CHECKLIST REGARDING STATE V. HENDERSON

Dewey P. Brinkley 10/25/10

BLOOD COLLECTION/CHAIN OF CUSTODY/SBI CHEMICAL ANALYSIS

1. Blood Collection
2. Must be qualified person via statute 20-139.1
3. Test kit has to be stored at certain temperature (according to manufacturer Becton Dickinson, between 39 -77 degrees Fahrenheit)
4. Test kit has expiration date printed on outside of box (provides warranty for vacuum so that vial draws proper amount of blood, which should be 10 ml.) May also provide warranty for chemicals in test tubes, potassium oxalate (anti-coagulant), and sodium fluoride (preservative)
5. Needle also has separate expiration date (which is different from date on box)
6. Nurse has to wipe arm with antiseptic pad in kit. (If alcohol wipe, can possibly affect SBI result)
7. Once samples are taken, tubes are supposed to be slowly inverted 8-10 times to insure proper mixing of chemicals and blood. Shaking tube can cause hemolysis, or breaking up of red blood cells, which can skew result. No mixing or improper mixing increases possibility of fermentation, which can lead to neo-creation of alcohol in sample.
8. How were vials and exterior box labeled? There are evidence seals inside test kit that are supposed to be placed over vials to insure integrity of samples. (not done in Henderson case).
9. Does nurse know if proper chemicals were there? Do they know if this assembly line created kit has proper amounts of preservative and anti-coagulant? Did she or officer check expiration? Do they know if proper amount of blood (10 ml.) was drawn? How were vials labeled.
10. CHAIN OF CUSTODY
11. All links in chain must be present to testify or argue under Lambroia v. Peek for suppression. State’s cases – Bailey, Grier—only apply to weaknesses in chain, not missing person in link. Have to argue it goes to admissibility rather than weight because blood is an organic, changeable substance that can degrade and ferment
12. Unrefrigerated Periods—lead to fermentation of sample (glucose (sugar) present in all blood, yeasts or other bacteria also common in blood) If can’t prove that enough preservative present, or improperly mixed, then chances of fermentation (neo-creation of ethanol, a product of yeasts eating sugar) go way up.
13. Evidence most likely stored in RPD evidence refrigerator—don’t know temperature and don’t know who has access. Outer box labeled? How does officer that carries blood to SBI know which kit to get? How many times does box change hands?
14. Once in SBI lab, SBI assigns own case number and blood goes into refrigerated vault to sit until testing. Where does SBI put case number? Internal protocol as to when tested? How do they assure kits do not get mixed up?

III Cross-Examination of SBI Chemist

1. Chemist will have no knowledge of what has happened to blood prior to arrival at SBI. (Doesn’t know if blood was properly drawn, proper chemicals in proper amounts in vials, proper refrigeration, proper integrity of sample)
2. Chemist will have to know maintenance records regarding particular gas chromatograph used. How often cleaned? In shop for maintenance recently? When calibrated? Who prepares solution for calibration? (n-proponol is solution used to calibrate, which has set amount of alcohol) Calibrated before each batch run?
3. Using calibration solution, this solution becomes an internal standard for the blood sample that is run through machine. Once calibrated, chemist is ready to begin testing samples.
4. The machine itself has a carousel in which several blood samples from different defendants can be placed (some can hold up to 60 or 70 vials). HERE IS WHERE POSSIBILITY OF HUMAN ERROR BECOMES VERY POSSIBLE.
5. Chemist will get kit box, and remove one vial of Defendant’s blood, and from this one vial create two headspace vials to place in headspace rack (the carousel). The other vial of Defendant’s blood is never tested. Chemist will use pipette to suck up 200 microliters of blood which will be combined with 1800 microliters of n-proponol in headspace vial. Two separate headspace vials are created of Defendant’s blood and placed in headspace rack (carousel).
6. The headspace rack has slots that are numbered. The chemist has to then type in which defendant’s sample is in which slot into the computer portion of the machine. (human error a great possibility)
7. Once headspace vials are created, ask chemist how many total batch runs (perhaps up to 30 different blood samples at a time) he does in a day? A week? Are headspace vials labeled with case number or defendant’s name? Does anybody double check headspace rack position to make sure Defendant’s blood is notated in correct headspace rack slot?
8. A covering is placed over the headspace vials with a crimping tool.
9. Chromatograph will first heat up the headspace vials to insure proper equilibrium between headspace and liquid in headspace vials. This is Henry’s Law. (ethanol establishes equilibrium between the liquid portion and the headspace above it)
10. At injection port of machine, headspace vial covering is punctured and headspace gas is sucked up into the machine. (no liquid is sucked up)
11. Machine uses a carrier gas (helium) to push Defendant’s headspace gas sample through a column which I think is 30 meters long.
12. Gas chromatography is based on the idea that different molecules have different retention times (the speed at which they travel through the machine and column) and the machine is able to separate various compounds based on retention time.
13. There is material in the column that can absorb residues from sample to sample.
14. Machine SBI uses has two separate columns so it is shaped like a Y. Each headspace vial sample travels down both columns, which is why you get two results from the two headspace vials, rendering a total of four results. SBI takes the mean of these four results and rounds down for its final result printed in analyst report.
15. Final result shows up as a peak on a chromatogram (paper report generated by Machine). Defendant’s alcohol result is the area under the peak, as measured by the chromatograph.

QUESTIONS FOR ANALYST

1. Temperature within the chromatograph is critical, correct? Even if off even a couple of degrees, can effect result dramatically, correct?
2. No re-calibration in between running individual headspace samples. Is this good scientific practice? What if my client’s sample was the last sample run in a rack of 50 vials. Isn’t it possible the ethanol residues in column from previously run samples could affect result? Why not re-calibrate after each sample is tested?
3. Referring to *Scientific Testimony*, I’m going to read you a quote: “Potentially thousands of chemicals may have same retention time, peak shape, and detector response. Bluntly, GC is one of the quickest ways of getting the wrong answer in qualitative analysis.” How do you know that the peak that was created by my client’s sample was the result of ethanol? Could it not be the product of some other chemical in his blood? Move to suppress.
4. Discuss Possibility of Fermentation. You have the instrumentation in the lab to check my client’s samples for proper amounts of sodium fluoride, the preservative in the vials. Did you do that? How can you rule out that my clients blood sample fermented before getting to SBI? Do bells and whistles go off on the machine if there is not enough preservative in the sample? Do bells and whistles go off in the chromatograph if the sample has fermented over time?
5. Are you familiar with the American Academy of Forensic Sciences Forensic Toxicology Laboratory Guidelines? I’m going to read you a quote from section 8.2 which states: “As a general matter of scientific principle, the detection or initial identification of drugs and other toxins should be confirmed whenever possible by a second technique based on a different chemical principle.”

The SBI only tests using one chemical principle, the gas chromatograph flame ionization detector, correct? You could test for ethanol using a different chemical principle such as an enzymatic test, correct? You have the ability and instrumentation to conduct a separate test, correct?

So, essentially, SBI is not in compliance with the recommended guidelines of the American Academy of Forensic Sciences, correct? Because you test for alcohol using only one chemical principle, correct? Move to suppress.

1. Do you wash pipettes in between creating headspace vials from one Defendant to the next?

ULTIMATE ARGUMENTS

1. Can’t be sure the chemical recorded by the chromatograph was ethanol, as other molecules can have same retention times
2. SBI has made mistakes and continues to make mistakes. Human error in this process is possible all over the place.
3. SBI doesn’t employ commonly accepted scientific methods to test for alcohol. Should be presumptive and confirmatory test using two different chemical principles.
4. Possibility of residue in column in between samples, which could jack up my client’s result—no calibration in between individual samples being run through machine.
5. Fermentation—SBI has ability to test for yeast growth and proper amount of preservative in sample, and did not.