



February 19, 1993

Portage County Sheriff's Department  
203 W. Main Street  
Ravenna, OH 44266  
ATTN: Lt. John Ristity

SERI Case No: M'3449'93

BCI Lab No: 90-31768

Agency No: 90-2674

Victims: Bearnhardt Hartig  
Cora Hartig

Suspects: Butch Wolcott  
Tyrone Noling  
Gary E. St. Clair  
Joseph Dalesandro

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### ANALYTICAL REPORT

On February 10, 1993, five (5) items of evidence were received and on February 17, 1993, one (1) item of evidence was received at the Serological Research Institute from Lt. John Ristity, via Federal Express (6593403946 and 6507769321). A forensic serological comparison of these items was requested on a rush basis.

#### ITEM 1 BLOOD SAMPLE FROM JOSEPH DALESANDRO

This item consists of a single tube of liquid blood in fair condition. A portion of the blood was sampled and tested for ABO and for secretor status by the Lewis genetic marker. DNA was extracted from this sample, amplified by the Polymerase Chain Reaction (PCR), and grouped for the HLA DQ $\alpha$  genetic marker. The results are in the table.

#### ITEM 2 BLOOD SAMPLE FROM GARY E. ST. CLAIR

This item consists of a single tube of liquid blood in good condition. A portion of the blood was sampled and tested for ABO and for secretor status by the Lewis genetic marker. DNA was extracted from this sample, amplified by the Polymerase Chain Reaction (PCR), and grouped for the HLA DQ $\alpha$  genetic marker. The results are in the table.

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**ITEM 3 BLOOD SAMPLE FROM BUTCH WOLCOTT**

This item consists of a single tube of liquid blood in good condition. A portion of the blood was sampled and tested for ABO and for secretor status by the Lewis genetic marker. DNA was extracted from this sample, amplified by the Polymerase Chain Reaction (PCR), and grouped for the HLA DQ $\alpha$  genetic marker. The results are in the table.

**ITEM 4 BLOOD SAMPLE FROM TYRONE NOLING**

This item consists of a single tube of liquid blood in good condition. A portion of the blood was sampled and tested for ABO and for secretor status by the Lewis genetic marker. DNA was extracted from this sample, amplified by the Polymerase Chain Reaction (PCR), and grouped for the HLA DQ $\alpha$  genetic marker. The results are in the table.

**ITEM 5 CIGARETTE BUTT**

This item consists of a flattened, smoked, white filtered cigarette butt. No logo is visible on the burnt end. A trimmed portion of the smoked end had been removed and placed in a separate container (Item 5A). A portion of this paper was sampled and tested. The remaining filter (Item 5B) was also examined and three (3) areas were sampled. One next to the trimmed filter paper over wrap (Item 5B-2), a portion of the filter element at the smoked end (Item 5B-1) and an area near the burnt end for a blank control. The pieces were extracted and a small portion of the debris pellet from each of the extracts was examined microscopically for nucleated epithelial cells (oral cavity cells). Nucleated epithelial cells were identified in the debris pellets from the smoked areas. The liquid extract was tested for the enzyme amylase, ABO, and secretor status. The remaining cellular pellets and control were digested for their DNA content. The DNA solutions were subjected to the PCR test and grouped for the HLA DQ $\alpha$  genetic marker. The genetic marker results are in the table.

**ITEM 6 SALIVA FROM TYRONE NOLING**

This item consists of a dried saliva sample on gauze. A portion was extracted and tested for ABO and secretor status. The results are in the table.

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**TABLE OF RESULTS**

ITEM NO.	DESCRIPTION	ABO	LEWIS	SECRETOR STATUS	HLA DQ $\alpha$
1	Blood from J. Dalesandro	O	a-b+	Secretor	2,4
2	Blood from G. St. Clair	O	a-b+	Secretor	2,4
3	Blood from B. Wolcott	O	a+b-	Nonsecretor	1.1,3
4 and 6	Blood and Saliva from T. Noling	O	a-b-	Secretor	1.2,1.2
5A	Trimmed Filter Paper	NA	a+b-	Nonsecretor	NA
5B-1	Filter Element	NA	a+b-	Nonsecretor	3,4 (wk)
5B-2	Filter Paper Over Wrap	NA	a+b-	Nonsecretor	3,4
5 Control	Control Area from Burnt End	NA	NA		NA

KEY: NA = No activity (wk) = Weak activity

**EXPLANATION**

The enzyme amylase is found in many body fluids including saliva, urine, blood serum, perspiration and vaginal secretion. The highest concentration of amylase is found in saliva followed by perspiration, urine and vaginal secretion. Amylase can be separated into two types: Amy 1 and Amy 2. Amy 1 is found in saliva and perspiration. Amy 2 is found in urine and vaginal secretion. Vaginal secretion can also contain Amy 1. A small amount of amylase activity was detected in Items 5B-1 and 5B-2, but none in Item 5A or the blank control.

A secretor is a person who secretes his ABO blood group substances together with H substance into his body fluids (e.g. semen, saliva, vaginal secretion, etc.). Therefore, an A secretor will secrete A plus H, a B secretor B plus H and an O secretor just H. The method for detecting the blood group substances in body fluids is known as absorption inhibition. Body fluids from ABO nonsecretors give test results of no activity by the inhibition test. The more sensitive absorption elution test is used for detecting the small amount of ABO blood group substances which are found in nonsecretors and also in dilute stains from secretors.

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The four (4) samples from the Cigarette Butt (Item 5) had no activity for the ABO absorption inhibition and absorption elution tests.

The Lewis inhibition test can indicate ABO secretor status. A Lewis a-b+ is an ABO secretor, an a+b- is an ABO nonsecretor and a type a-b- can be either an ABO secretor or nonsecretor.

The Cigarette Butt (Item 5A, 5B-1 and 5B-2) extracts all had Lewis inhibition results of a+b-. Therefore, the smoker of the cigarette butt is a nonsecretor of unknown ABO type.

Deoxyribonucleic acid or DNA is found in nucleated cells, e.g. white blood cells, spermatozoa, salivary, vaginal and tissue epithelial cells. The DNA can be extracted and the amount obtained is proportional to the number of cells present.

Two types of DNA testing are presently available. One detects the presence of Restriction Fragment Length Polymorphisms (RFLPs) in the DNA. This is commonly known as "DNA Profiling" or "DNA Fingerprinting" and in most cases results in either a positive identification or exclusion of an individual as a donor. This analysis requires approximately 100 ngs of high quality DNA for a successful determination.

The second method relies on identifying a small specific section of DNA known as the HLA DQ $\alpha$  locus wherein there are twenty-one (21) different phenotypes. Although there may be an elimination of a person using this system clearly an identification to the exclusion of all others is not possible. The advantage of this method is that it requires substantially less DNA as the recovered DNA can be amplified (increased in amount) in order to obtain successful typing. The amplification uses the Polymerase Chain Reaction (PCR) method.

The Human Leukocyte Antigen Class II (HLA-D) genes are located on chromosome 6. The HLA-D genes are organized into three regions: HLA-DR, -DQ, -DP, each of which encodes an alpha and beta glycopeptide. The sequence of DNA found in the HLA DQ alleles is known.

The typing is performed by hybridizing the amplified DNA to nylon strips containing specific probes which will recognize the six common DQ $\alpha$  alleles detected (DQ $\alpha$  1.1, 1.2, 1.3, 2, 3 and 4). These alleles will give rise to 21 possible types. The end result is the visualization of an enzymatically detected dye giving rise to a series of colored dots. The number and position of the dots determines the type.

Because DQ $\alpha$  is a genetic marker following the normal rules of genetics, a maximum of two alleles only are expressed in any one individual. Therefore, the detection of more than two alleles indicates a mixture of body fluids from more than one individual.

The Cigarette Butt (Item 5B-1 and 5B-2) had HLA DQ $\alpha$  results of 3,4.

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CONCLUSIONS

1. Joseph Dalesandro and Gary E. St. Clair are both ABO type O secretors and HLA DQ $\alpha$  type 2,4. Butch Wolcott is an ABO type O, a nonsecretor, and an HLA DQ $\alpha$  type 1.1,3. Tyrone Noling is an ABO type O secretor and an HLA DQ $\alpha$  type 1.2,1.2.
2. The smoker of the Cigarette Butt (Item 5) is a nonsecretor of unknown ABO type and an HLA DQ $\alpha$  type 3,4. The combination of groups present in Item 5B occurs in approximately 2.3% (or 2 in 86 persons) of the Caucasian population, in approximately 1.9% (or 1 in 53 persons) of the African-American population, and in approximately 2.8% (1 in 36 persons) of the Mexican-American population.
3. Joseph Dalesandro, Gary E. St. Clair, Butch Wolcott, and Tyrone Noling could not be the person who smoked the Cigarette (Item 5).

SEROLOGICAL RESEARCH INSTITUTE



Gary C. Harmor  
Senior Forensic Serologist

GCH/par

cc: Robert Durst, Chief Criminal Prosecutor

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