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Formal Written Statement

Jayshree Patel states:
My full name is Jayshree Patel. I am a forensic scientist employed by the Institute of Environmental Science and Research Limited, known as ESR, Mt Albert, Auckland.

I have a Bachelor of Science Honours degree in Biochemistry gained in 1991, from the University College of North Wales, United Kingdom. I also hold a Master of Science degree in Medical Genetics from the University of Newcastle-Upon-Tyne, United Kingdom, gained in 1992. From 1992 onwards, I have worked in the field of human DNA profiling. Since 1995 I have been working more specifically in the area of forensic DNA profiling. From 1995 - 2003 I was employed by the United Kingdom's Forensic Science Service, where my time included the examination of items for blood and other bodily fluids. My roles there also included training Court Reporting Scientists in the interpretation of DNA evidence. I have been employed as a Scientist by the Forensic Biology Group of ESR since January 2004.

ESR is a Crown Research Institute and its functions include the provision of independent forensic testing and advice. The ESR forensic laboratories are accredited to an international standard in the field of Forensic Science Testing.[1]

Exhibit Receipt
An ESR Custody Record for this case is available if required.

The sample descriptions used in this statement have been taken from sample packaging or accompanying documentation.

Purpose of Examination
I understand from accompanying documentation that the samples submitted relate to an investigation into the death of Mr Crispin Dye.

Furthermore, I understand that in lieu of a reference DNA sample for Mr Dye, the sample submitted from the shirt, item 3aix (X0000638079), is to be used as a putative reference DNA sample for him.

[1] *ANAB, the ANSI National Accreditation Board provides accreditation services to the forensic laboratories of ESR to the international standard of ISO/IEC 17025. ANAB provides accreditation services to public and private sector organisations and is a subsidiary of the American National Standards Institute (ANSI).*

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I have been asked to analyse the sample from the jeans, item 1xiii (X0000638075), and determine whether or not DNA profiling results suitable for comparison could be obtained. I understand that from previous testing undertaken at the Forensic & Analytical Science Service, New South Wales, that the jeans sample is of poor quality and the DNA is degraded.

Both of the samples submitted were analysed using the specialist method of DNA analysis known as **mini-Short Tandem Repeat (mini-STR) DNA profiling** which analyses eight DNA sites. The test is useful for samples containing substances that may prevent a standard STR DNA profiling test from working effectively, or for samples which may contain smaller amounts of DNA that may possibly be of poor quality. Technical details relating to this procedure are presented in Appendix 1 of this statement.

Examinations, Results and Opinions

The results and conclusions provided in this statement form my expert opinion, which is based on my scientific knowledge, experience and training. These results apply to the items as received and relate only to the items tested.

I have received assistance from scientific support staff for some aspects of the examinations completed in this case.

A Summary of DNA Results is provided in Appendix 2. This summary should be referred to in conjunction with this statement.

When the contributor of DNA to a sample is unknown, the contributor may be referred to by a letter, for example, Male A. Where contributors are referred to by different letters, the DNA in these samples have originated from different individuals, for example, Male A could not be the contributor of DNA to a sample described as from Male B. These DNA profiles would be suitable for comparison to reference DNA samples should any become available.

Mini-STR DNA profiling results

A male DNA profile was obtained from the **stained area of the shirt, item 3aix (X0000638079)**. I shall refer to the source of this DNA as **Male A**. The DNA profile of Male A is suitable for comparison. For the purposes of this statement this DNA profile will be used as a putative reference DNA sample for Mr Dye.

No additional DNA was detected in this sample using this test.

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A mixed DNA profile was obtained from the **stained area of the jeans, item 1xiii (X0000638075)**. By mixed I mean that more than one person has contributed DNA to this sample, and that in this instance at least two people have contributed DNA in approximately equal proportions. It was determined that some of the DNA present could have originated from Male A. If this DNA profile is assumed to be from Mr Dye, then the finding of DNA from Mr Dye on items of clothing that I understand to have been worn by him would not be unexpected.

To progress with an interpretation of these results further, I have assumed that two people have contributed DNA to this sample and that Male A is one of these two contributors.

Under these assumptions a DNA profile, in my opinion from a male, was determined for the remaining DNA contribution to the jeans sample. I shall refer to the source of this DNA as **Male B**. The DNA profile of Male B is suitable for comparison.

No additional DNA was detected in this sample using this test.

Appendix 3 provides the DNA profiles determined for each of Male A and Male B at the eight DNA sites of the mini-STR DNA test used.

Please note it is not possible to identify the type of cells from which this DNA has originated, neither is it possible to state when or how the cells were deposited. If the potential origins of the DNA profiles cannot be identified, it may not necessarily follow that they are relevant to this case, since transfer of cells can occur as a result of other legitimate contact mechanisms. The relevance of these DNA results requires careful consideration in the context of this case given the sensitivity of the techniques employed and the possibility that the DNA tested is unconnected with the alleged offence under investigation.

My interpretation and conclusions are based on the information available to me at the time of this examination. Should this information change, I may need to re-evaluate my conclusions.

I confirm the truth and accuracy of this statement. I make this statement with the knowledge that it is to be used in court proceedings. I am aware that it is an offence to make a statement that is known by me to be false or intended by me to mislead.

Ms Jayshree Patel
02 June 2023

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Appendix 1: Technical Information Relating to STR Profiling at ESR

This appendix is not to be read aloud. It is provided to be produced as an exhibit for the court if required.

The STR (short tandem repeat) profiling technique involves the analysis of areas of short, repeated lengths of DNA. A method known as the Polymerase Chain Reaction, (PCR), is used. During the PCR, specific regions of DNA are located and then copied many times. In this way, minimal amounts of DNA isolated from small or degraded samples can be increased to a level where they are able to be detected, profiled and compared with other samples.

The STR profiling technique is usually combined with a sex test which determines whether the DNA in a particular sample is most likely to have originated from a male or a female.

At ESR, STR profiles are obtained from a number of loci simultaneously in multiplexed reactions. For a list of the loci which have been used for samples for this case, refer to Table 1 below. The resultant STR profiles are visualised as a pattern of peaks following automated laser-induced fluorescence. Sample profiles are deduced by reference to allelic ladder standards.

The results from samples that appear to correspond can be statistically assessed and the evidential significance of the results can be estimated. Frequency information is obtained from population databases constructed by ESR for the major ethnic groups in New Zealand. A verbal statement of opinion as to the significance of the results is provided using the following scale:

Likelihood Ratio	Verbal Equivalent
1	is neutral
1 - 10	provides slight support
10 – 100	provides moderate support
100 – 1,000	provides strong support
1,000 – 1,000,000	provides very strong support
Over 1,000,000	provides extremely strong support

Table 1: Loci used in mini-STR Profiling

D13S317	D2S1338	D18S51
D7S820	D21S11	CSF1PO
Amelogenin	D16S539	FGA

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Appendix 2: Summary of mini-STR DNA Results

ESR Reference	External ID	Sample Description	Could Have Come From
23ESR05855-1	3aix (X0000638079)	Stained area of shirt	Male A (As requested, an assumed putative reference sample for Mr Dye)
23ESR05855-2	1xiii (X0000638075)	Stained area of jeans	Mixed DNA profile, assuming from two people: Male A (assumed) and Male B

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Appendix 3: Mini-STR DNA Profiling Results

Profile name	D13S317	D7S820	Amel	D2S1338	D21S11	D16S539	D18S51	CSF	FGA
Male A	9, 13	9, 12	X, Y	21, 23	29, 30	11, 14	16, 17	11, 12	21, 25
Male B	8, 11	10, 12	X, Y	17, 17	30, 30	11, 12	15, 18	10, 12	20, 23.2