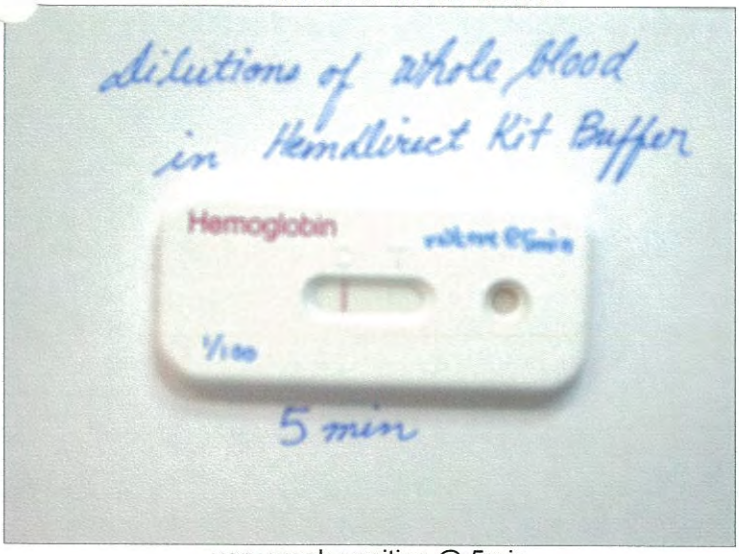
HemDirect Validation
Sensitivity Study
Comparison of Diliutions of Whole Blood in Water vs Kit Buffer

DILUTION IN WATER		
	5 mins	**10 mins**
1/10	negative (hook effect)	negative (hook effect)
1/100	very weak positive	very weak positive
1/1000	weak positive	positive
1/10,000	positive	positive
1/100,000	very weak positive	weak positive
1/1MIL	negative	negative
1/10MIL	negative	negative

DILUTION IN KIT BUFFER		
	5 mins	**10 mins**
1/100	very weak positive	weak positive
1/1000	positive	positive
1/10,000	positive	positive
1/100,000	positive	positive
1/1MIL	weak positive	positive
1/10MIL	negative	weak positive
1/20MIL	negative	very weak positive

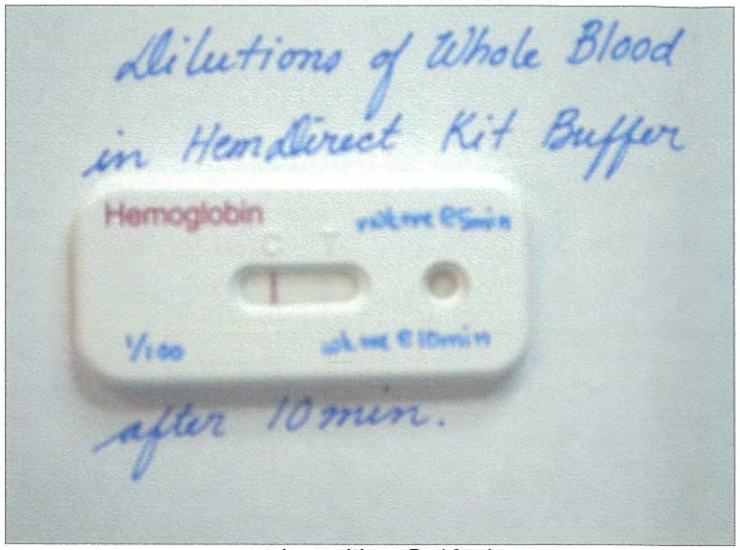
HemDirect Validation - Sensitivity

1/100 dilution in kit buffer



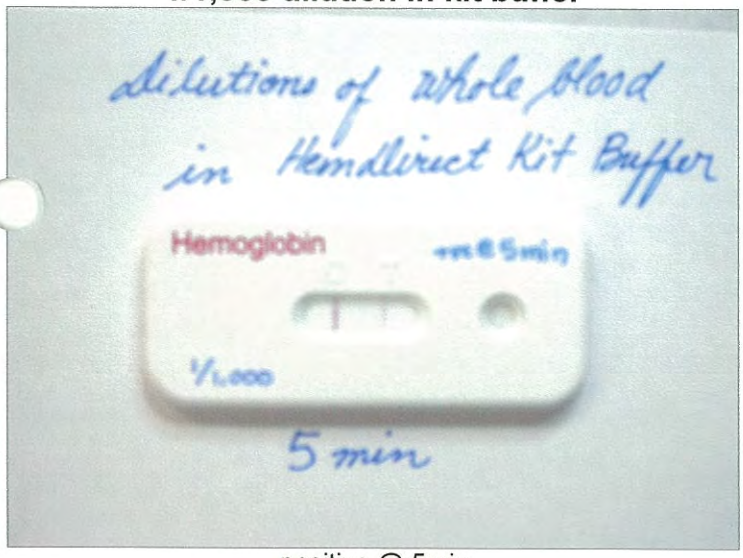
very weak positive @ 5min

1/100 dilution in kit buffer



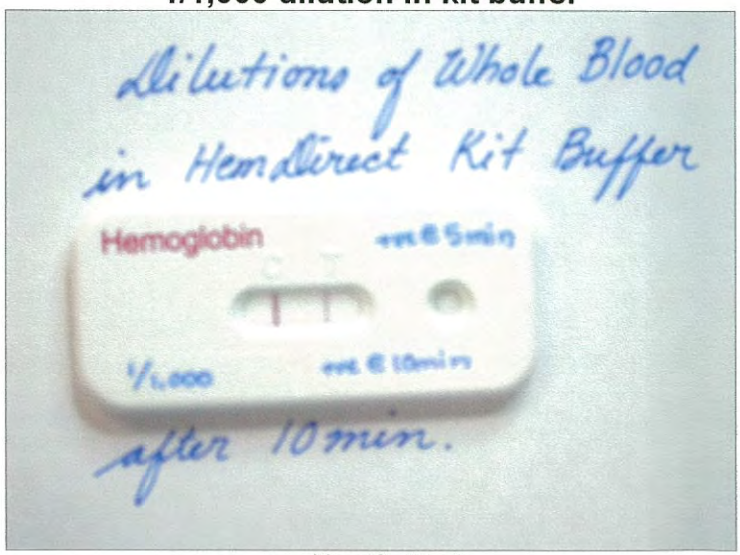
weak positive @ 10min

1/1,000 dilution in kit buffer



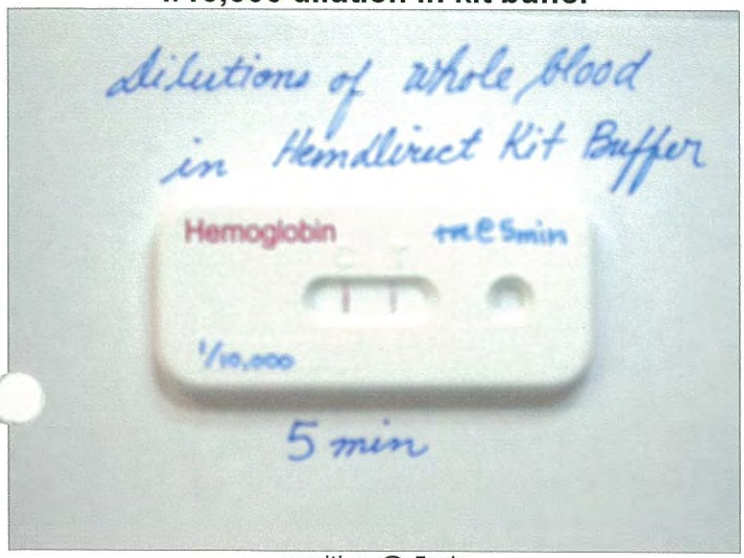
positive @ 5min

1/1,000 dilution in kit buffer



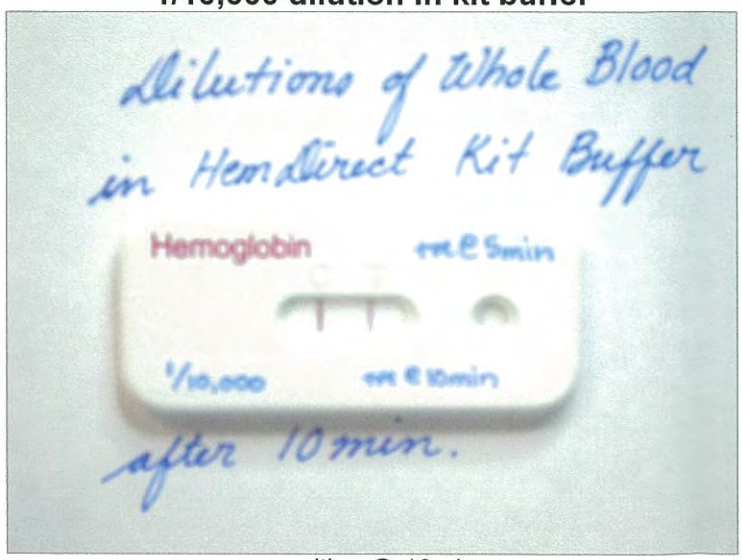
positive @ 10min

1/10,000 dilution in kit buffer



positive @ 5min

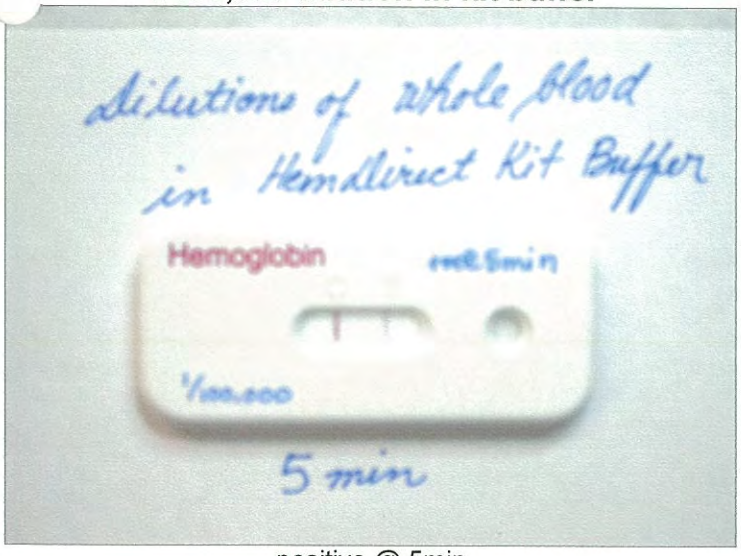
1/10,000 dilution in kit buffer



positive @ 10min

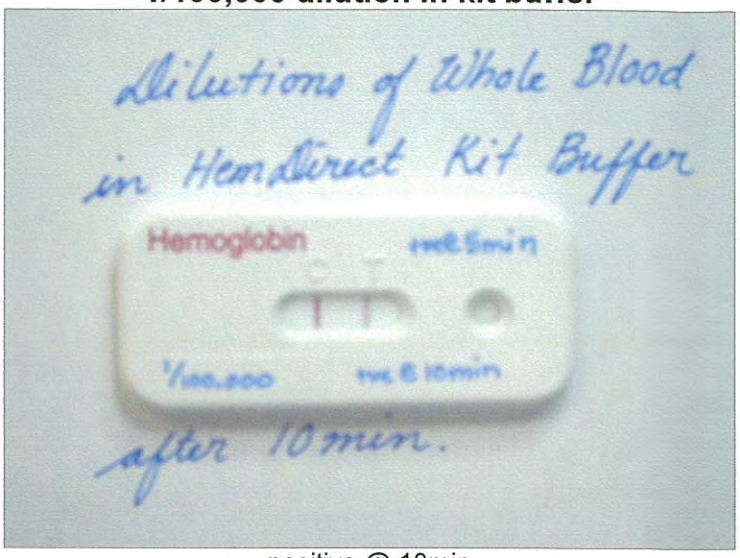
HemDirect Validation - Sensitivity

1/100,000 dilution in kit buffer



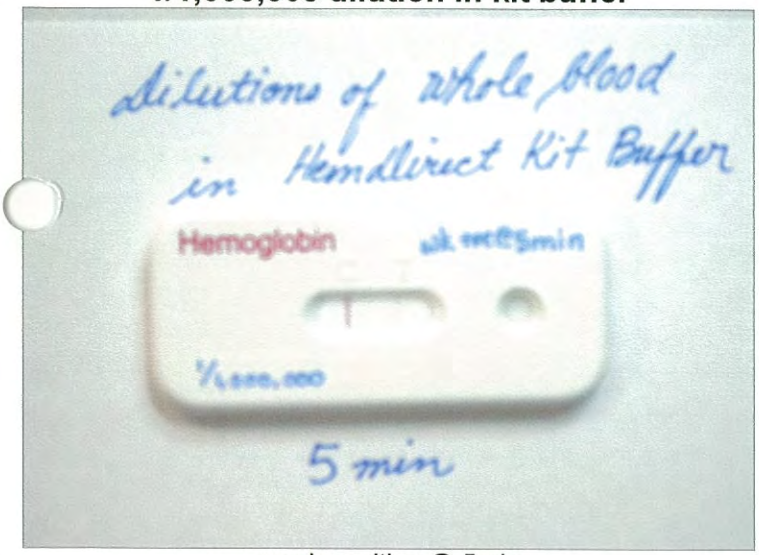
positive @ 5min

1/100,000 dilution in kit buffer



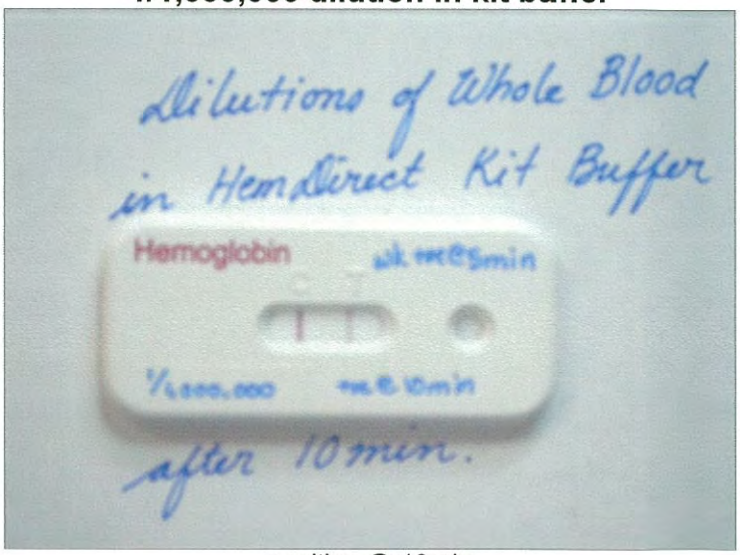
positive @ 10min

1/1,000,000 dilution in kit buffer



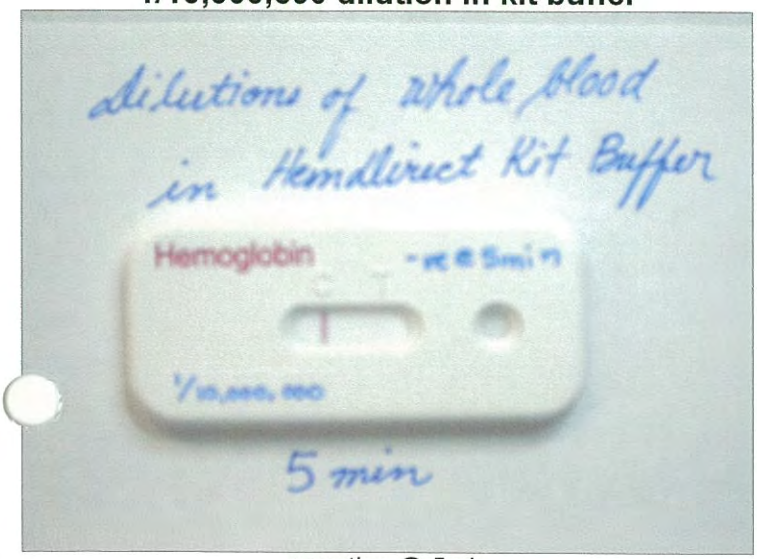
weak positive @ 5min

1/1,000,000 dilution in kit buffer



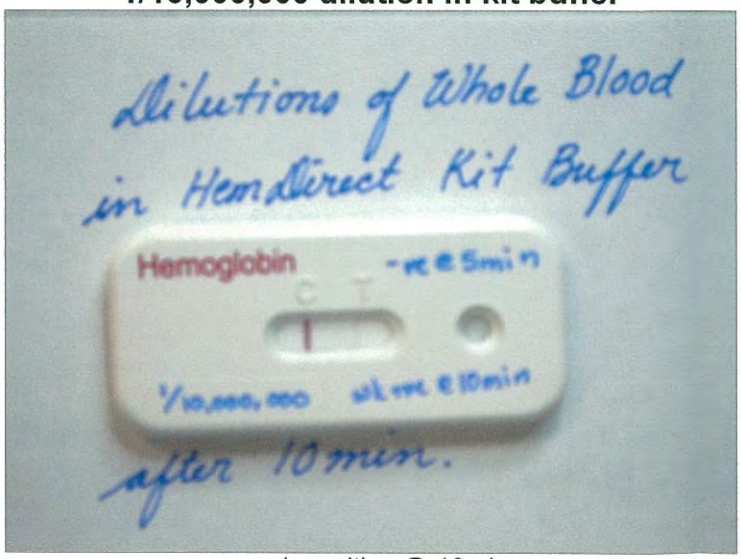
positive @ 10min

1/10,000,000 dilution in kit buffer



negative @ 5min

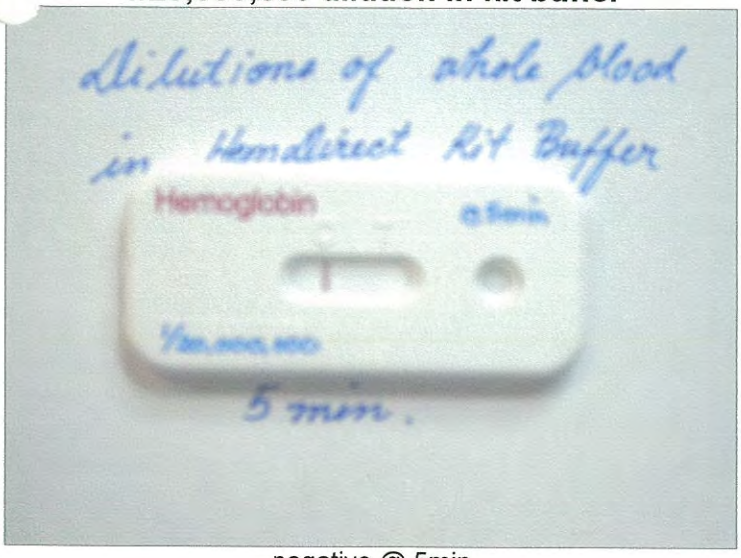
1/10,000,000 dilution in kit buffer



weak positive @ 10min

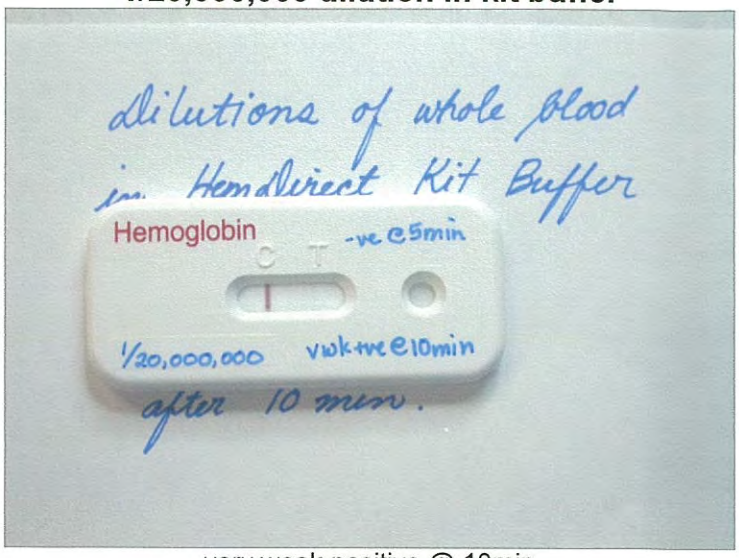
HemDirect Validation - Sensitivity

1/20,000,000 dilution in kit buffer



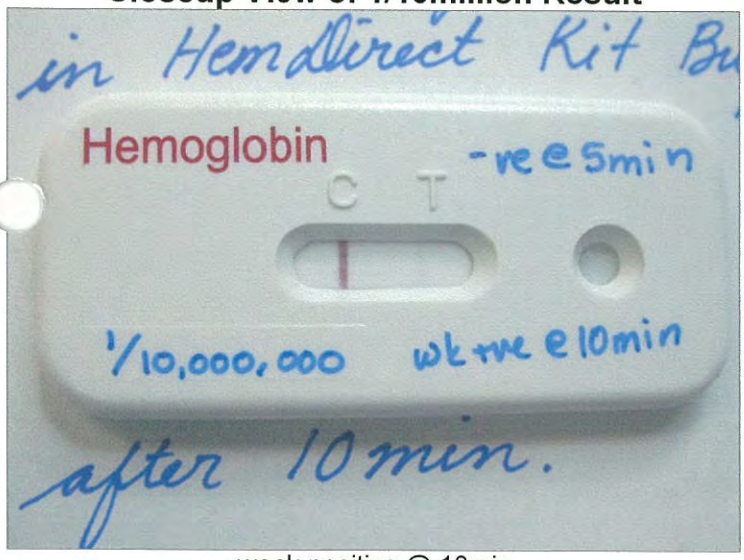
negative @ 5min

1/20,000,000 dilution in kit buffer



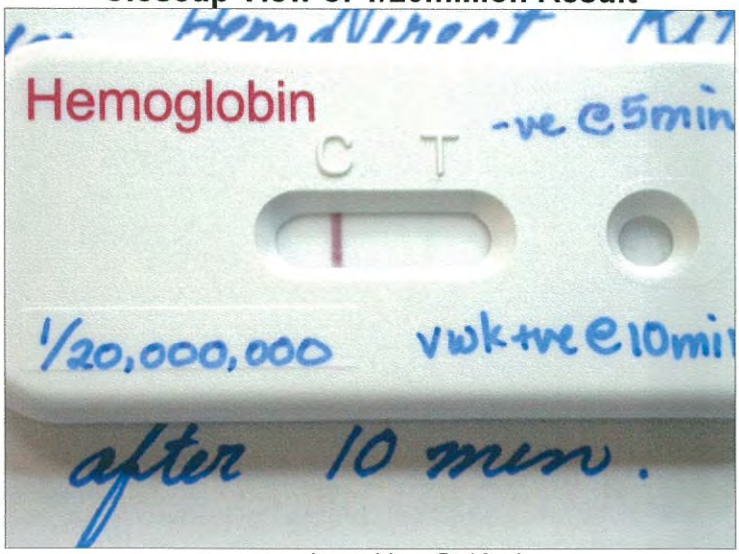
very weak positive @ 10min

Closeup View of 1/10million Result



weak positive @ 10min

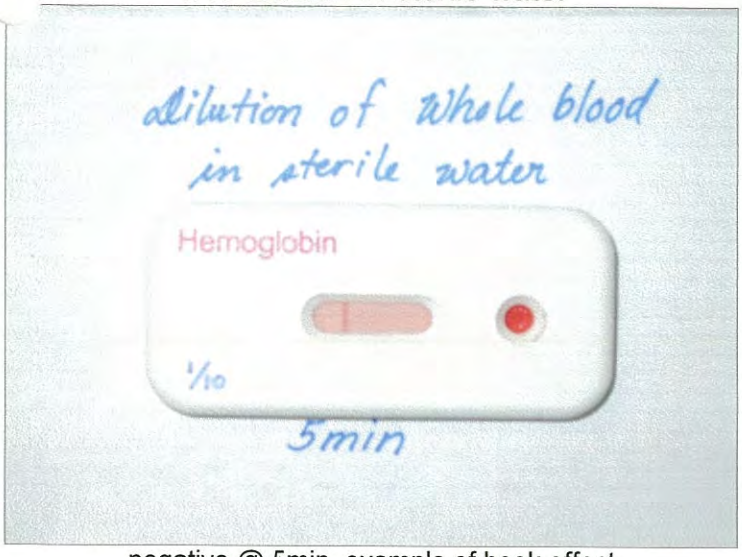
Closeup View of 1/20million Result



very weak positive @ 10min

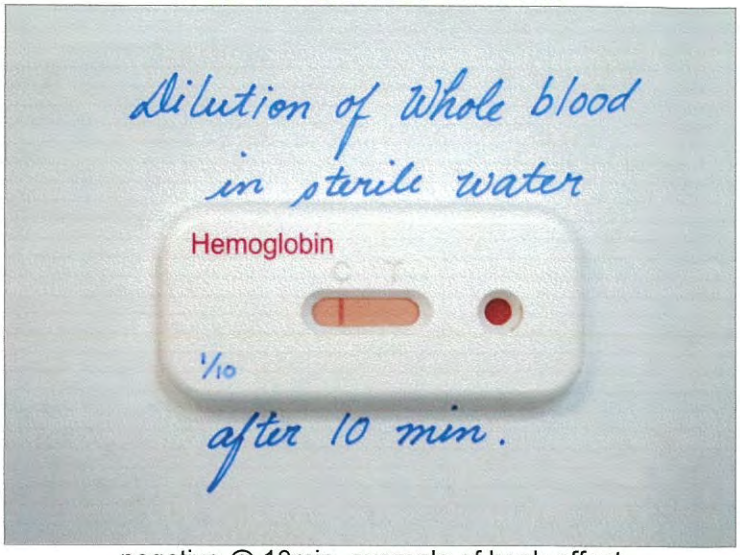
HemDirect Validation - Sensitivity

1/10 dilution in sterile water



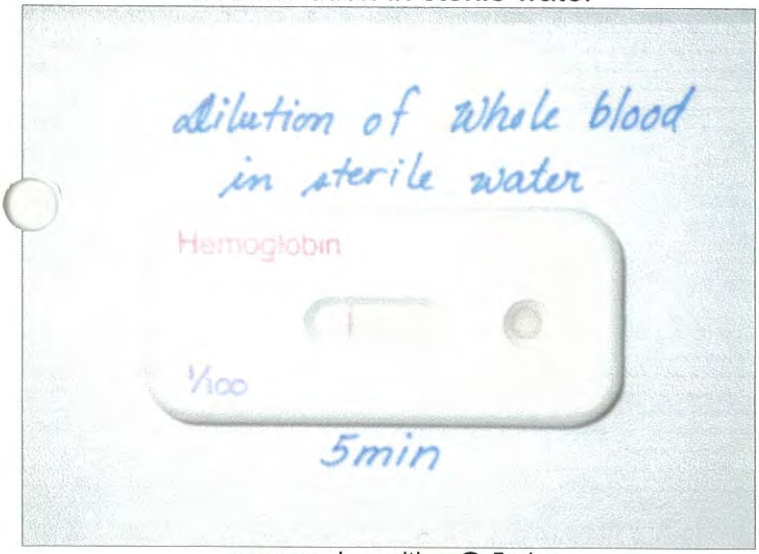
negative @ 5min, example of hook effect

1/10 dilution in sterile water



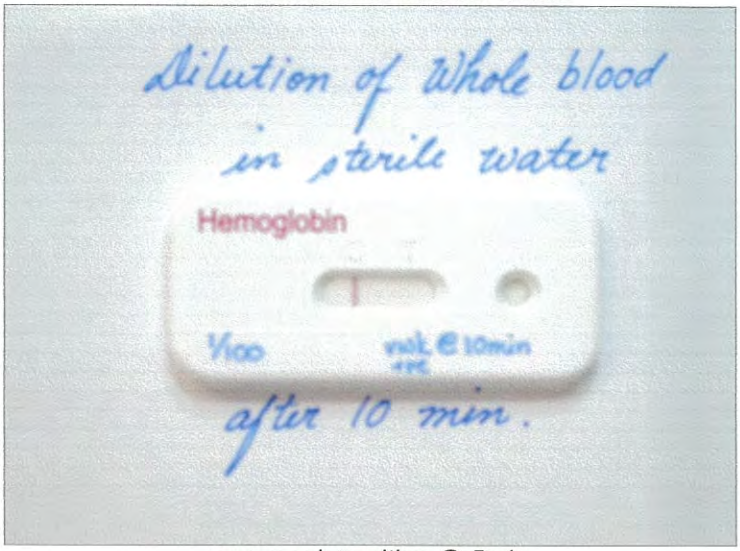
negative @ 10min, example of hook effect

1/100 dilution in sterile water



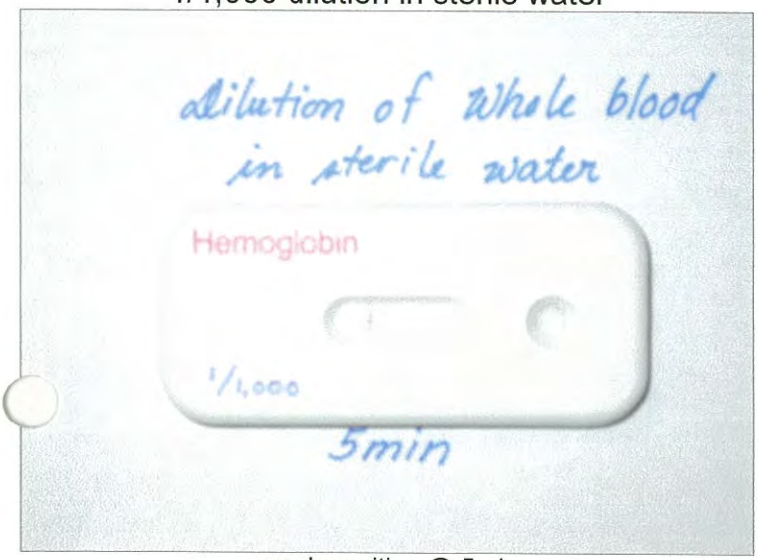
very weak positive @ 5min

1/100 dilution in sterile water



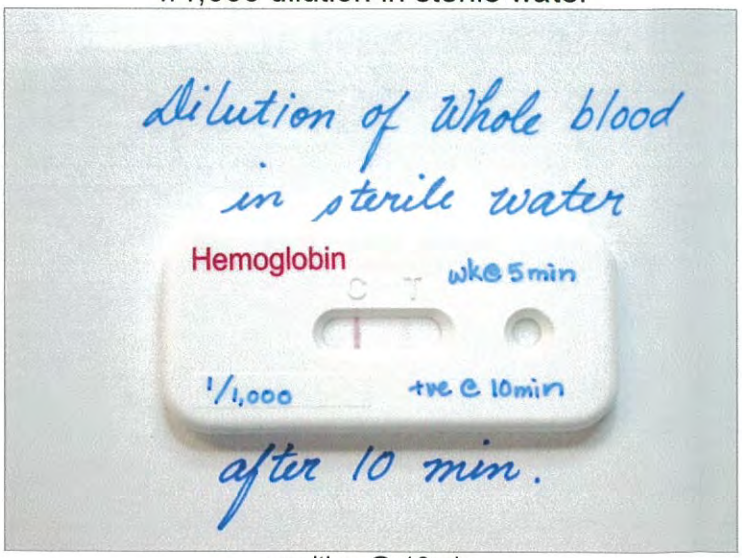
very weak positive @ 5min

1/1,000 dilution in sterile water



weak positive @ 5min

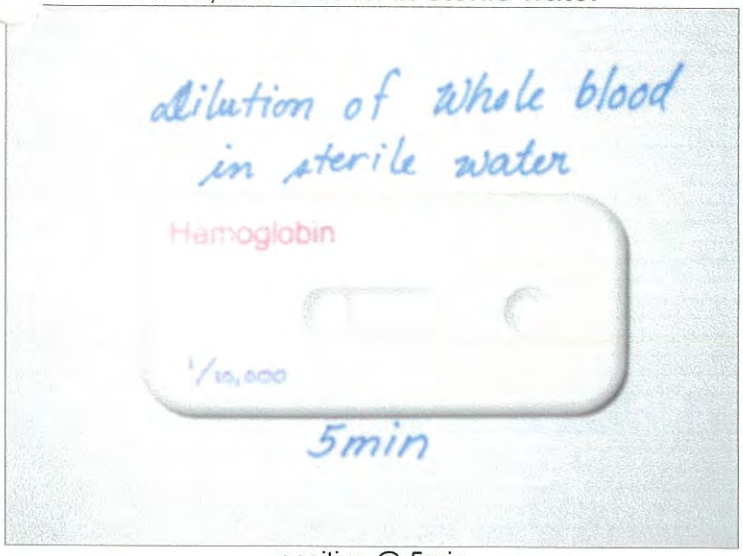
1/1,000 dilution in sterile water



positive @ 10min

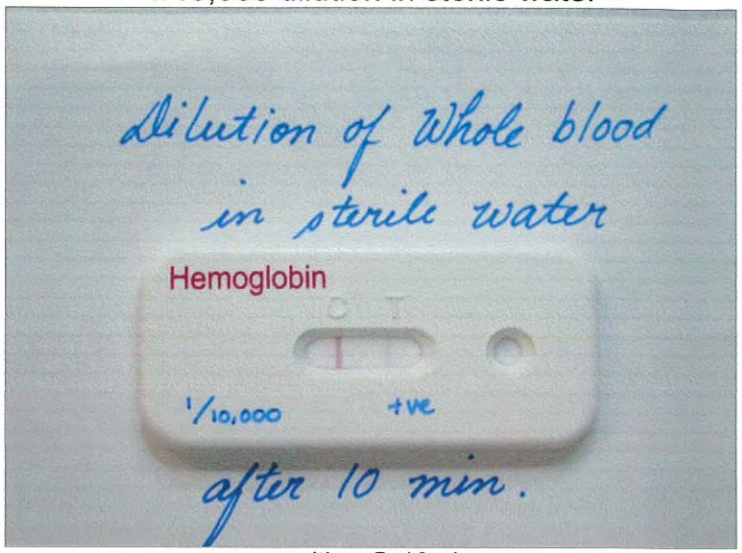
HemDirect Validation - Sensitivity

1/10,000 dilution in sterile water



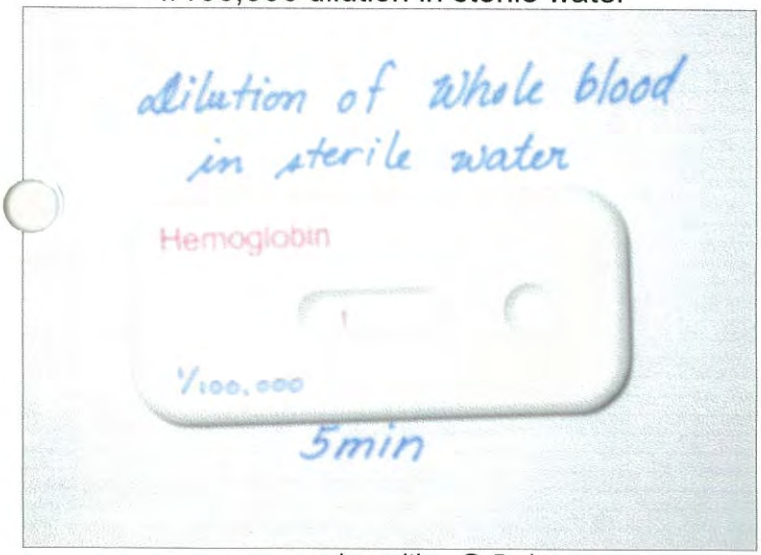
positive @ 5min

1/10,000 dilution in sterile water



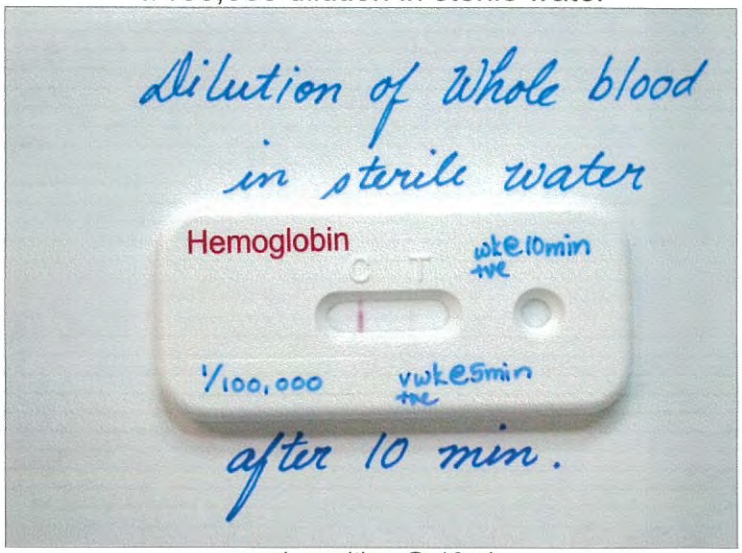
positive @ 10min

1/100,000 dilution in sterile water



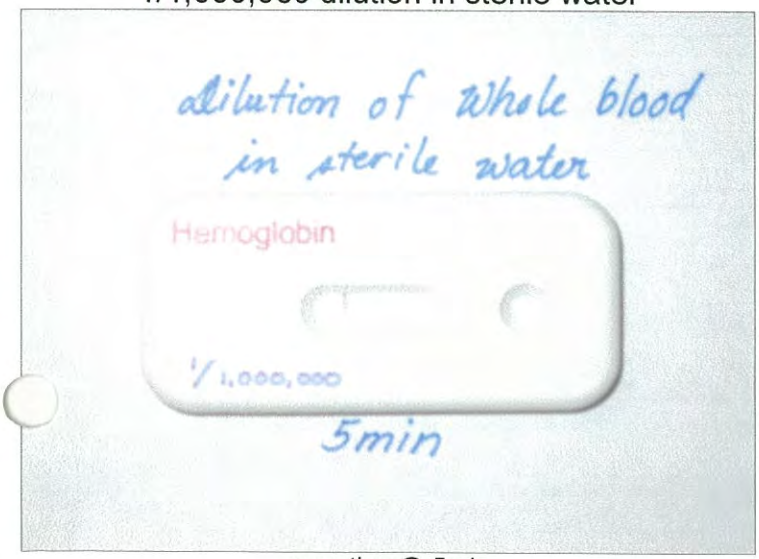
very weak positive @ 5min

1/100,000 dilution in sterile water



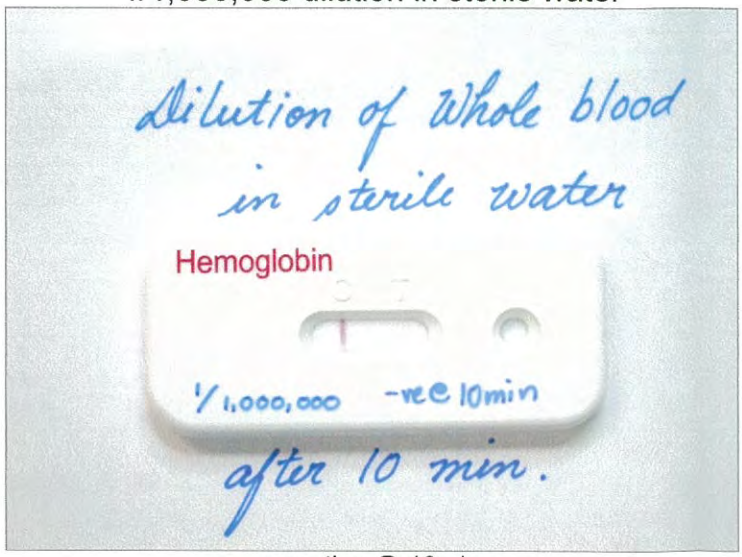
weak positive @ 10min

1/1,000,000 dilution in sterile water



negative @ 5min

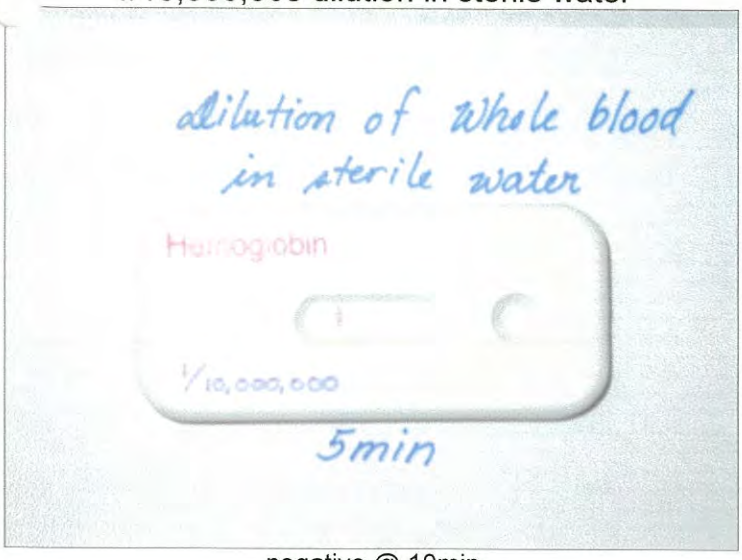
1/1,000,000 dilution in sterile water



negative @ 10min

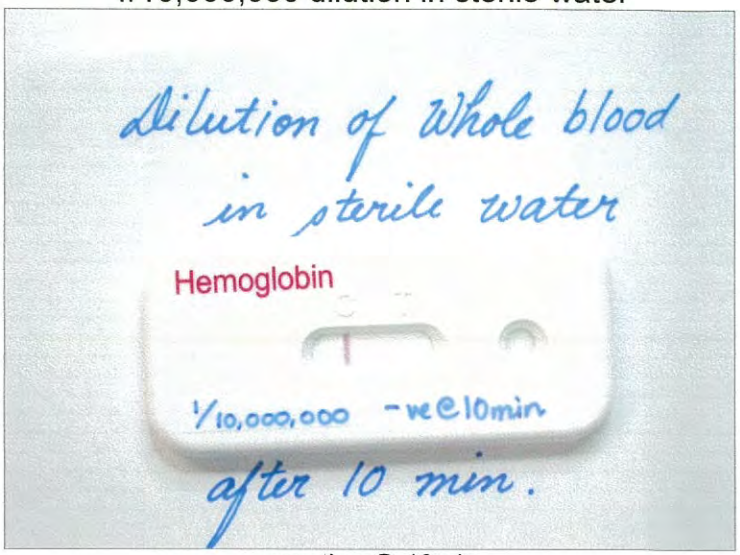
HemDirect Validation - Sensitivity

1/10,000,000 dilution in sterile water



negative @ 10min

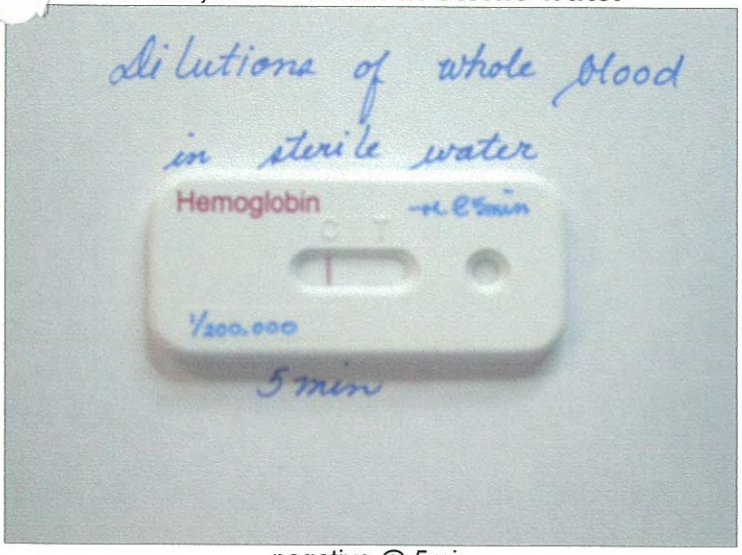
1/10,000,000 dilution in sterile water



negative @ 10min

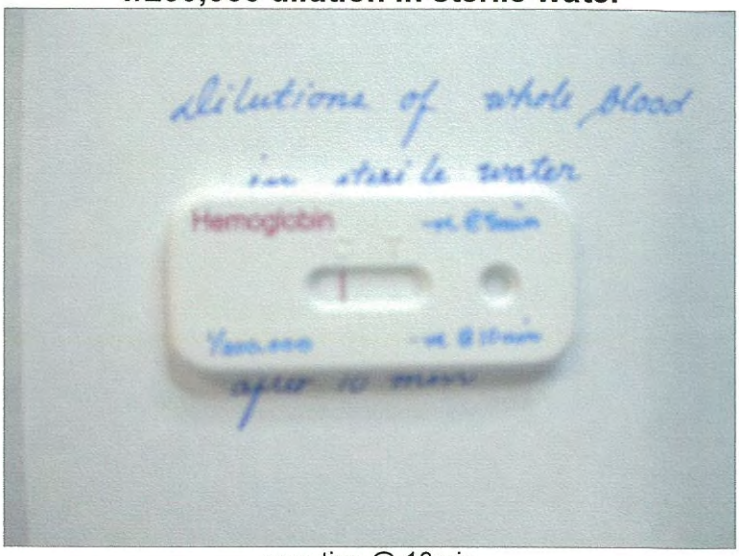
HemDirect Validation - Sensitivity

1/200,000 dilution in sterile water



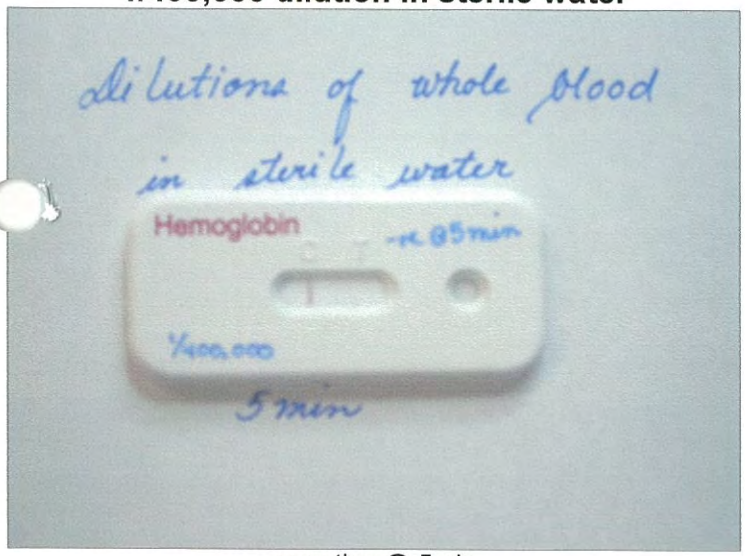
negative @ 5min

1/200,000 dilution in sterile water



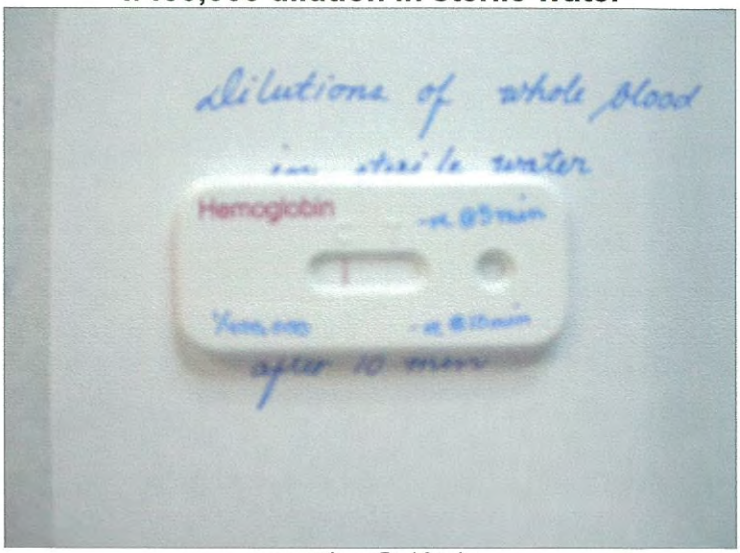
negative @ 10min

1/400,000 dilution in sterile water



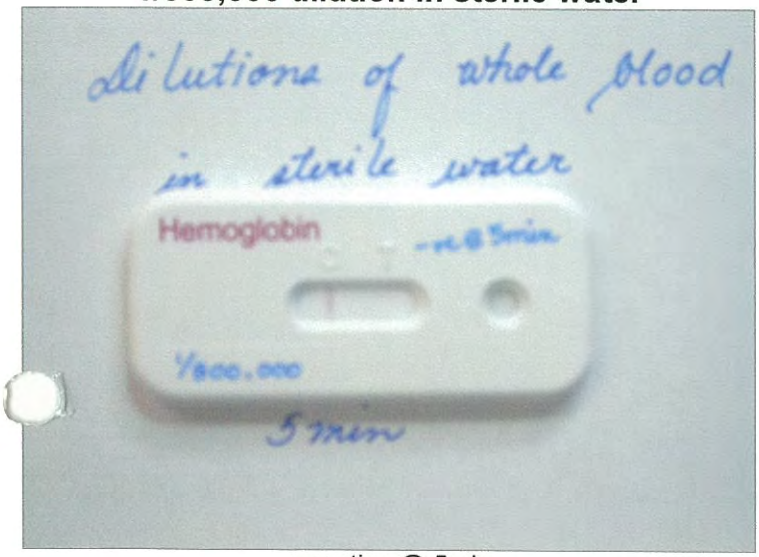
negative @ 5min

1/400,000 dilution in sterile water



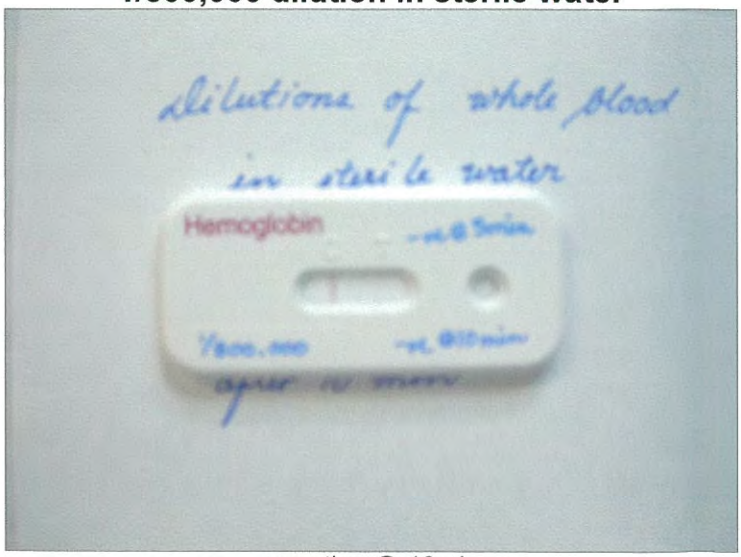
negative @ 10min

1/800,000 dilution in sterile water



negative @ 5min

1/800,000 dilution in sterile water



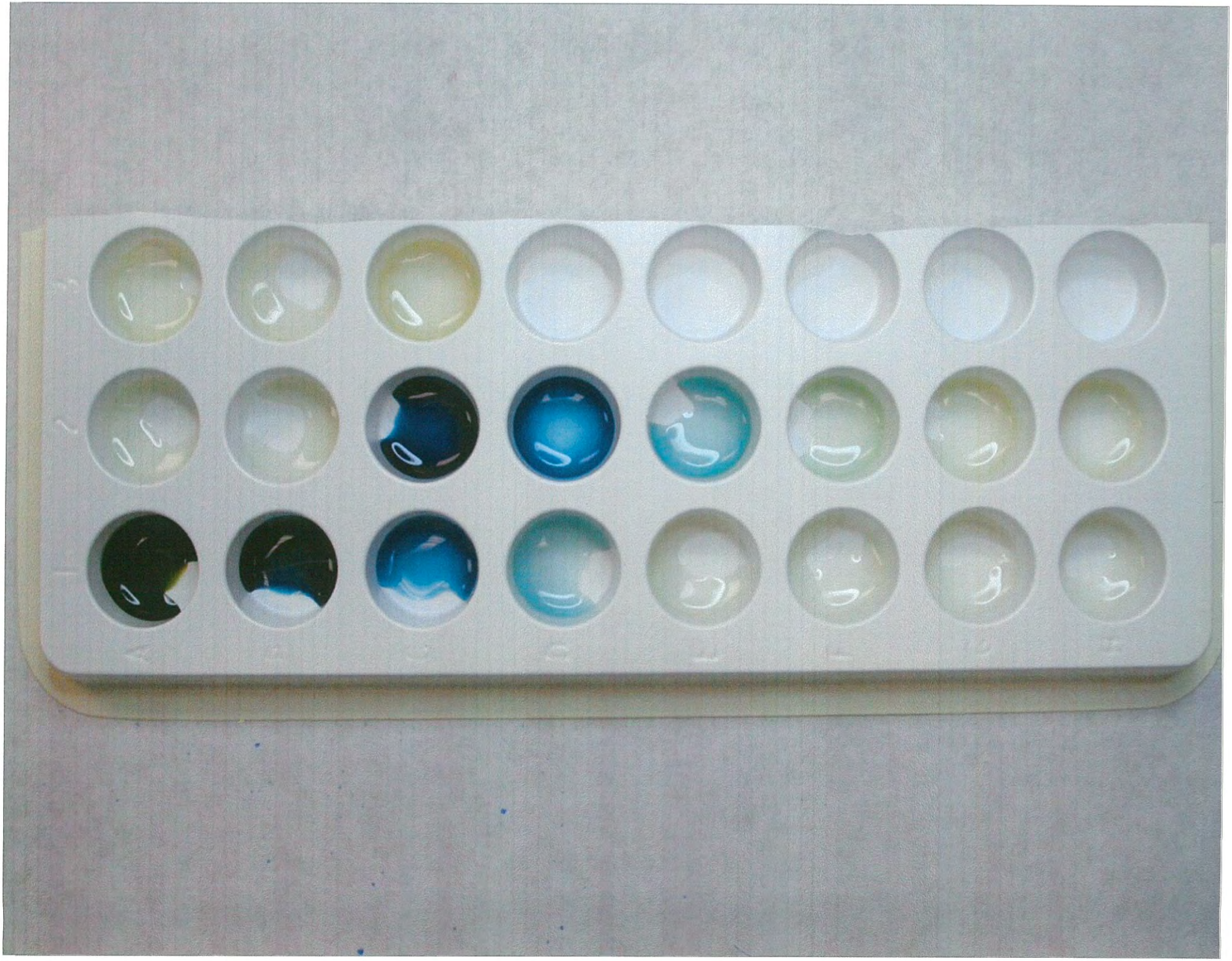
negative @ 10min

HemDirect Validation
Sensitivity
O-tol Titer Comparison

Row	Column 1	Column 2	Column 3
A	1/10 dil'n in water	1/1M dil'n in water	1/20M dil'n in kit buffer
B	1/100 dil'n in water	1/10M dil'n in water	water
C	1/1K dil'n in water	1/100 dil'n in kit buffer	kit buffer
D	1/10K dil'n in water	1/1K dil'n in kit buffer	
E	1/100K dil'n in water	1/10K dil'n in kit buffer	
F	1/200K dil'n in water	1/100K dil'n in kit buffer	
G	1/400K dil'n in water	1/1M dil'n in kit buffer	
H	1/800K dil'n in water	1/10M dil'n in kit buffer	

NOTES:
Sterile Water #3967
O-tol #4017
10% Hydrogen Peroxide #4018
HemDirect Kit Buffer #11492

HE DIRECT VALIDATION: O- OL TITER COMPARISON



ANTI HUMAN

A420 Lot #726 Host Animal: Rabbit

Freeze Dried Product. Reconstitute with one (1) ml deionized water.
SERI antisera for species determination are quality control tested by both SERI and the manufacturer. Cross-over electrophoresis is utilized to test for species cross-reactivity. The results of sensitivity tests are tabulated below. Titers are for comparison purposes only.

Species Serum	Crossover Result
Bovine	neg
Cat	neg
Chicken	neg
Deer	neg
Dog	neg
Duck	neg
Elk	neg
Goat	neg
Horse	neg

Species Serum	Crossover Result
Human	pos
Monkey	pos
Moose	neg
Mouse	neg
Pigeon	neg
Rabbit	neg
Rat	neg
Sheep	neg
Swine	neg
Turkey	neg

TITER: vs whole serum dilutions | Crossover 1/100K | Diffusion 1/6400

KEY: Blank = Not Tested | pos = positive | neg = negative | wk = weak positive

Serological Research Institute, Richmond, CA 94806

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1

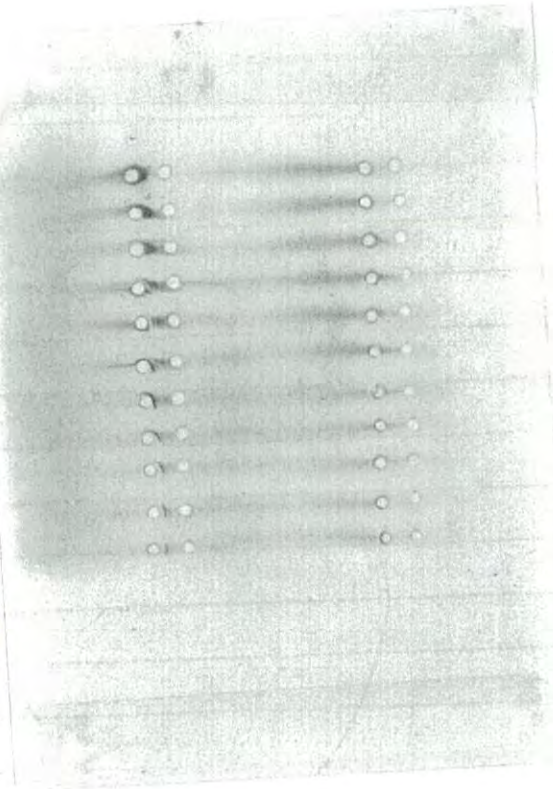
1379

i 9/03

120 V, 30 min

#726 α Human (1:1) +ve

	#1850 Human Serum
+ve	(1/100)
+ve	(1/200)
+ve	(1/400)
+ve	(1/800)
+ve	(1/1600)
+ve	(1/3200)
+ve	(1/6400)
+ve	(1/12,800)
+ve	(1/25,600)
+ve	(1/51,200)
+ve	(1/102,400)



#725 α Bovine (1:1) -ve

	#1575 Bovine Serum
-ve	(1/200)
+ve	(1/400)
+ve	(1/800)
+ve	(1/1600)
+ve	(1/3200)
+ve	(1/6400)
wk +ve	(1/12,800)
wk +ve	(1/25,600)
-ve	(1/51,200)
-ve	(1/102,400)

Note: BW wants insert saying crossover titer is 1/100 K. We have not done this in the past. Always have reported 12.5 K on the insert. Tube test has been dropped from the insert.

SERI

ANTI HUMAN

A420 Lot #728 Host Animal: Rabbit

Freeze Dried Product. Reconstitute with one (1) ml deionized water. SERI antisera for species determination are quality control tested by both SERI and the manufacturer. Cross-over electrophoresis is utilized to test for species cross-reactivity. The results of sensitivity tests are tabulated below. Titers are for comparison purposes only.

Species Serum	Crossover Result
Bovine	neg
Cat	neg
Chicken	neg
Deer	neg
Dog	neg
Duck	neg
Elk	neg
Goat	neg
Horse	neg

Species Serum	Crossover Result
Human	pos
Monkey	pos
Moose	neg
Mouse	neg
Pigeon	neg
Rabbit	neg
Rat	neg
Sheep	neg
Swine	neg
Turkey	neg

TITER: vs whole serum dilutions — Crossover 1/25K — Gel Diffusion 1:6400

KEY: Blank = Not Tested — pos = positive — neg = negative — wk = weak positive

Serological Research Institute, Richmond, CA 94806

SERI
Lot ~~718~~ 728 Rabbit α HU

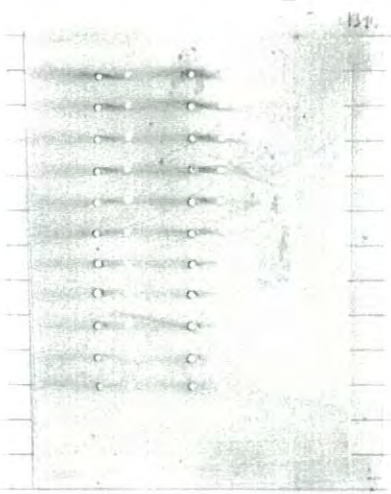
1397 α Human Titer AB 5/10/05
1% E25 gel 120V, 40MA 30min

α human
lot 728
Reconstituted
in 1mL
Sterile dH_2O

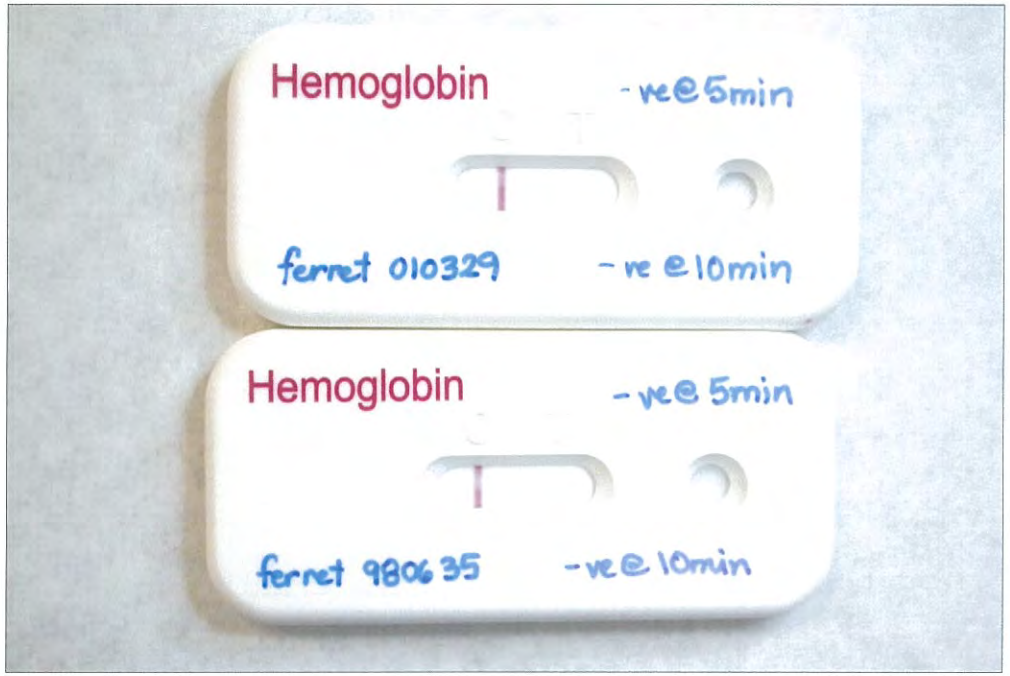
human
Serum
Lot 1850

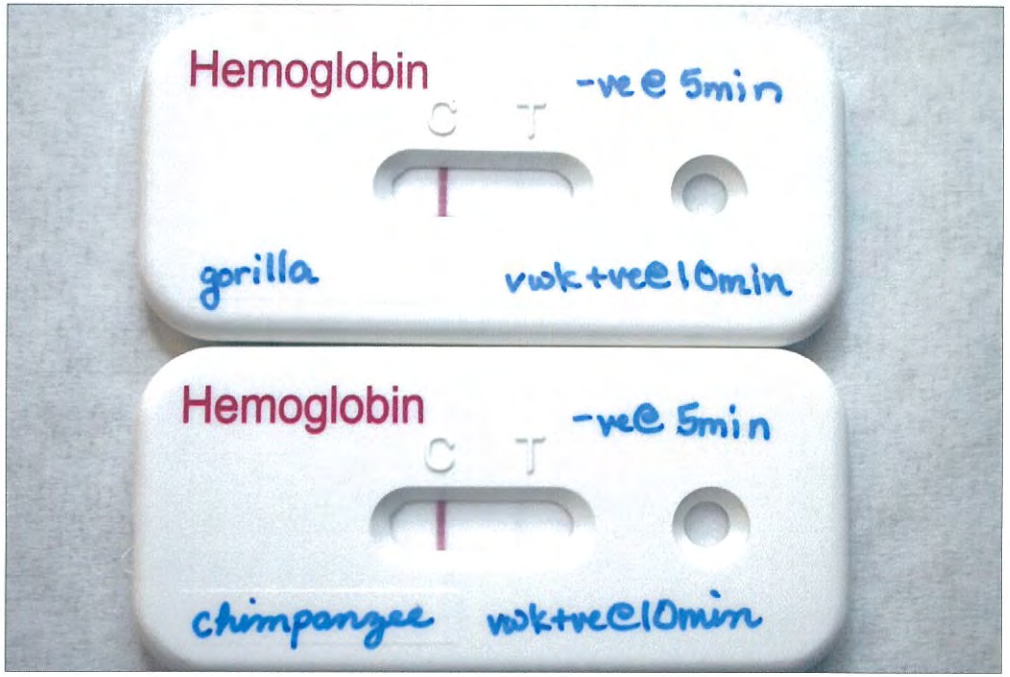
α human		Human Serum
	+	1/100
	+	1/200
	+	1/400
	+	1/800
	+	1/1600
	+	1/3200
	+	1/6400
	+	1/12800
	+	1/25600
	+	1/51200
	WK+	1/102400
	VWK+	1/204800

α human		Human Serum
	+	1/100
	+	1/200
	+	1/400
	+	1/800
	+	1/1600
	+	1/3200
	+	1/6400
	+	1/12800
	+	1/25600
	+	1/51200
	WK+	1/102400
	VWK+	1/204800



HEMDIRECT: SPECIES CROSSREACTIVITY

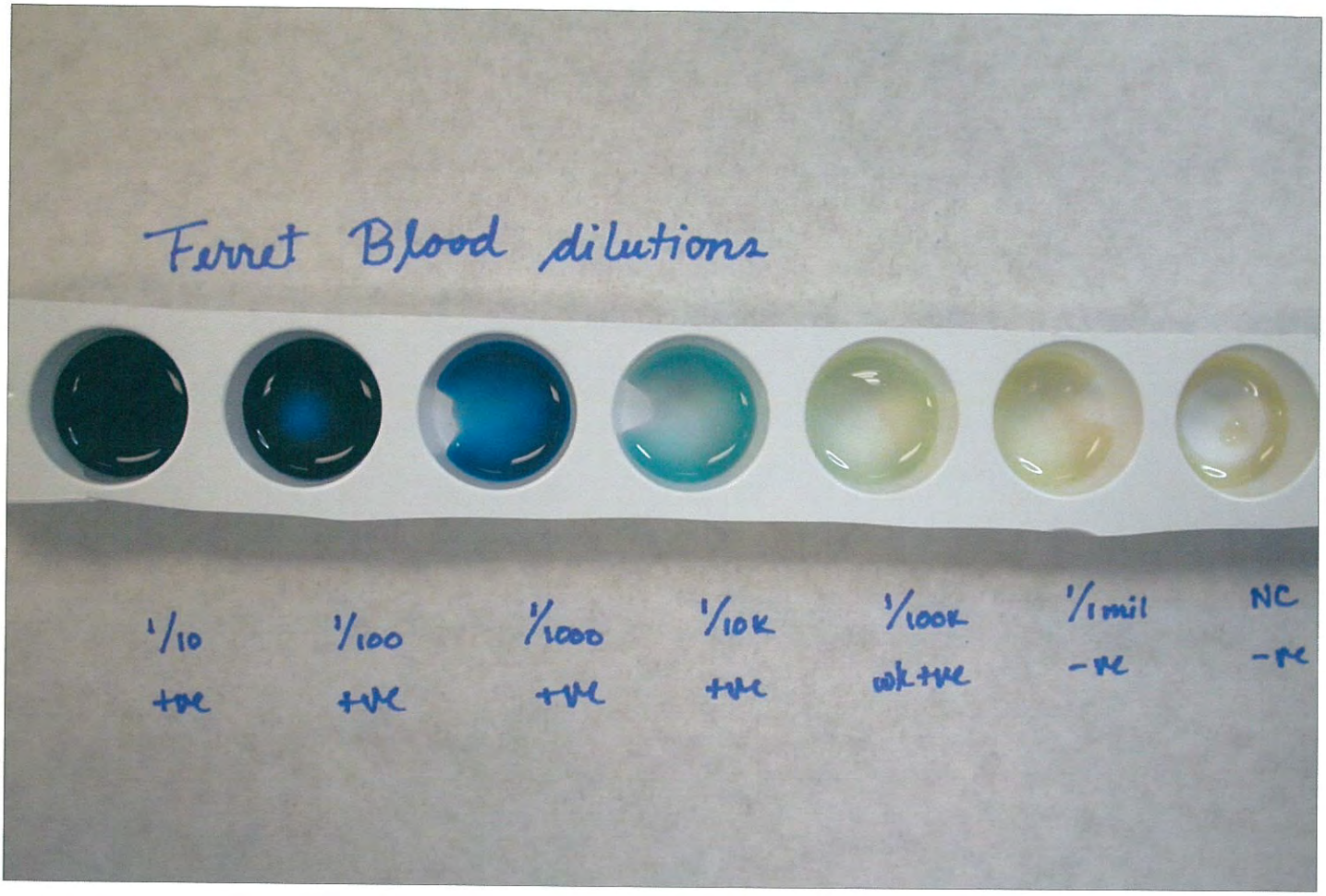






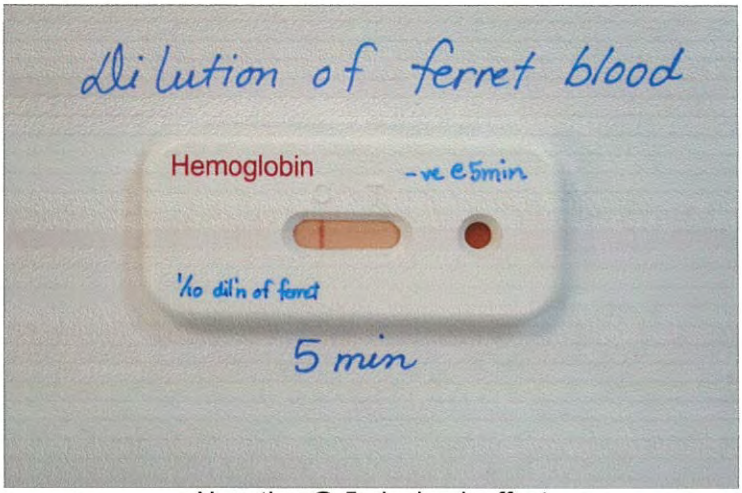
Samples of Animal Blood on slides obtained from Dale Laux, Ohio BCI.

HEMDIRECT: FERRET O-TOL TITER



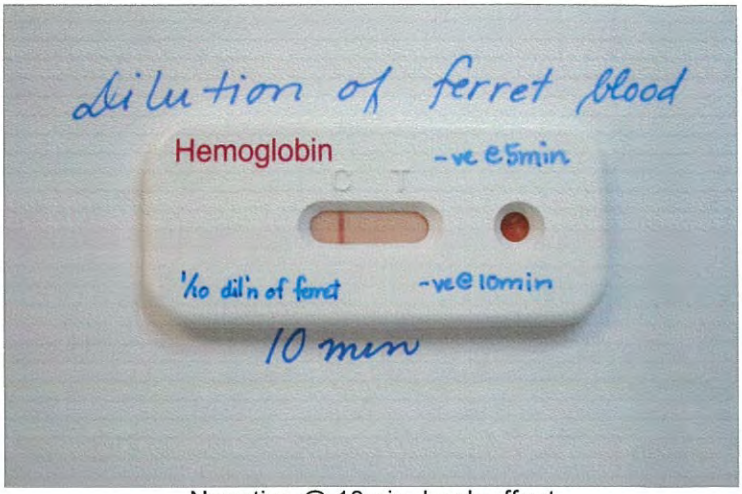
HEMDIRECT FERRET CROSSREACTION

1/10 DILUTION WHOLE FERRET BLOOD



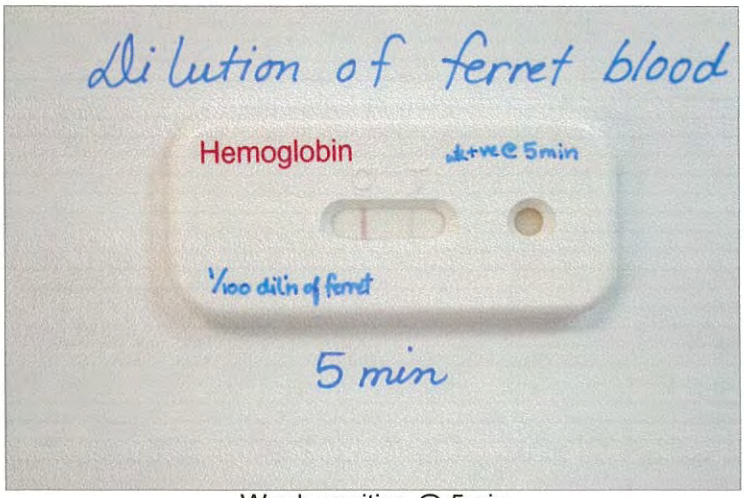
Negative @ 5min, hook effect

1/10 DILUTION WHOLE FERRET BLOOD



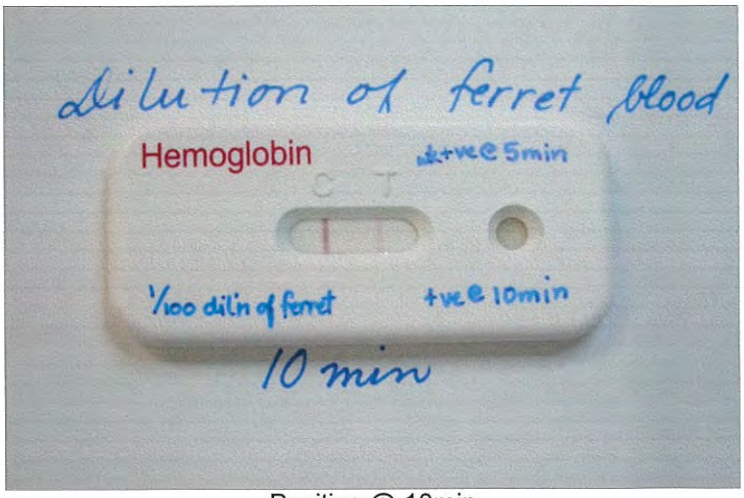
Negative @ 10min, hook effect

1/100 DILUTION WHOLE FERRET BLOOD



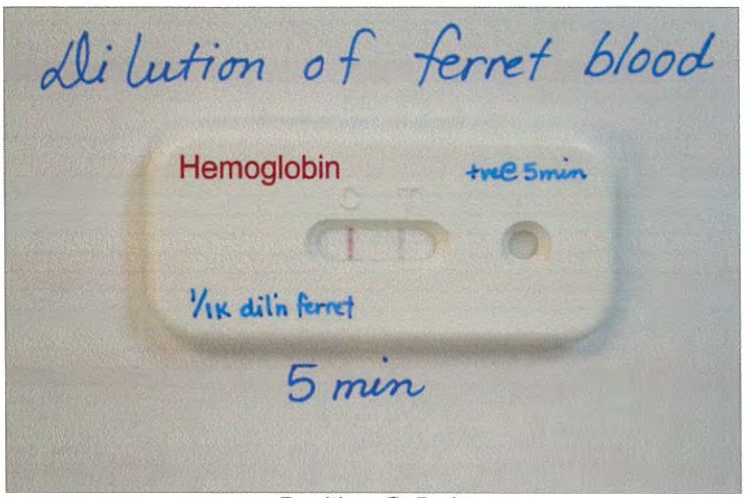
Weak positive @ 5min

1/100 DILUTION WHOLE FERRET BLOOD



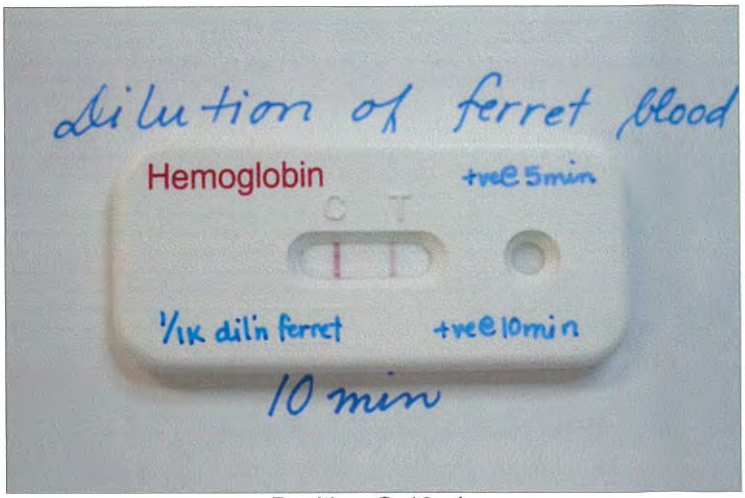
Positive @ 10min

1/1K DILUTION WHOLE FERRET BLOOD



Positive @ 5min

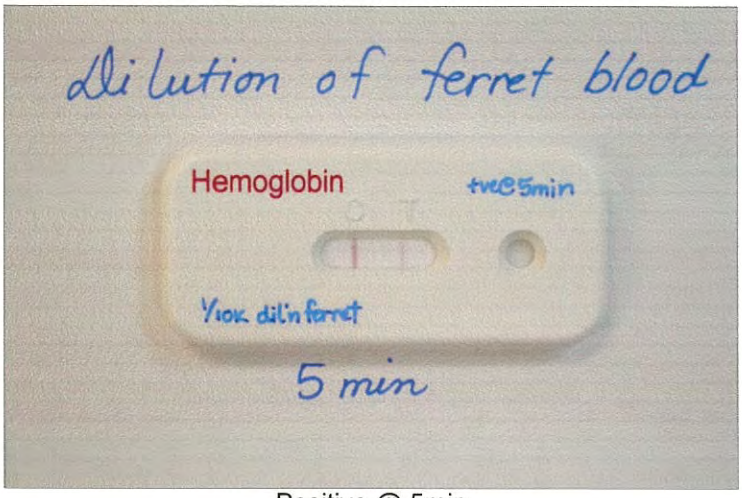
1/1K DILUTION WHOLE FERRET BLOOD



Positive @ 10min

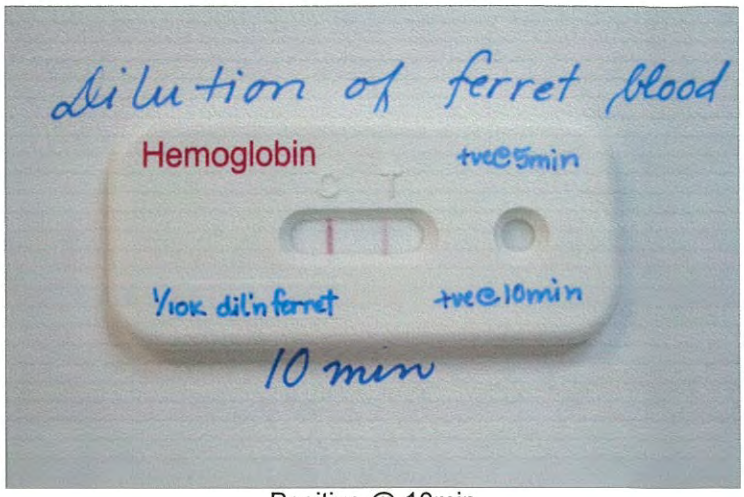
HEMDIRECT FERRET CROSSREACTION

1/10K DILUTION WHOLE FERRET BLOOD



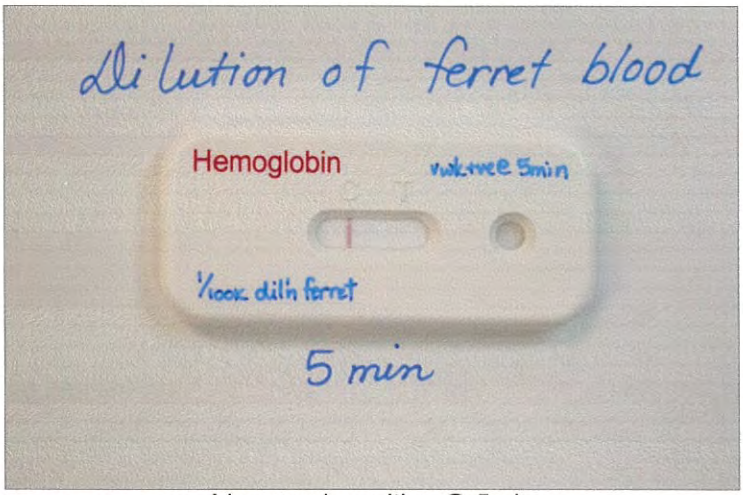
Positive @ 5min

1/10K DILUTION WHOLE FERRET BLOOD



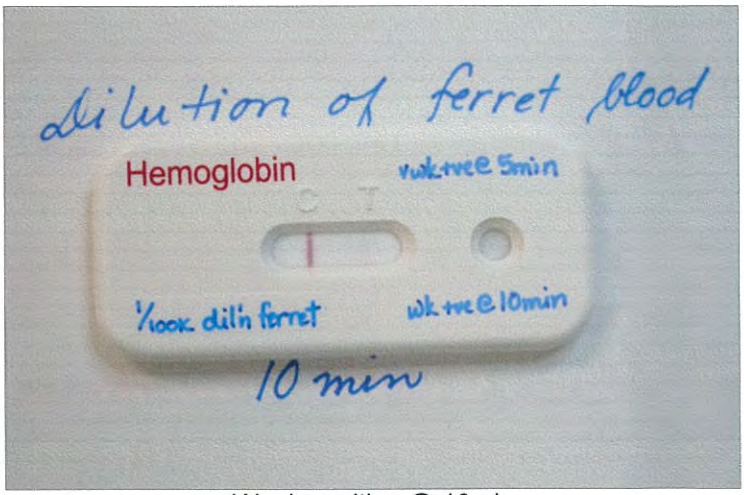
Positive @ 10min

1/100K DILUTION WHOLE FERRET BLOOD



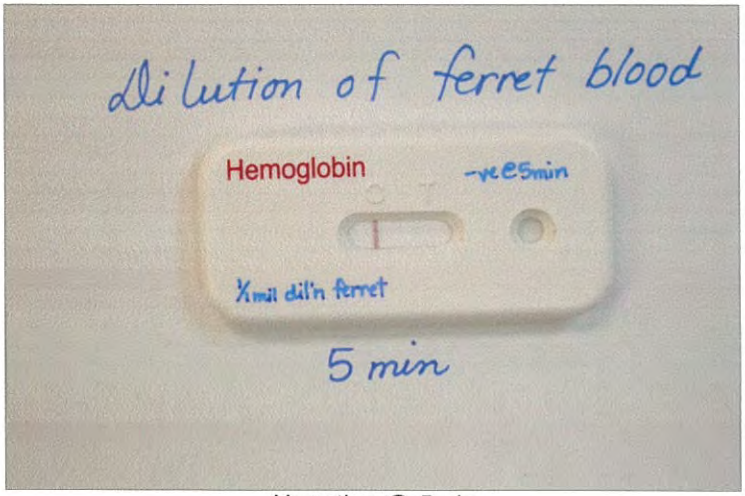
Very weak positive @ 5min

1/100K DILUTION WHOLE FERRET BLOOD



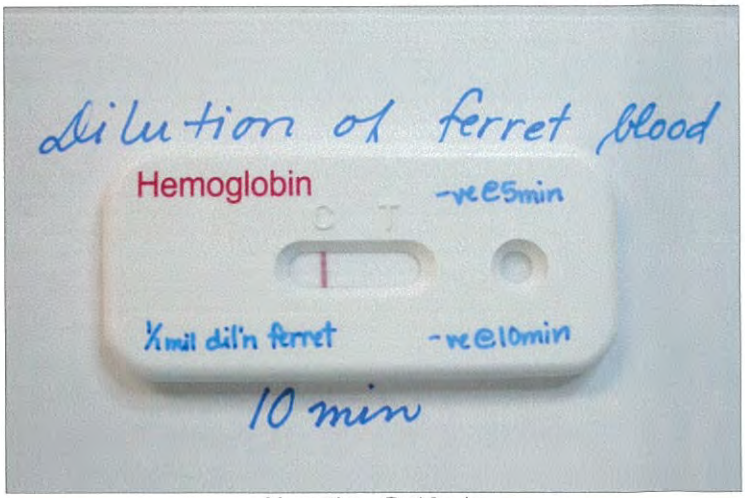
Weak positive @ 10min

1/1MIL DILUTION WHOLE FERRET BLOOD



Negative @ 5min

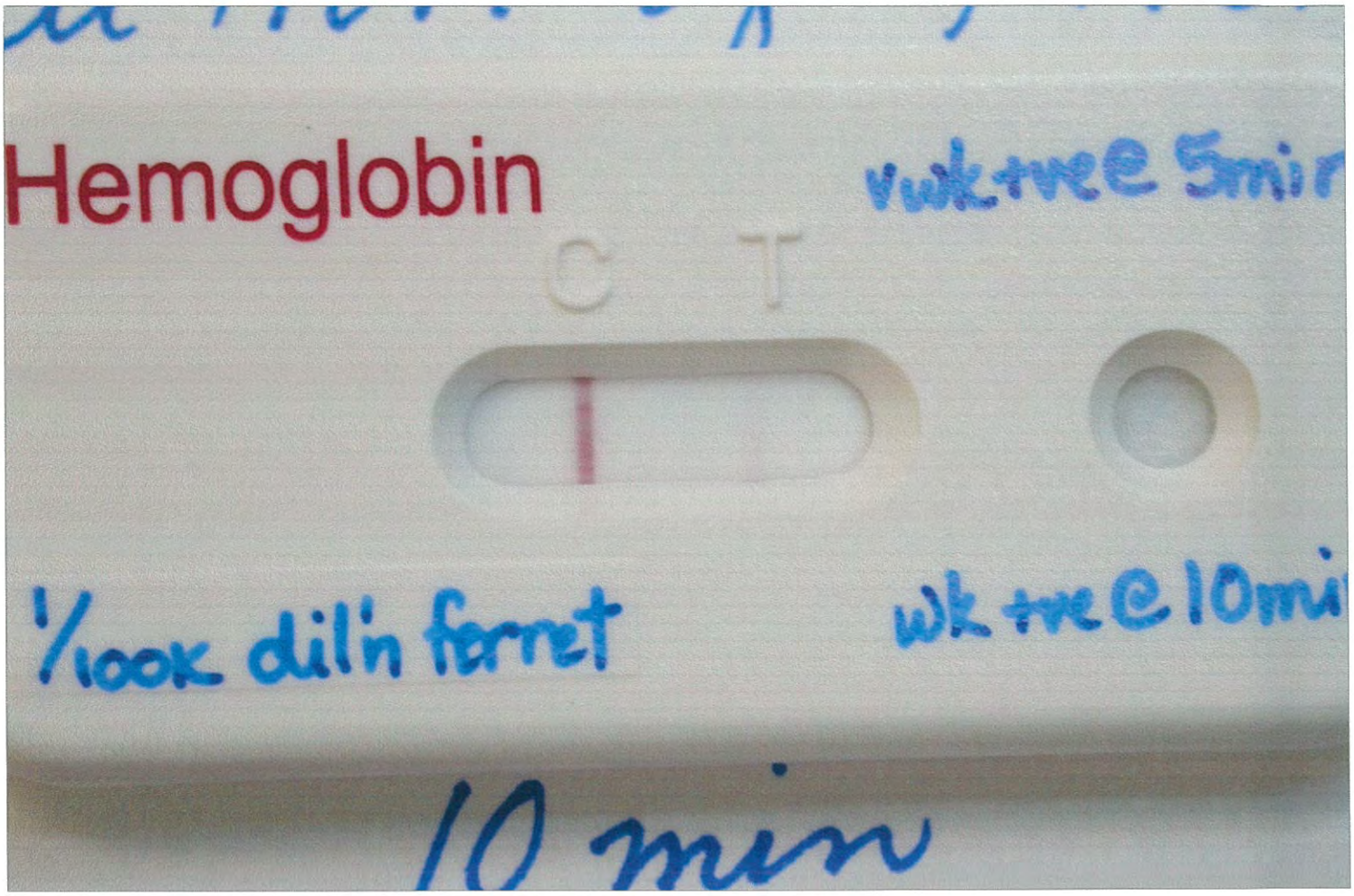
1/1MIL DILUTION WHOLE FERRET BLOOD



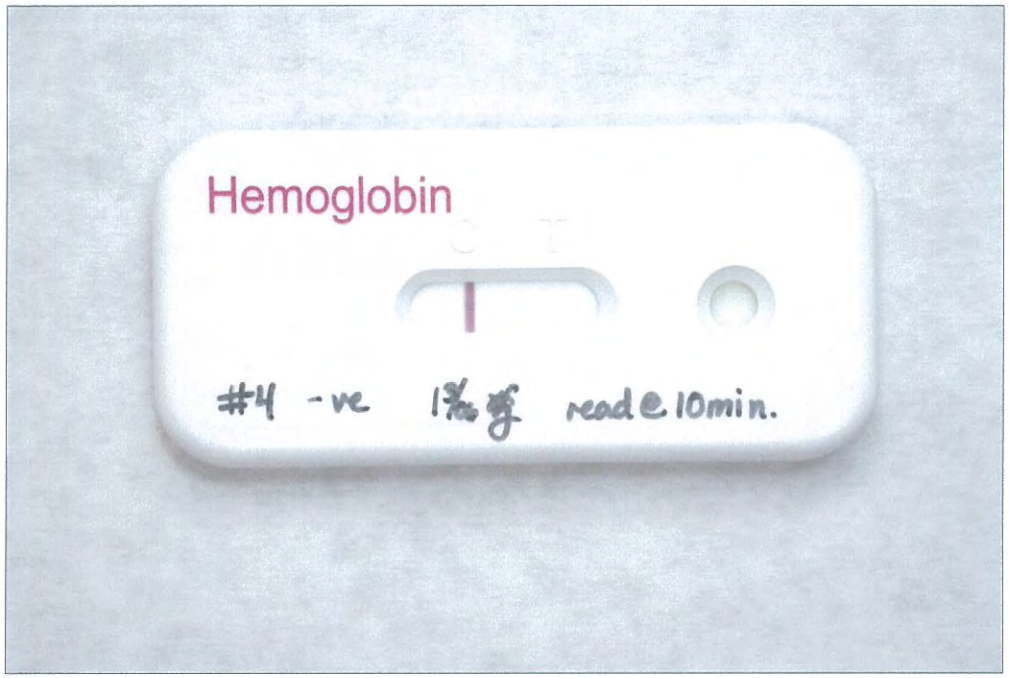
Negative @ 10min

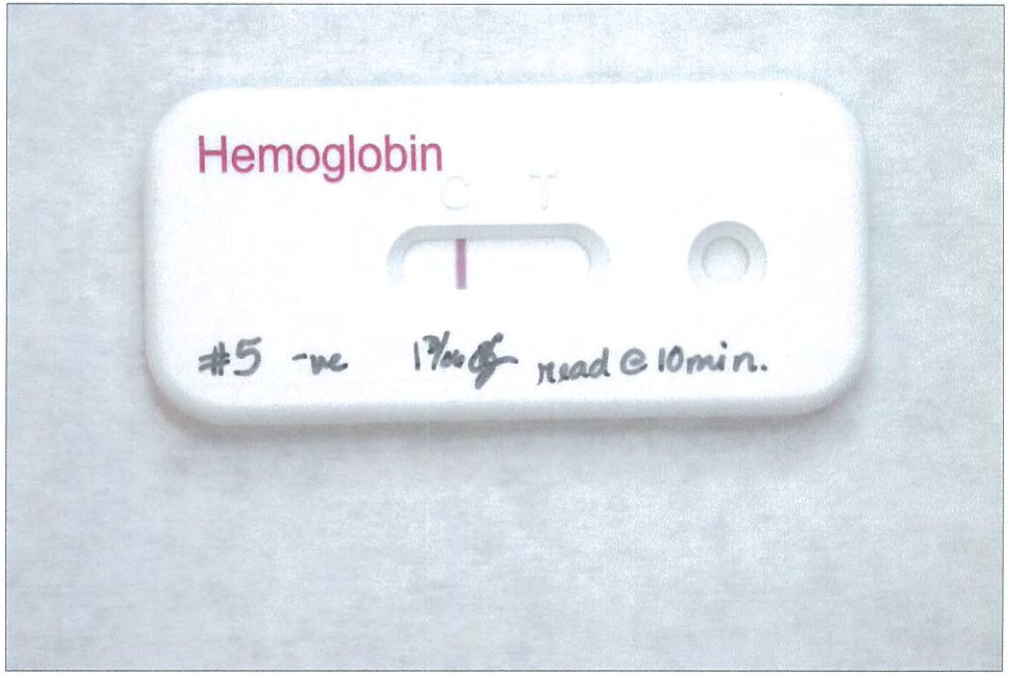
HEMDIRECT FERRET CROSSREACTION

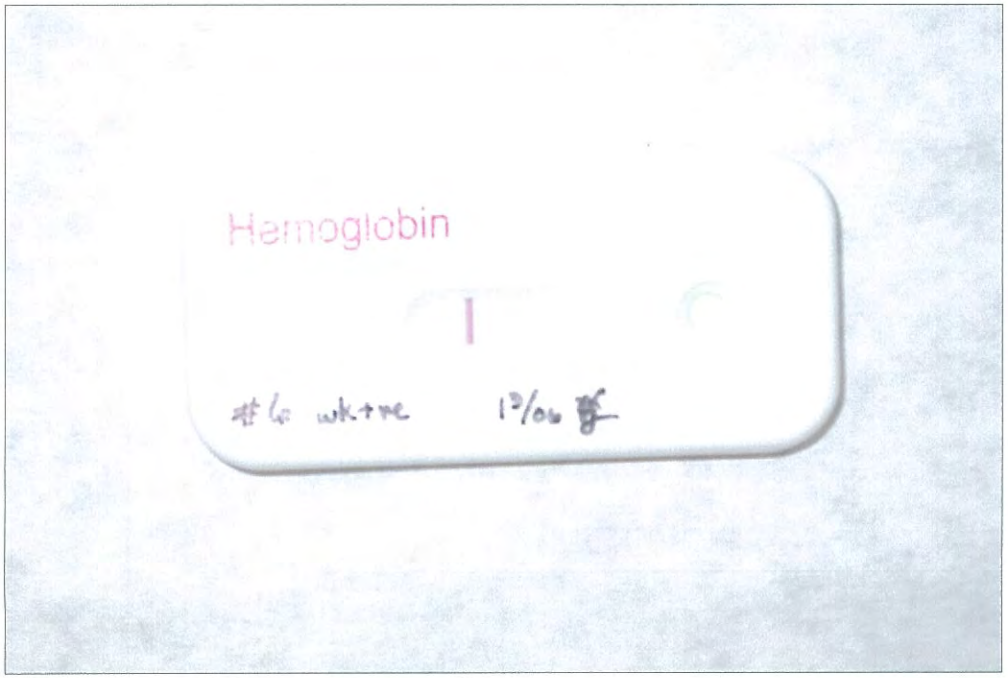
REACTION ENDPOINT AT 1/100K DILUTION

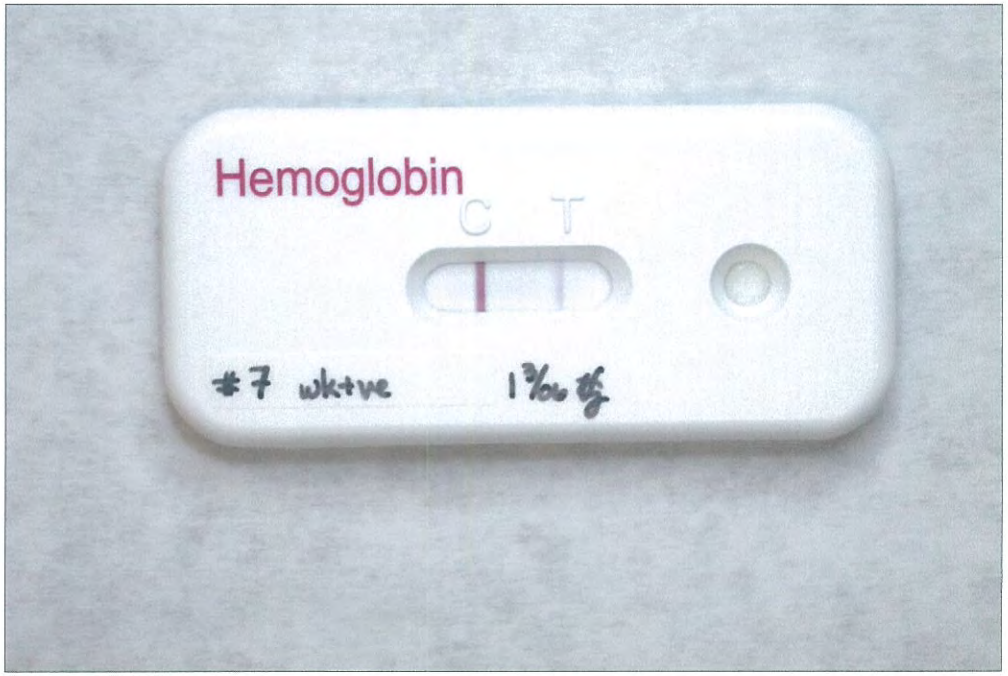


HEMDIRECT VALIDATION

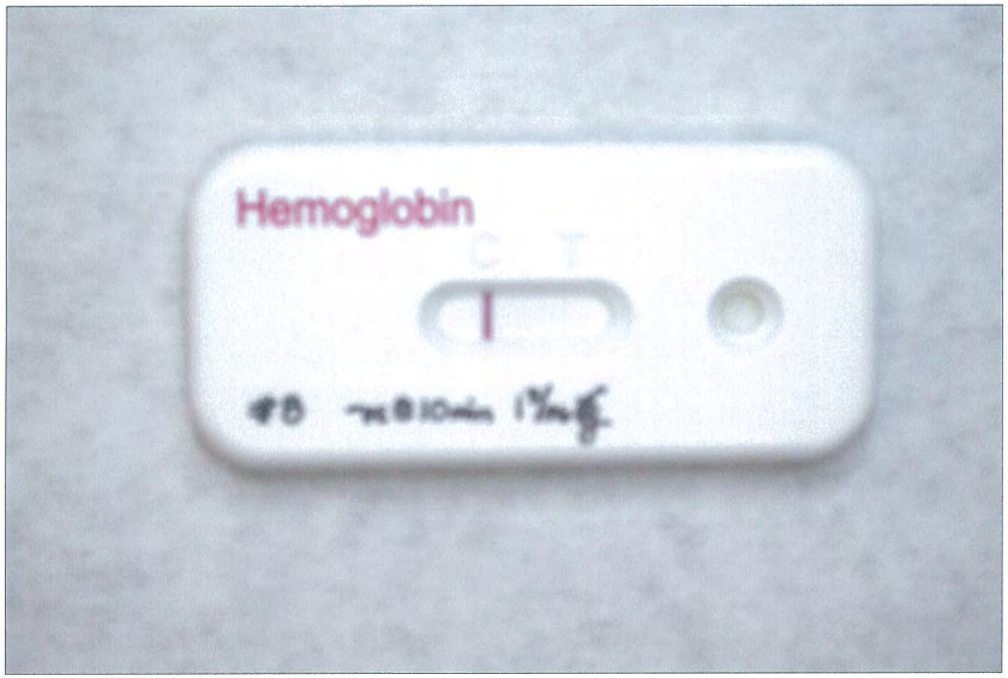


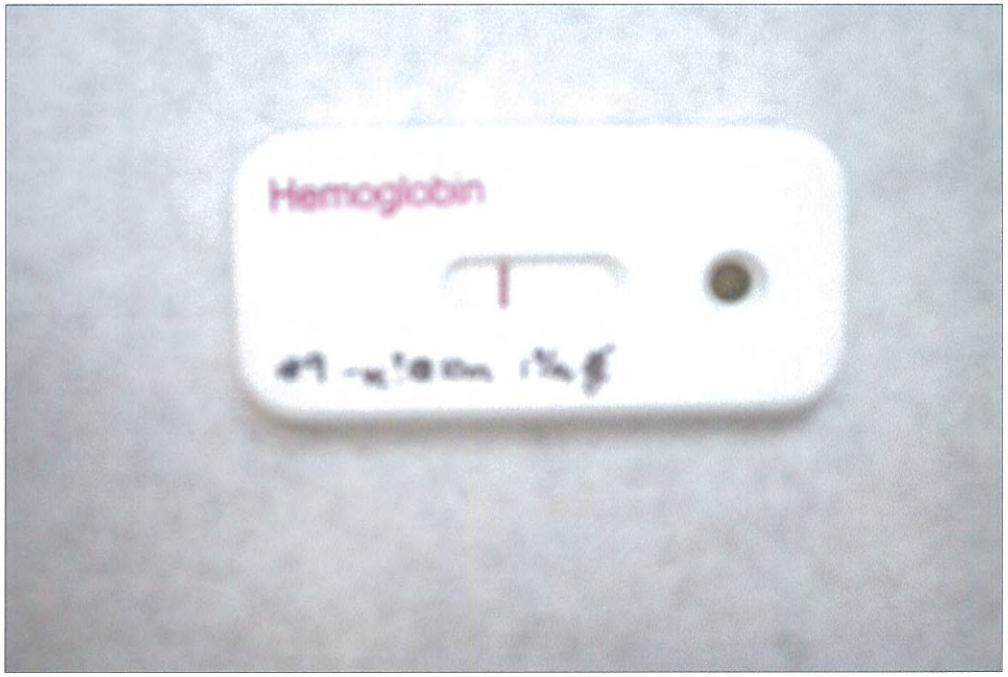


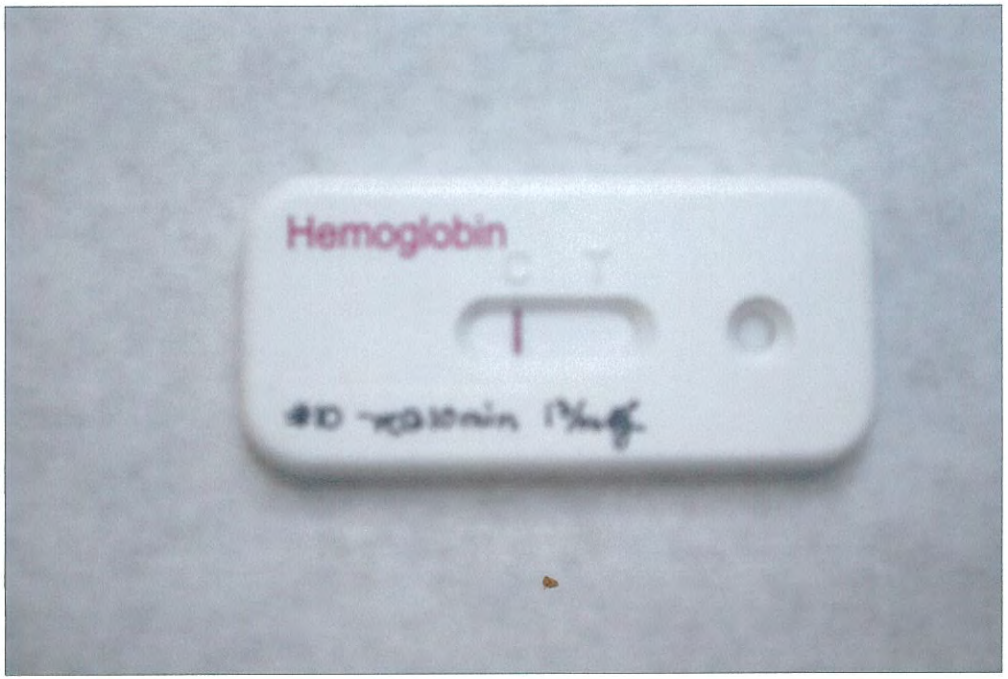


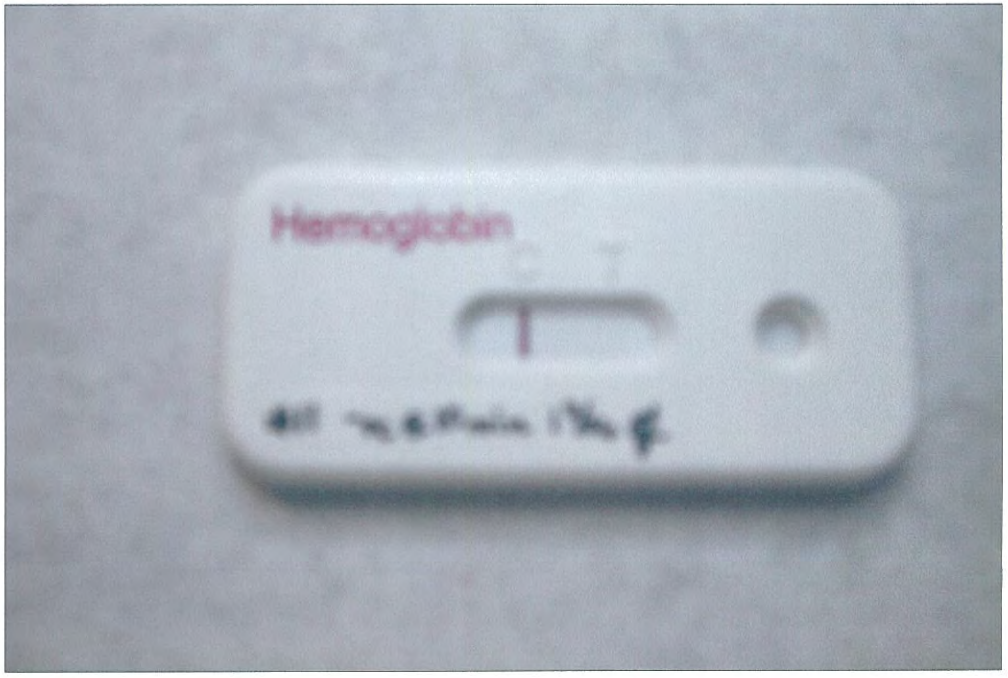


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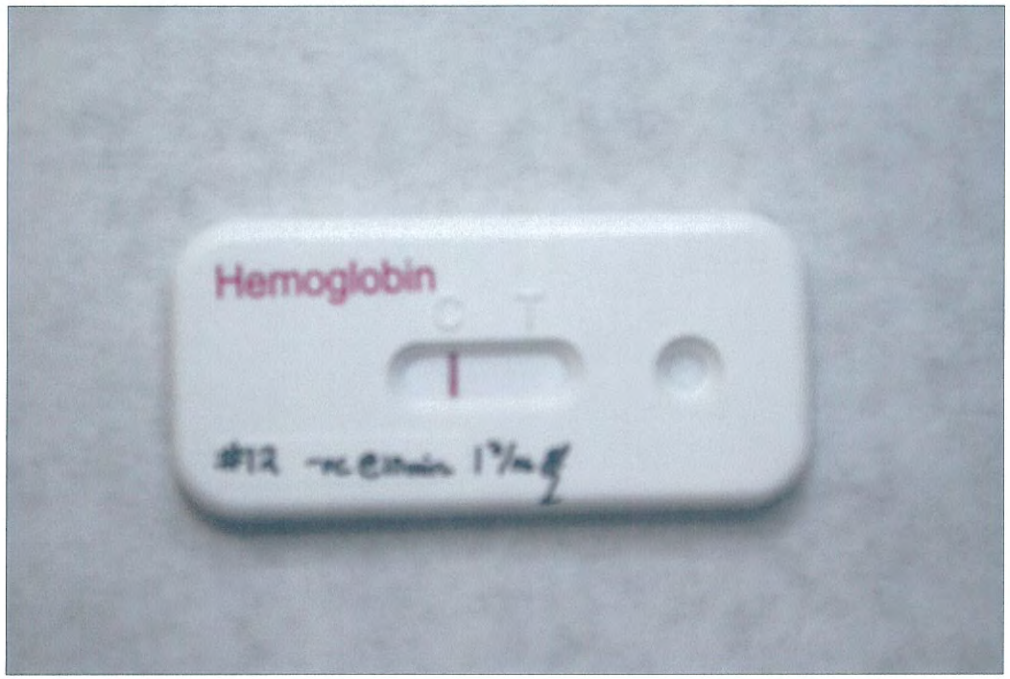


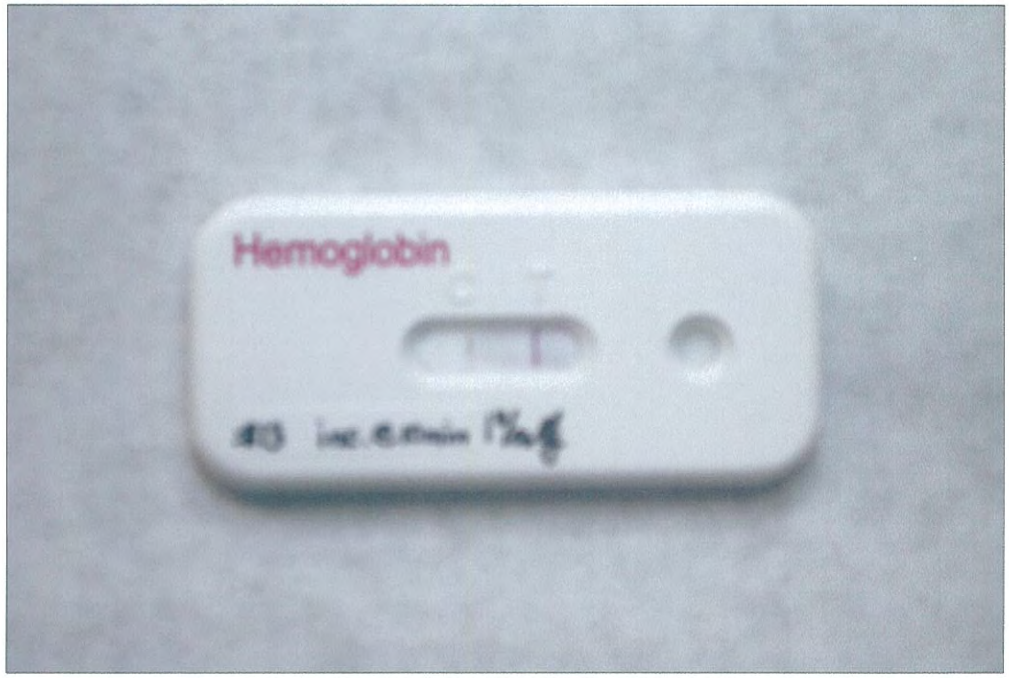


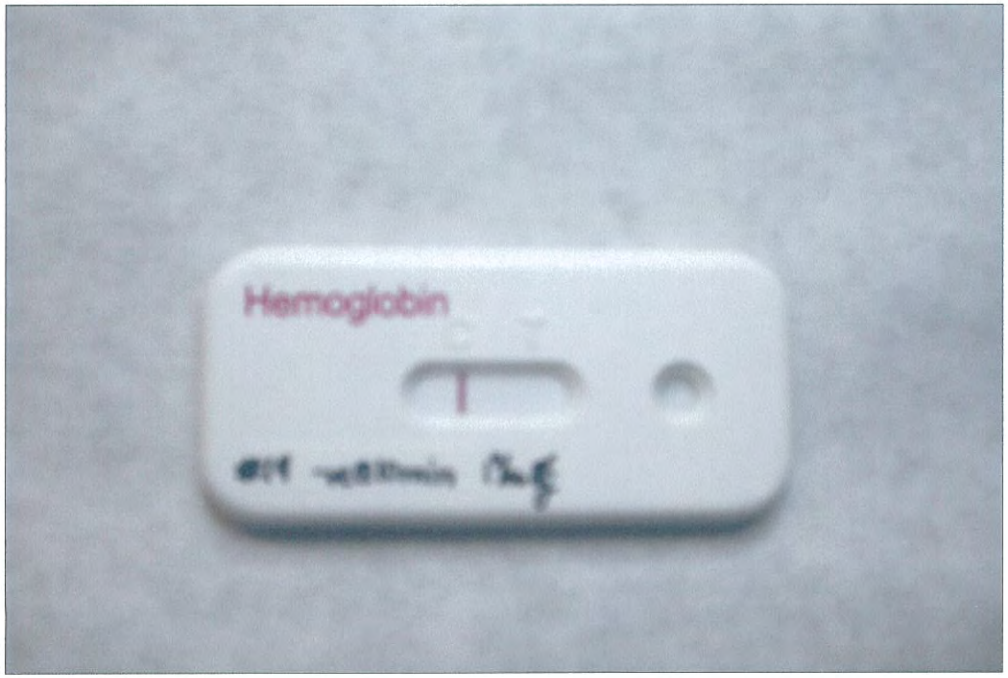


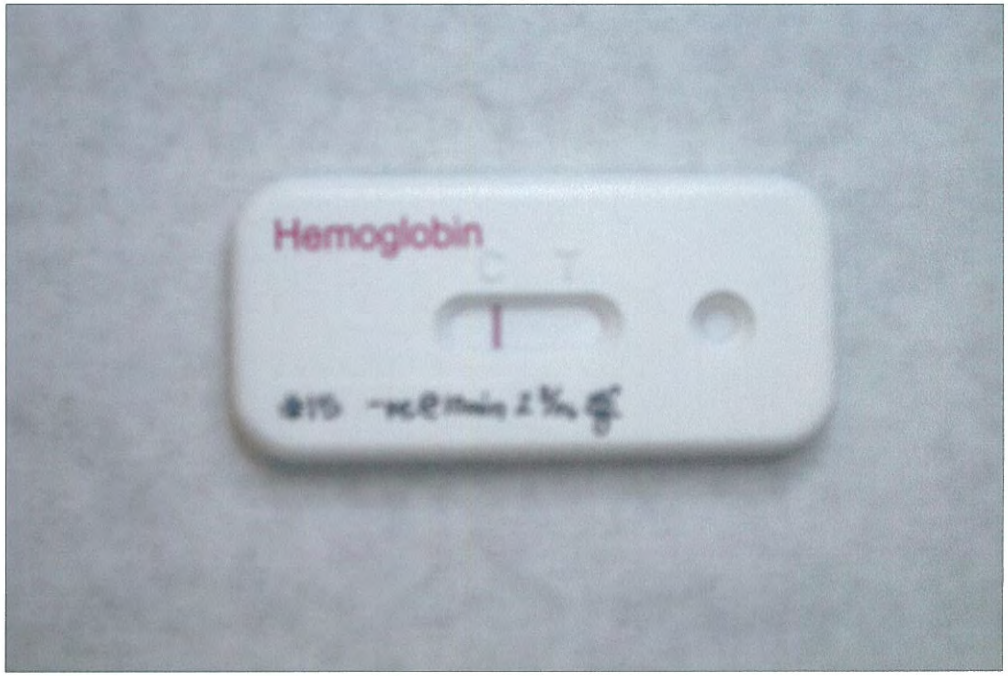


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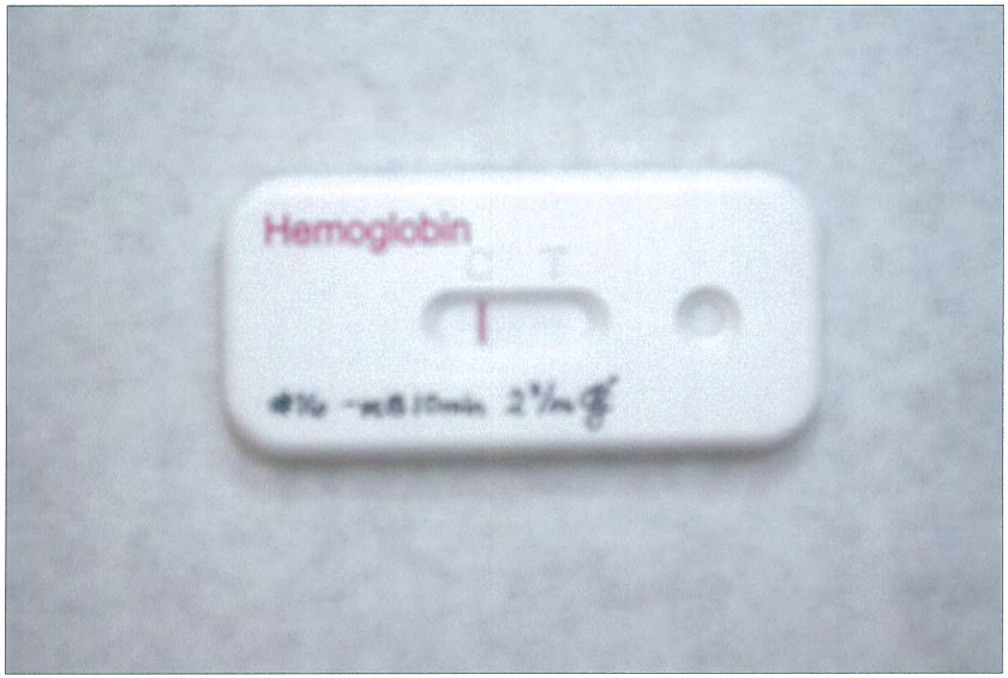


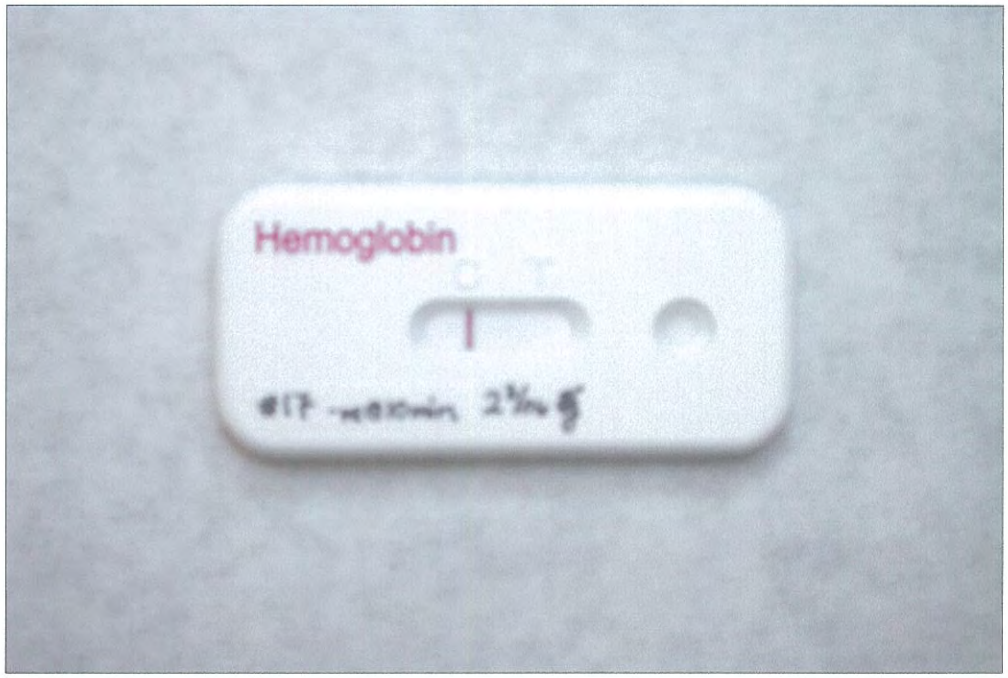


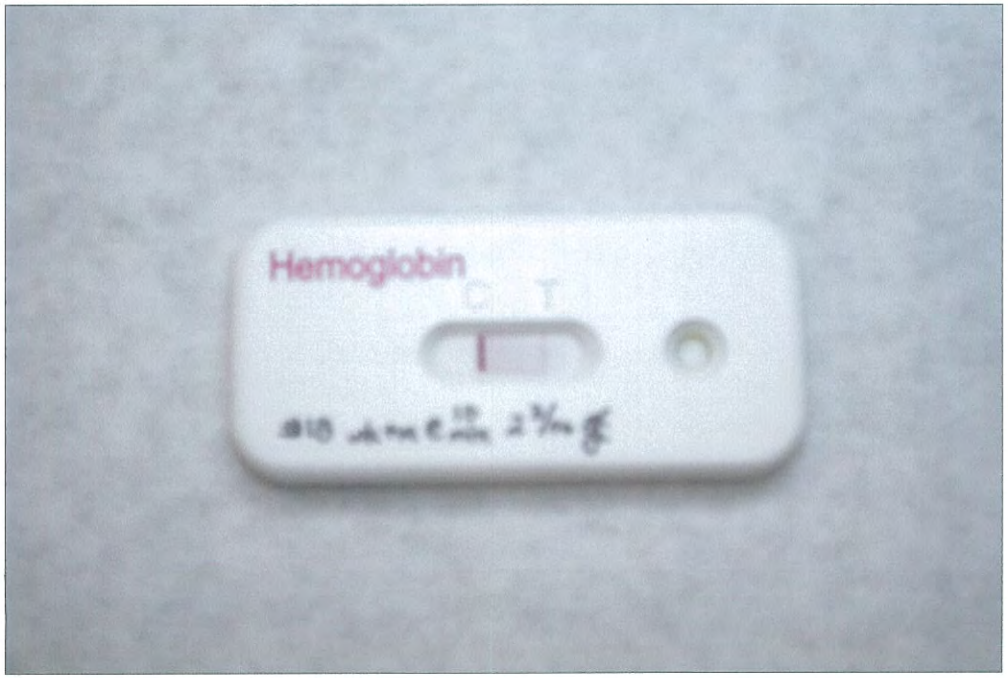


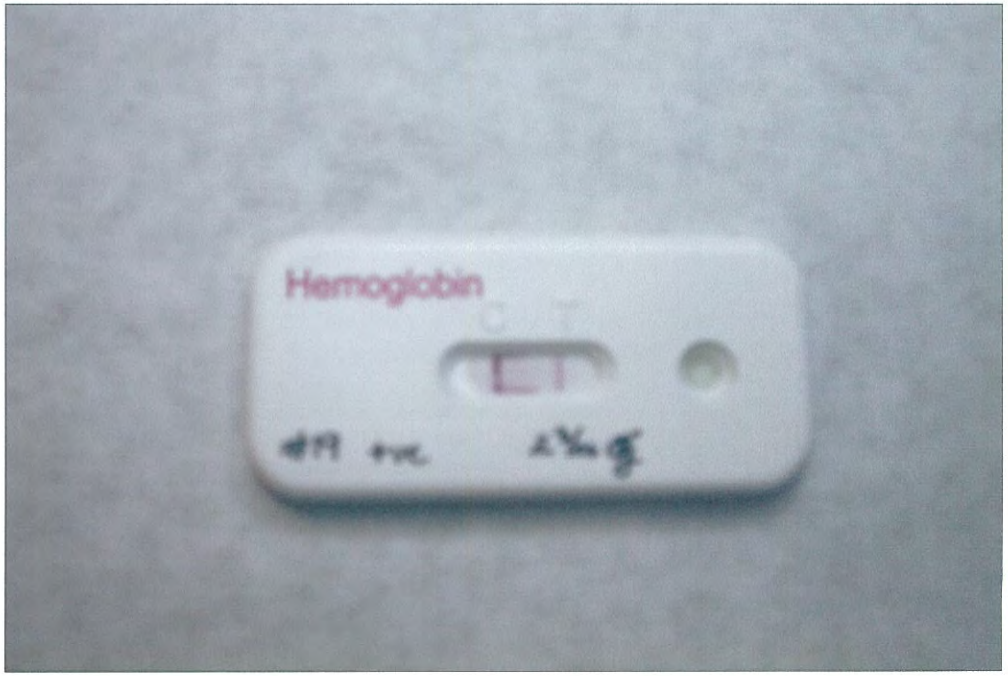


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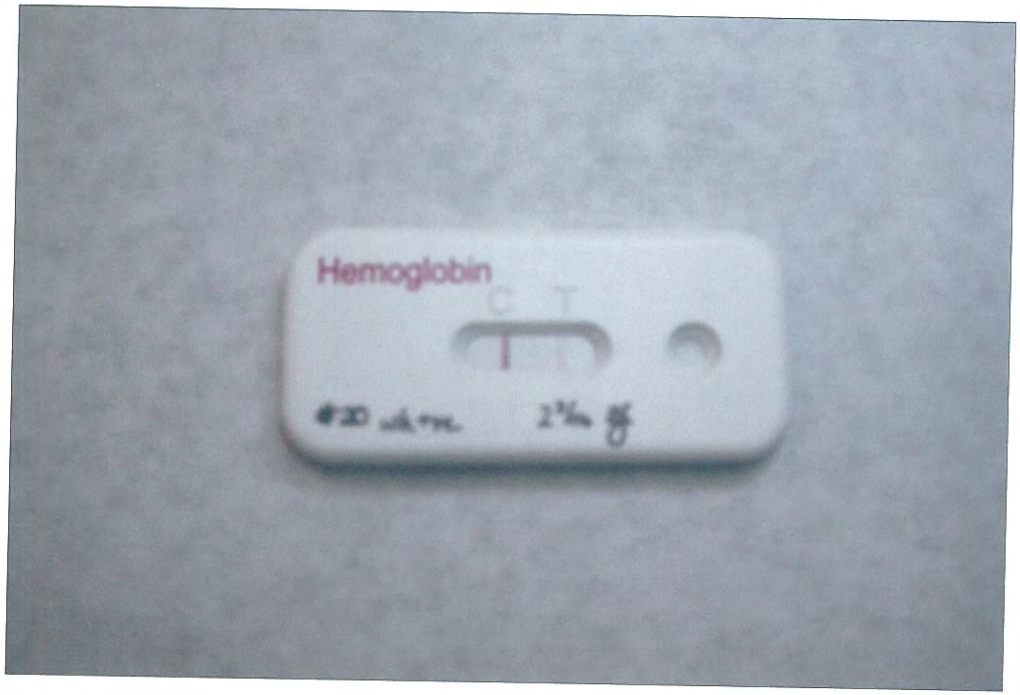


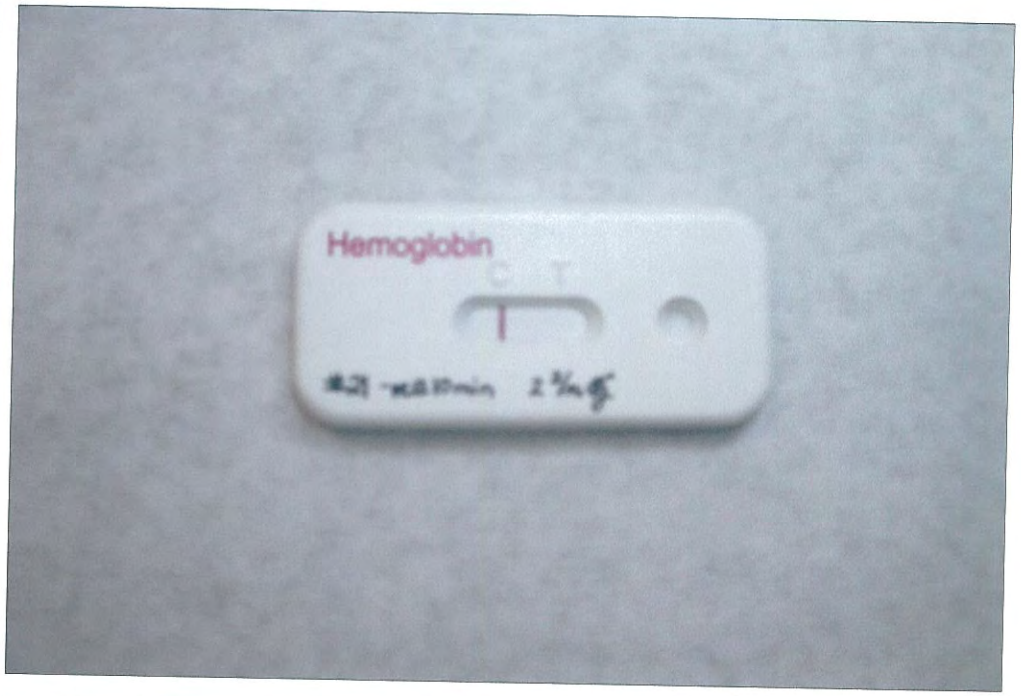


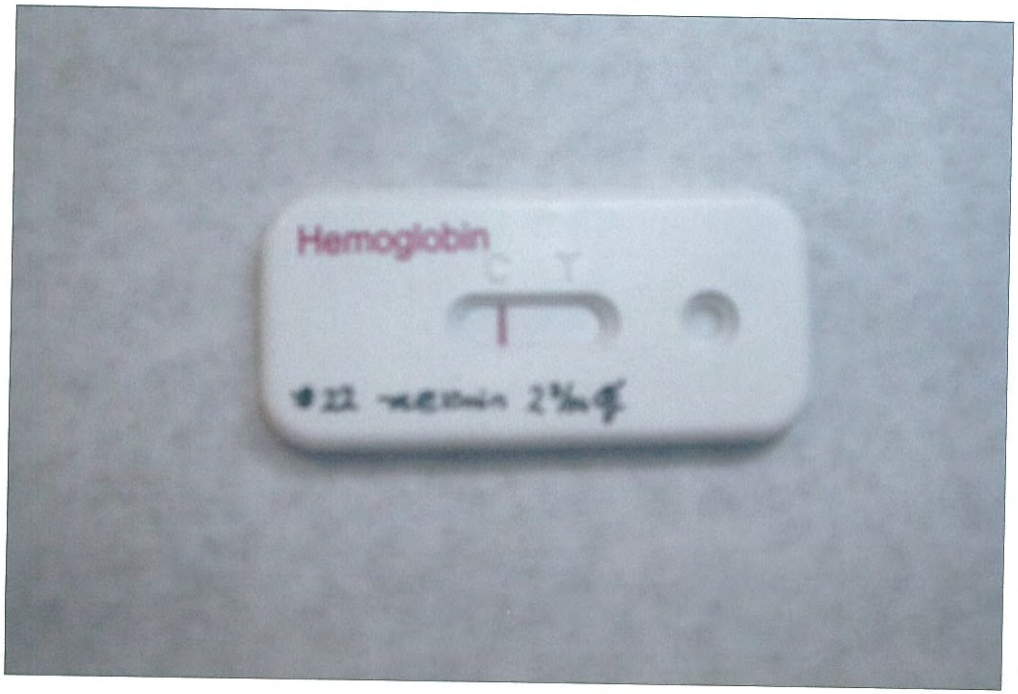




HEMDIRECT VALIDATION







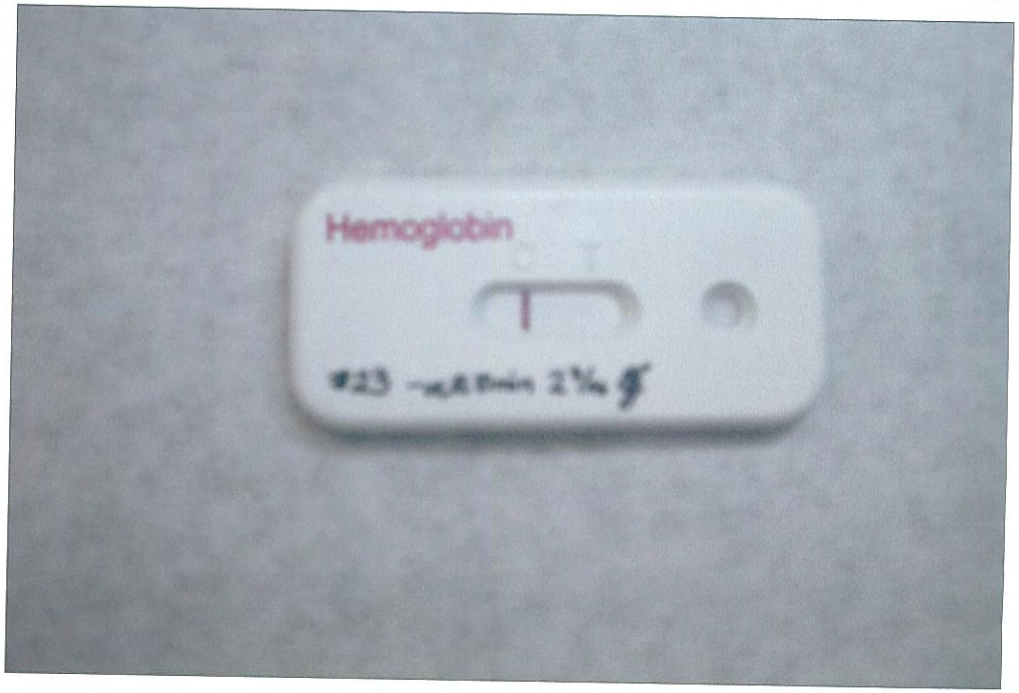


EXHIBIT G

SAN LUIS OBISPO COUNTY SHERIFF

1585 KANSAS AVE.
SAN LUIS OBISPO, CA 93405

SUPPLEMENTAL INCIDENT REPORT

CASE NUMBER	SUPPLEMENT NUMBER
960610965	565
CASE TYPE	CAD EVENT NUMBER
HOMICIDE	
REPORTING OFFICER	REPORT DATE
SLSO1535 - LIDDELL, SHELBY	04/22/2021

INCIDENT

LOCATION				DATE	TIME
, CA				04/22/2021	00:00
PREMISE NAME					
STATION	BEAT	RESP AREA		JURISDICTION	
ST24				SLSO	

ADDITIONAL INFORMATION

☐ INC SUPP 1

INC SUPP 1

INC SUPP 4

☐ INC SUPP 3

INC SUPP 6

PRESIDIO

STATUS

CASE STATUS	CASE STATUS DATE	DISPOSITION	DISPOSITION DATE	APPROVAL	APPROVAL DATE
FIL	04/20/2021	AA	04/08/2021	SLSO1240 - NICHOLSON, CHAD	04/26/2021

PROPERTY

ENTRY NO	INVOLVEMENT	TYPE	MAKE	MODEL					
898	E	40							
SERIAL NUMBER		QUANTITY	COLOR	COLOR	OAN	REF NO	EVIDENCE		
							Y		
DESCRIPTION						CUSTODY STATUS			
PLYWOOD FROM TRAIL POS PRES. BLUESTAR						CHECK-OUT			
COMMENT									

ENTRY NO	INVOLVEMENT	TYPE	MAKE	MODEL					
899	E	40							
SERIAL NUMBER		QUANTITY	COLOR	COLOR	OAN	REF NO	EVIDENCE		
							Y		
DESCRIPTION						CUSTODY STATUS			
SCREWS FROM PLYWOOD						CHECK-OUT			
COMMENT									

ENTRY NO	INVOLVEMENT	TYPE	MAKE	MODEL					
900	E	53							
SERIAL NUMBER		QUANTITY	COLOR	COLOR	OAN	REF NO	EVIDENCE		
							Y		
DESCRIPTION						CUSTODY STATUS			
PHOTOS OF TRAILER SEARCH & BLUESTAR						SUBMITTED			
COMMENT									

NARRATIVE

Case Number: 9606-10965
Date Written: April 23, 2021
Purpose of Report: Document Search of Trailer at 710 White Court, Arroyo Grande & Vehicle Examination

Synopsis: I photographed the search of a travel trailer, California License Plate 1EA9027, at 710 White Court, Arroyo Grande. Additionally, I photographed and assisted in processing a separate trailer, California License Plate 4ML7869, at the Crime Laboratory Annex. BlueStar was applied to the interior floor of this trailer and a positive reaction was observed and photographed.

April 21, 2021

On Wednesday April 21, 2021, at approximately 1430 hours, I arrived at 710 White Court, Arroyo Grande, along with multiple members of the San Luis Obispo Sheriff' s Office to photograph and search two trailers on the property.

One Aljo travel trailer, California License Plate 1EA9027, was located parked in the driveway, in front of the garage. The second trailer, a Haulmark Passport cargo trailer, California License Plate 4ML7869, was parked north of the driveway on a dirt area, adjacent to the garage. I photographed the trailers. The travel trailer was then searched on scene. I photographed items throughout the search.

I cleared the scene at approximately 1535 hours and responded to the Sheriff' s Office Crime Laboratory Annex along with Forensic Specialist J. West.

Sergeant C. Nicholson towed the cargo trailer to the Crime Laboratory Annex where it was then secured.

April 22, 2021

On Thursday April 22, 2021 at approximately 0900 hours, FS. West, Detectives C. Cole, S. Archibald, T. Lopes, M. Terrell, S. Garrett, and I met in the Crime Laboratory Annex to examine and process the white Haulmark Passport cargo trailer, California License Plate 4ML7869.

I photographed the exterior and interior of the trailer. Items were removed from the trailer and examined. I collected photographs throughout the process.

The interior floor and back pulldown hatch of the trailed was processed with BlueStar, a presumptive reagent for the presence of blood. I collected photographs of the BlueStar reactions. One area, on the floor inside the side door entrance to the trailer, had a reaction observed. The area was cut out of the floor (Evidence Item #898) and booked into the Sheriff' s Property Office along with two screws (Evidence Item #899) also removed from that section of floor.

We concluded our examination at approximately 1230 hours.

All photographs were transferred to the Crime Laboratory Archive as well as a compact disc (Evidence Item #900).

Disposition of Evidence:

All evidence was booked in the Sheriff' s Property Office.

Closing Statement

Case Status Exceptionally Cleared.

Forensic Specialist Shelby Liddell, #1535
SBL

RESTRICTED

ATTACHMENT 2

Dan Dow
District Attorney
State Bar #237986
County of San Luis Obispo
County Government Center, Room 450
San Luis Obispo, CA 93408
Telephone: (805) 781-5800

Attorney for the People of the State of California

ELECTRONICALLY FILED BY
Superior Court of California,
County of Monterey
On 5/31/2022 10:12 AM
By: Renee Inofuentes, Deputy

SUPERIOR COURT OF CALIFORNIA

COUNTY OF MONTEREY

THE PEOPLE OF THE STATE OF CALIFORNIA, Plaintiff, vs. PAUL RUBEN FLORES & RUBEN RICARDO FLORES, Defendant.	MONTEREY CASE NO. 22CR003712 & 22CR003713 SAN LUIS OBISPO CASE NO.: 21F-02402-A, B MOTION TO ADMIT CADAVER DOG HANDLER TESTIMONY Date: June 6, 2022 Time: 8:30 a.m. Dept: 4

I

STATEMENT OF THE CASE

During the Preliminary Hearing, the Honorable Judge Craig Van Rooyen admitted the testimony of all five dog handlers in this case finding that the *Malgren* factors were met. On January 21, 2022, the Honorable Judge Jacquelyn Duffy denied the defense 995 motion finding that the testimony of the five dog handlers was properly admitted and that the Malgren factors were met. The People seek to admit this same testimony at jury trial.

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II

STATEMENT OF RELEVANT FACTS

Six California Rescue Dog Association (CARDA) human remains detection (HRD) certified dogs have been deployed during searches in this case: four were deployed during a 1996 search of defendant Paul Flores's dormitory room, and two were deployed at Ruben Flores's property in March 2021. All six dogs alerted to the presence of human remains.

1. The Search of Paul Flores's Dormitory Room

On June 29, 1996, detectives searched Paul Flores' dorm room. They used four dogs that were trained to detect human remains, commonly referred to as "cadaver dogs." The dogs were sent into the residence hall one at a time and out of sight of the others. The first dog reacted Paul Flores' room (number 128) in the Santa Lucia Hall. The dog had walked through two other residence halls without reaction. The second dog entered the room and indicated at the mattress and box spring cover on the bed belonging to Paul Flores. This dog pawed and bit the mattress. This dog had no other indications at any other location. The third and fourth dogs also alerted to the mattress. In total all four CARDA (California Rescue Dog Association) HRD (Human Remains Detection) certified dogs alerted on Flores' mattress.

Wayne Behrens is one of those handlers. He responded to Cal Poly on June 29, 1996, and suggested to detectives that they search the interior of the Santa Lucia dorm (Paul Flores's dorm hall) as his dog Sierra show interest on the exterior of the building underneath a window. He thought maybe a scent was traveling inside the dorm and coming out the window. As they entered the dorm, Sierra went ahead of him and went down a hall. She went in a doorway, then immediately returned to Behrens and alerted. She showed interest in a closed door. As he got closer, he saw crime scene tape on that door. Investigators opened the door and Sierra entered the room. She went left and then alerted on the bed. Behrens and Sierra backed out of the room and Behrens stated he was "stunned" at what he had just witnessed. He suggested the detectives use additional Human Remains Detection dogs to confirm Sierra's findings. He indicated that Sierra was very reputable and had found evidence

in several cold cases. Sierra is a “C1 Cadaver dog,” meaning she is certified in “small scents.” The mattress was the only location on which Sierra alerted during his entire search.

Adela Morris, one of the dog handlers, explained that the dogs are trained to alert on human remains as soon as decomposition begins at death. The dog alert indicates a strong possibility that a deceased person had been in the room. She used two CARDA certified dogs named Cholla and Cirque. She remembers seeing Behrens at the location. Detectives asked her to go inside Santa Lucia dorm, so she took Cholla in first. In her words, Cholla “went screaming down the hallway.” Cholla alerted on one door in the hallway. Morris tried to walk Cholla a little more inside the hallway, but the dog continued to alert on that one door. Investigators opened the door and Cholla entered “intensely.” Cholla could not “vacuum up the scent enough.” Morris stated the scene appeared intense for Cholla. The dog alerted on the left side of the dorm room which included the mattress and a trash can. The mattress was an “intense scent sight” for Cholla. Cholla searched the remainder of the building and showed zero interest in anything else. Morris noted that Cholla was trained to locate human remains including bones, body parts, and blood.

Morris then brought her other dog, Cirque, to the entrance of the dorm room. She stated that Cirque did the same thing as Cholla and alerted on the same dorm room door. Cirque also alerted on the bed mattress in the same location that Cholla had alerted. It should be noted that Morris did not know the results of Behrens’ search when she ran her two dogs through the dorm.

Gail Laroque is also a dog handler. She used a Boxer named Torrey who in her words was experienced. She was also present at the Santa Lucia dorm on June 29, 1996. She was unaware of the two previous searches at the time of her search. She let Torrey search the dorm building and Torrey immediately rand own the hall and did a “fish-hook” towards the door of room number 128. She stayed at the far end of the hall so as not to influence Torrey. Torrey scratched on the door of room number 128. Laroque entered the dorm room Torrey ran inside towards the bed frame and was very excited, sniffing the bed frame. Torrey also alerted on a grey trash can inside the dorm room, as well as the left side of the dorm

room where there was a desk and possibly a phone. Torrey continued to smell and alert on the bed frame. Afterwards, Laroque learned that investigators had removed the mattress after the three prior dogs had searched the room. Laroque said this explained why Torrey was doing "air searching" because she was looking for the primary source of the scent which was most likely the missing mattress. She asked investigators to remove the trash can from the dorm so Torrey would stop alerting on it in the room. When she took Torrey out of the room, there were three trash cans in the hallway. Torrey then alerted again on the trash can that had been in room number 128, grabbed the trash can and brought it to Laroque. Laroque stated this was a "double alert" on the trash can.

The mattress is still in evidence, but the trash was removed. All four handlers are alive and available to testify.

2. The Search of Ruben Flores's Property

In March 2021, investigators searched Ruben Flores's property at 710 White Court in Arroyo Grande.

CARDA certified dog handlers Kris Black and Karen Atkinson ran their dogs throughout the entire property, as well as around the Volkswagen. Both dogs showed a subtle change in behavior in the left northwest side behind the lattice under the deck. This is the area where ultimately human blood was found approximately four feet beneath the surface. This

Phil Hanes is a Senior Archeologist and Ground Penetrating Radar director for Natural Investigations Company. He utilized his GPR machine to map and grid certain areas of the property. He wrote in his report:

> Grid 1 was placed along the rear of the residence underneath the western most portion of the rear porch (Figure 1). The grid measured 36-feet east west by 4-feet north south. Analysis of the data from the grid showed minor disturbance throughout the grid consistent with soils to be expected underneath a residence and a large approximately 4-foot by 6-foot anomaly located at the western end of the grid. This anomaly showed significant soil disturbance from the surface to a depth of approximately 4-feet below surface with the most soil disturbance between 1.5-feet to 3.5-feet below surface. Based on the size, shape, and location of this anomaly this location was chosen for 710 WHITE COURT GPR 2 excavation (excavation 2) and represented the highest probability excavation target located within the survey.

The following photograph was provided by Mr. Hanes and shows the various areas mapped by Ground Penetrating Radar at Ruben Flores' house. It also shows the location of four excavations identified by the Archeologists as places to dig. As mentioned above, they were most enthusiastic about digging at Grid 1.



III

LAW AND ARGUMENT

Cadaver dogs are trained to scent and alert to decomposing human remains. (*People v. Peterson* (2020) 10 Cal.5th 409, 419, fn. 5.)

> An alert … is nothing more than the dog's signal to its handler that it has detected an odor it has been trained to locate. A dog can accomplish this by either a passive or aggressive alert. A passive alert generally consists of the dog merely sitting and looking at the area where it detects the source of the odor. An aggressive alert, as the name suggests, generally consists of the dog scratching or using some other active indication to the area where it detects the odor.

(Mark E. Smith, *Going to the Dogs: Evaluating the Proper Standard for Narcotic Detector Dog Searches of Private Residences*, (2009) 46 Hous. L. Rev. 103, 115.) Certified cadaver dogs and their handlers go through months of constant training to become a reliable search team. The admissibility of their alerts requires evidence of their training and reliability; however, the case-specific nature of dog scent evidence and its decades-long use places it outside the scope of the requirements of *People v. Kelly* (1976) 17 Cal.3d 24.

1. The *Kelly* Test

The admissibility of expert testimony based on a new or novel scientific technique is governed by rules adopted in the leading cases of *Frye v. United States* (D.C. Cir. 1923) 293 Fed. 1013 and *People v. Kelly* (1976) 17 Cal.3d 24 (abrogated by statute on another point as explained in *People v. Wilkinson* (2004) 33 Cal.4th 821, 845-848). Federal courts have since abandoned *Frye*. (*Daubert v. Merrell Dow Pharmaceuticals, Inc.* (1993) 509 U.S. 579; *People v. Cowan* (2010) 50 Cal.4th 401, 469, fn. 22.) But California has retained the *Kelly* test despite *Daubert*. (*People v. Leahy* (1994) 8 Cal.4th 587, 598-604, 612.)

Under the *Kelly* test, the proponent of the evidence must establish (1) the reliability of the method—that it is " 'sufficiently established to have gained general acceptance in the particular field in which it belongs,' " (2) that the witness is an expert qualified to give an opinion on the subject, and (3) that correct scientific procedures were used. (*Kelly*, *supra*, 17 Cal.3d at p. 30.) "The first and third prongs can be confused; the *Kelly* first-prong analysis applies only to a new technique or procedure, whereas the third prong is case specific. [Citation.]" (*People v. Stevey* (2012) 209 Cal.App.4th 1400, 1410.) "In determining whether there has been 'general acceptance,' '[t]he goal is not to decide the actual reliability of the new technique, but simply to determine whether the technique is generally accepted in the relevant scientific community.' [Citation.]" (*People v. Morganti* (1996) 43 Cal.App.4th 643, 656.) The purpose of these threshold requirements, often referred to as the *Kelly* test, is to protect against the risk of unproven or experimental science garnering an aura of certainty. (*Kelly*, *supra*, 17 Cal.3d at p. 32.)

Not all new scientific testing procedures or instruments are subject to the *Kelly* test. "The *Kelly* rule is frequently inapplicable to expert testimony because the testimony is often neither based on a new scientific technique nor likely to convey an aura of certainty. '[A]bsent some special feature which effectively blindsides the jury, expert opinion testimony is not subject to *Kelly*.' " (*In re O.D.* (2013) 221 Cal.App.4th 1001, 1006-1007, citing *People v. Stoll* (1989) 49 Cal.3d 1136, 1157.) The *Kelly* rule only applies to scientific instruments, machines and testing devices, not to other forms or types of tests or analyses normally performed by experts.

2. Dog Tracking and Dog Scent Evidence is Not a "Newly Developed Scientific Technique"

The admission of dog-trailing or dog-scent evidence was first approved more than forty years ago in *People v. Craig* (1978) 86 Cal.App.3d 905 (*Craig*), where the Court of Appeal explained that dog trailing does not involve standardized techniques and inanimate, fungible instruments whose accepted use in the scientific community may be established; rather, it involves the use of individual dogs, whose "ability and reliability [should] be shown on a case-by-case basis." (*Craig*, *supra*, 86 Cal.App.3d at p. 915; see also *People v. Westerfield* (2019) 6 Cal.5th 632, 706.) "As such, *Kelly* does not apply; the evidence is admissible if proper foundation is laid concerning the present ability of a particular well-trained dog to trail a human. This 'is a fact which, like other facts, may be proven by expert testimony.' " (*People v. Peterson* (2020) 10 Cal.5th 409, 444, citing *Craig, supra*, 86 Cal.App.3d at p. 915.)

In *People v. Jackson* (2016) 1 Cal.5th 269, the California Supreme Court agreed with the analysis in *Craig* when it found that dog scent evidence (specifically, scent trailing) did not require a *Kelly* hearing. (*Id.* at p. 320.) The Court found that scent trailing evidence is not "new," and is not so foreign that it would be unusually difficult for a factfinder to evaluate, as "[j]urors are capable of understanding and evaluating testimony about a particular dog's sensory perceptions, its training, its reliability, the experience and technique of its handler, and its performance in scent trailing, such as performed in this case." (*Id.* at pp. 317, 320.) It

is unlikely a factfinder would believe dogs are scientifically infallible, which was a risk that the *Kelly* (and *Daubert*) procedure was designed to address. (*Id.*)

In 2019, the California Supreme Court referred to this evidence more expansively as "dog scent" evidence when it affirmatively cited *Craig* and *Jackson* and analyzed the appropriateness of the jury instruction (CALJIC No. 2.16) for dog scent evidence overall and specifically for dog scent evidence involving cadaver dogs. (*People v. Westerfield* (2019) 6 Cal.5th 632, 706-709.)[1]

In 2020, the California Supreme Court affirmed its ruling in *Jackson* that dog trailing evidence does not require a hearing under the *Kelly* test. (*People v. Peterson* (2020) 10 Cal.5th 409, 444-446.)[2]

Based on the logic of *Craig*, *Jackson*, and *Peterson* and the expansive language of the California Supreme Court in *Westerfield*, dog scent evidence is not subject to the *Kelly* test given the animate nature of the dog and the case-by-case basis for admission of dog scent evidence. For dog scent evidence to be admissible in this case, the People must meet foundational requirements to demonstrate the training and reliability of the individual dog and its alert(s).

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[1] The relevant current jury instruction for dog tracking evidence is Judicial Council of California Criminal Jury Instruction (CALCRIM) number 374, which states,

You have received evidence about the use of a tracking dog. You may not conclude that the defendant is the person who committed the crime based only on the fact that a dog indicated the defendant (or a location). Before you may rely on dog tracking evidence, there must be:

1. Evidence of the dog's general reliability as a tracker;
AND
2. Other evidence that the dog accurately followed a trail that led to the person who committed the crime. This other evidence does not need to independently link the defendant to the crime.

In deciding the meaning and importance of the dog tracking evidence, consider the training, skill, and experience, if any, of the dog, its trainer, and its handler, together with everything else that you learned about the dog's work in the case.
(*Id.*)

[2] Other jurisdictions have almost uniformly held that dog scent evidence from cadaver dog alerts is admissible subject to the proper foundation of the training and reliability of the individual dog. (See *Torrez v. State* (Fla. Dist. Ct. App. 2020) 294 So.3d 390, 402; *Castillo v. Commonwealth* (Va. Ct. App. 2019) 70 Va.App. 394, 436 [827 S.E.2d 790, 811]; *People v. Lane* (Mich. Ct. App. 2014) 308 Mich.App.38, 53 [862 N.W.2d 446, 457]; *Trejos v. State* (Tex. App. 2007) 243 S.W.3d 30; *Clark v. State* (Md. Ct. Spec. App. 2001) 140 Md. App. 540, 579 [781 A.2d 913, 936]; *State v. Brown* (1999) 266 Kan. 563 [973 P.2d 773, 780]; *People v. Lifrieri* (N.Y. App. Div. 1996) 230 A.D.2d 754 [646 N.Y.S.2d 172].)

3. Foundational Requirements for Dog Scent Evidence

After the Court of Appeal in *Craig* held that dog scent evidence is not subject to the *Kelly* test, the Court of Appeal in *People v. Malgren* (1983) 139 Cal.App.3d 234 (*Malgren*) elaborated on the foundation necessary for dog scent evidence. Specifically, the *Malgren* court identified five foundational requirements for the admissibility of dog trailing evidence:

> (1) the dog's handler was qualified by training and experience to use the dog; (2) the dog was adequately trained in tracking humans; (3) the dog has been found to be reliable in tracking humans; (4) the dog was placed on the track where circumstances indicated the guilty party to have been; and (5) the trail had not become stale or contaminated.

(*Id.*, at p. 238.)

When the issue was presented to the California Supreme Court in *Jackson* in 2016, the Court approved the admission of dog-scent evidence upon a sufficient showing of the first four *Malgren* requirements, holding that the fifth *Malgren* factor "is not an independent requirement; it is satisfied by evidence that establishes the other four factors." (*Jackson*, *supra*, 1 Cal.5th at p. 325-326.) "If a well-qualified handler trains a dog who has reliably trailed human scent and is well trained in ignoring or forgetting past smells and in indicating negative trails, then the dog will not trail if the scent on the scent item is stale or nonexistent, or if there is no trail that matches the scent on the scent item." (*Id.* at p. 325.) Evidence of the first four *Malgren* requirements ordinarily will suffice to support admission of dog trailing evidence. (*People v. Peterson*, *supra*, 10 Cal.5th at p. 445.)

In this case, the dog handlers will each testify to the dogs' training, reliability, and certification by CARDA, as well as the handlers' own training and the specific circumstances that led to the independent alerts by each dog.

4. The Probative Value Outweighs Any Unfair Prejudice

In this case, four cadaver dogs in Paul Flores's dorm room and two cadaver dogs at Ruben Flores's property independently of each other, alerted to locations associated with Paul Flores. No body was found. This case is substantially similar to the Texas homicide case

Trejos v. State (Tex.App.2007) 243 S.W.3d 30, where no body was recovered but two cadaver dogs independently alerted to the spot where the defendant said he had buried the body. The court in that case held that the probative value of the evidence substantially outweighed the danger of unfair prejudice, confusion of issues, or misleading the jury because the dogs' alerts corroborated other evidence (in that case, the defendant's incriminating statements). (*Id.* at pp. 38, 55.)

In this case, the proposed testimony of the handlers for the individual cadaver dogs is highly probative and is not unfairly prejudicial. (See Evid. Code, § 352.) The independent alerts of cadaver dogs to the presence of human remains on Paul Flores's mattress in his door room at or near the time of the crime and the independent alerts of cadaver dogs at 710 White court are highly probative to the issues of whether Kristin Smart was murdered and the identity of the perpetrator. Furthermore, other evidence that Kristin Smart is dead corroborates the cadaver dog evidence: Kristin Smart was last seen alive (walking with Paul Flores) on May 25, 1996, she has not contacted family or friends since May 24, 1996, the testimony that the family was very close and attended all familial events together she did not have access to a large sum of money, and she left her belongings behind. The testimony will not amount to an undue consumption of time, as the foundation for the admissibility of each dog's alerts also serves to provide context and weight for the alerts to be described and each independent alert corroborates the work of the other dogs and are relevant to the reliability of any alert by an individual dog.

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IV

CONCLUSION

For all of the above-referenced reasons, the People respectfully request the Court admit dog scent evidence of alerts by cadaver dogs after evidence establishing the dogs' and their handlers' specific training and reliability.

Date: May 31, 2022

Respectfully submitted,

Dan Dow
District Attorney

By: Christopher Peuvrelle
Deputy District Attorney

ATTACHMENT 3

SUBMITTED CONDITIONALLY UNDER SEAL