

AFFIDAVIT OF DR. JOY HALVERSON, DVM, MPVM

State of California)
) ss.
County of Yolo _____)

Before the undersigned Notary Public, duly qualified and acting in and for said county and state, appeared Dr. Joy Halverson, to me well known to be the affiant herein, who stated the following under oath:

- "1. I, Joy Halverson, am the Director and Senior Scientist at QuestGen Forensics, a laboratory located in Davis, California.
2. I have been contacted by attorney John T. Philipsborn, identified to me as a member of the California Bar, currently involved in *Echols and Baldwin v. State*, a post-conviction criminal case pending in Arkansas. Mr. Philipsborn has asked me whether there are generally accepted scientific methods that can be used to identify the specific species of an animal from one or more hairs. Based on my background, including my formal education, professional experience, training, scholarship, professional memberships, research, and consultation with fellow professionals, it is my opinion that a very specific identification of an animal species can be made from hairs.
3. The laboratory that I am associated with, QuestGen Forensics, conducts testing of animal DNA, and animal hairs, using mitochondrial DNA testing methods generally accepted in the scientific community. I have been asked

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if it would be possible for me to identify any animal hairs pertinent to the case on which Mr. Philipsborn consulted me, *State v. Echols and Baldwin*.

Based on the below-described background, training, education, and experience, as well as based on my qualifications of having previously conducted forensic testing for cases, and qualified as an expert on the identification of animal hairs based on accepted scientific methods, I believe that I can identify animal hairs submitted to me in the *Echols and Baldwin* case if they are of sufficient length.

4. Briefly stated, the protocol for the identification of a species of animal from hair is to initially view the hair as it arrives in the laboratory, and conduct an initial microscopic examination so as to screen out human from animal hairs, and animal hairs from other trace evidence submitted. The likely animal hair is then cleaned thoroughly.
5. After cleaning, there may be additional microscopic examination before the hairs are prepared for DNA extraction.
6. Generally accepted techniques suitable to obtaining mitochondrial DNA sequences are applied to the extraction of DNA from the hair. The extractions are processed in generally accepted technology applied to the identification of mitochondrial DNA. Focus is placed on cytochrome B genes. These particular genes have been extensively researched in a variety of academic and research settings. The United States government maintains

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a database on the gene within the framework of the National Cancer Institute.

7. The DNA sequence of any unknown animal hair is then compared with the known sequences contained in the cytochrome B gene database (GenBank), and in the vast majority of cases, particularly in the United States, a sequence consistent with a known species of animal is identified, and is the basis for the identification of the animal through the hair at issue.
8. The method just described has been applied, in my professional experience, in a number of criminal cases in several different states.
9. It is my understanding from the information provided me by Mr. Philipsborn that wildlife surveys have been conducted in the State of Arkansas that have generally identified the sorts of hair-bearing animals that might be found in given locales. Animals like dogs, raccoons, nutrias, rats, possums, and the like have hairs that are identifiable through the process described above, and it has been my experience that their DNA sequence is contained in the National Cancer Institute's cytochrome B gene database.
10. My background is as follows. I graduated with a Bachelor of Science degree in biology from the University of California at San Diego in 1976. I obtained a Doctorate in Veterinary Medicine from the University of California at Davis in 1981. I obtained a Master's Degree in Veterinary

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Epidemiology from the University of California at Davis in 1985.

11. My professional experience includes practice as a veterinary clinician from July of 1981 into December of 1986 at veterinary hospitals in Canberra, Australia and Sacramento, California.
12. From January of 1987 to December of 1988 I was a post-doctoral researcher at the University of California at Davis. The University of California at Davis is one of the leading research centers on issues of veterinary medicine in the world, and is generally considered one of the leading training centers in veterinary medicine in the United States.
13. Beginning in January of 1989, I have been associated with several research institutions and laboratories in the private sector that have concentrated on the subject of genetics in animals. My professional posts have included approximately five years as the President of Zoogen, Inc.; five years as a scientist at Celera AgGen, followed by my tenure as the Director and Senior Scientist at QuestGen Forensics beginning in December, 2001.
14. I am a member of the American Academy of Forensic Science, the American Veterinary Medical Association, the Association of Avian Veterinarians, and the International Society of Animal Genetics.
15. I have written and published a number of articles. Some of them are specific to the issues presented here. They include a 2005 article written with C. Basten entitled *A PCR Multiplex and Database for Forensic DNA*

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Identification of Dogs, 50(2) Journal of Forensic Science 50(2):352 (2005).

Another pertinent article written with several co-authors appeared under the title *Power of Exclusion for Parentage Verification and Probability of Match for Identity in American Kennel Club Breeds Using 17 Canine Micro-satellite Markers* which appeared in *Animal Genetics* 35(1):14 (2004). Also pertinent is another article written with numerous co-authors entitled *Combined Use of Maternal, Paternal and Bi-Parental Genetic Markers for the Identification of Wolf-Dog Hybrids*, *Heredity* 90(1):17 (2003).

16. I have attached a copy of my CV to this affidavit. That CV contains a true and correct recitation of my background and qualifications, including my publications. In the actual publications, there are a number of articles that I have not made reference to that involve the application of DNA testing methods of various kinds to the identification of animals, including canines, and avian species.
17. The CV sets forth a series of abstracts that I have either authored or co-authored which are pertinent to my knowledge of the identification of animal species from DNA. Virtually all of these abstracts are generally pertinent to the subject that I am being asked to address in the context of this case. I note that these abstracts have been presented to a variety of professional groups and societies, and have involved the uses of

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identification techniques of various kinds in forensic investigations.

18. In addition, my CV lists a number of presentations that I have been involved in, many of which are pertinent to the subject at hand, including descriptions of presentations that I have given to the American Academy of Forensic Science - for example, one entitled "Hanging by a Hair - Animal Trace Evidence in Forensic Investigations" at the annual meeting in 2005. I also gave a presentation entitled "Animal DNA - A Forensic Tool" at the International Society of Animal Genetics in 2004. Another presentation at the annual meeting of the American Academy of Forensic Science in 2005 was entitled *Forensic DNA Identification of Feline Hairs, Casework and a Mitochondrial Database*.
19. I presented to the European Academy of Forensic Science together with some colleagues in 2003 on the subject of *Canine DNA Testing and its Use in Criminal Investigations*. In 2002, I presented to the Virginia Homicide Investigator Organization on *Animal DNA and its Application to Homicide Investigations*.
20. I have attended numerous meetings of professional organizations, including of the American Academy of Forensic Science, the European Academy of Forensic Science, the Association of Zoo Veterinarians, the American Kennel Club, the International Society of Animal Genetics which are listed in my CV.

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21. In the attached CV I describe a series of cases under the title "Closed Casework" including cases that I was involved in as an expert applying DNA technology to the identification of hairs. This work was done in cases in: Illinois; Pennsylvania; Iowa; Florida; California; Oklahoma; New Mexico; Washington. I have also done work in cases in Canada and in the United Kingdom.
22. I have qualified as an expert on forensic DNA identification of animal hairs.
23. So long as the reviewing expert has sufficient background, experience, and qualifications, and that the generally accepted technology is properly applied, I believe that it is accurate to say that the identification of animal hair using mitochondrial DNA testing methods is generally accepted in the scientific community.
24. It is also correct, however, to state that not all laboratories conducting DNA testing are capable of testing animal hairs, either because of the technologies they use, or because of the analysts available, or both.
25. If called to testify in court, I would provide truthful and accurate testimony about all the subjects that I have covered here."

Further the affiant sayeth naught.

IN WITNESS WHEREOF, I hereunto set my hand this 22 day of

May, 2008.


DR. JOY HALVERSON

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see California jurat wording below.

Subscribed and sworn to before me this _____ day of _____, 2008.

Notary Public

My commission expires:

State of California County of

Yolo

Subscribed and sworn to (or affirmed)

before me on this 22 day of NOV, 2008, by

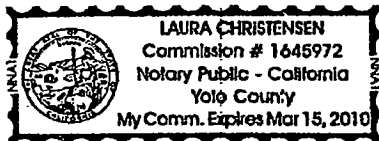
Joy Halverson (Halverson) LC 572708

proved to me on the basis of satisfactory evidence
to be the person(s) who appeared before me.

Signature

Laura Christensen

(Seal)



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