

DNA PROFILING IN CRIMINAL CASES: A MEDICO-LEGAL PERSPECTIVE

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I hereby declare that the work in this academic project is my own except for quotations and summaries which have been duly acknowledged.

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In the Name of Allah, Most Gracious, Most Merciful

Praise be to Allah. Blessing and peace be upon the Prophet, Muhammad (pbuh) his family and companions. First and foremost, I would like to express my gratitude to Allah for His consent, I can complete this research project.

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ABSTRAK

Kajian ilmiah ini mengkaji tentang pemakaian *Deoksiribonukleik Asid* (DNA) dari perspektif medico-legal dan menghuraikan lebih terperinci tentang sifat semulajadi DNA serta pengaplikasian teknik pemprofilan DNA. Di samping itu, kebolehterimaan pemprofilan DNA dalam undang-undang Syariah dan undang-undang sivil turut dikaji bagi menyakinkan bahawa bukti saintifik diterimapakai sebagai salah satu cara keterangan melalui pembuktian. Kes-kes jenayah tempatan melibatkan kes bunuh dan rogol di mana siasatannya menggunakan teknik pemprofilan DNA juga dikaji bertujuan untuk memberi gambaran sejauh mana penerimaannya di Malaysia hari ini. Dengan adanya kajian ini, diharap dapat memupuk kesedaran serta kefahaman kepada masyarakat tentang keberkesanan teknologi ini dalam menjejaki penjenayah khususnya.

ABSTRACT

This academic project examines the use of *Deoxyribonucleic Acid* (DNA) from the Medico-Legal perspective it further elaborate the nature of DNA profiling and applications of DNA profiling techniques. Beside, it studies the admissibility of DNA profiling according to Syariah and Civil as the evidential proof. Selected local criminal cases especially in murder and rape are highlighted to provide better picture of the use of DNA profiling technique in criminal investigation and in the courtroom. The greatest concern is the importance of DNA profiling in facilitating the process of investigation. Indeed, this research may inculcate awareness amongst members of society as to the advancement of technology to crack down criminals.

ملخص البحث

هذا الدراسة تعتبر دراسة عن تقرير الجينات الوراثية (DNA) في القضايا الجنائية خاصة في قضية القتل والاعتصاب في نظر القانون الطبي. وتبحث هذه الدراسة حول إجراءات الجينات الوراثية (DNA) في نظر الطبي وعملية القرينة في نظر الإسلامى. وبجانب ذلك أن قبول تقارير الجينات الوراثية (DNA) في القانون الشرعى و القانون المدنى الذى تقدّم هذه الدراسة تكون تبريرا على أن العلوم الحديثة لها قوة خاصة ويمكن قبولها للتبرير. وكذلك التحديات المواجهة على استخدام هذه العمليات تكون من ضمن الموضوعات هذا البحث. وأيضا أن هذه الدراسة تبحث عن القضايا الجنائية المحلية وخاصة القتل والاعتصاب الذى استخدمت إجراءات بتقرير الجينات الوراثية (DNA) لمعرفة مدى قبول هذه العملية بماليزيا. وبوجود هذه الدراسة توضح أهمية تقارير الجينات الوراثية (DNA) لغرس الشعور والإفهام لدى المجتمع حول تأثير هذه العملية خصوصا لتفتيش الجناة.

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GLOSSARY

<i>Al-Qur'an</i>	: The Holy Book revealed by Allah SWT to Prophet Muhammad SAW
<i>As- Sunnah</i>	: The tradition of Prophet Muhammad SAW including his deeds, saying and approval
<i>Ayah</i>	: Signs
<i>Bayyinah</i>	: Evidence
<i>Companions</i>	: The companions of Prophet Muhammad SAW who embraced Islam during the lifetime of the Prophet
<i>Diyyah</i>	: Compensation paid causing death
<i>Had (pl Hudud)</i>	: Offence and penalty prescribed by Allah
<i>Hudud</i>	: Several specific crimes and punishment lay down in the Qur'an
<i>Imam Ahmad</i>	: The disciples and followers of Imam Ahmad Ibn Hambal
<i>Imam Malik</i>	: The disciples and followers of Imam Malik Ibn Anas
<i>Imam Syafie</i>	: The disciples and followers of Imam Muhammad Ibn Idris Ash-Syafie
<i>Iqrar</i>	: Admission
<i>Islamic Jurisprudence</i>	: Fiqh
<i>Islamic Law</i>	: Practical law of Islam
<i>Lauth</i>	: Signs
<i>Mu'amalat</i>	: Civil transactions
<i>Qarinah</i>	: Circumstantial evidence
<i>Qasamah</i>	: Oath
<i>Qisas</i>	: The law of equality, retaliation
<i>Qiyafah</i>	: Evidence or to prove paternity
<i>Pbuh</i>	: Abbreviation of "Peace be Upon Him". It is compulsory for a Muslim to utter this blessing wherever he hears the Prophet Muhammad's name mentioned.

<i>r.a</i>	: Abbreviation of “ <i>Radhi Allahu ‘An Hu</i> ” meaning “Upon Him the Blessing of Allah”
<i>Righteous Caliph</i>	: Caliph Abu Bakar as-Siddiq, ‘Umar ibn al-Khattab, ‘Uthman Ibn ‘Affan and ‘Ali ibn Abi Talib
<i>SWT</i>	: Abbreviation of “ <i>Subhanahu wa Ta’ala</i> ” meaning “The AlMighty God”
<i>Shahadah</i>	: Testimony of a witness
<i>Shariah</i>	: The collective name for all laws ordained by Allah SWT for His servants through Prophet Muhammad SAW including the Islamic systems of ‘aqidah, akhlaq, ‘ibadah and mu’amalah.
<i>Surah Yusuf</i>	: Chapter twelve of Al-Qur’an
<i>‘Ulama</i>	: Islamic jurists
<i>Zina</i>	: Adultery or fornication

TRANSLITERATION
ARABIC WORDS TRANSLITERATION SYSTEM
TRANSLITERATION TABLE

1. ALPHABET

<u>Arabic</u>	<u>Latin</u>	<u>Example</u>	<u>Transliteration</u>
ء	,	فأر	fa`r
ب	b	برد	burd
ت	t	تل	tall
ث	th	ثوب	thawb
ج	j	جدار	jidar
ح	h	حليب	halib
خ	kh	خادم	Khadim
د	d	ديك	dik
ذ	dhz	ذهب	dhzahab
ر	r	رفيق	rafīq
ز	z	زميل	zamil
س	s	سلام	salām
ش	sh	شعب	sha ^c b

ص	s	صخر	sakhr
ض	d	ضيق	dayq
ط	t	طالب	talib
ظ	z	ظالم	zalim
ع	c	عقل	°aql
غ	gh	غلام	ghulam
ف	f	فيل	fil
ق	q	قلب	qalb
ك	k	كلام	kalam
ل	l	لب	lubb
م	m	مال	mal
ن	n	نجم	najm
هـ	h	هول	hawl
و	w	ورق	waraq
ي	y	يم	yam

2. Short Vowel

<u>Arabic</u>	<u>Latin</u>	<u>Example</u>	<u>Transliteration</u>
ا	a	كتب	kataba
ي	i	علم	°alima
و	u	غلب	ghuliba

3. Long Vowel

<u>Arabic</u>	<u>Latin</u>	<u>Example</u>	<u>Transliteration</u>
أ، آ	a	عالم، فتى	°Alim, fata
ي	i	عليم، داعي	°Alim, da°i
و	u	علوم، أدعو	°Ulum, Ad°u

4. Diphthong

<u>Arabic</u>	<u>Latin</u>	<u>Example</u>	<u>Transliteration</u>
و	aw	نوم	nawm
ي	ay	ليل	layl
و	iy	شافعي	Shafi°iy(ending)
ي	uw	علو	°uluww(ending)

ABBREVIATIONS

AMR	: All Malayan Report
DNA	: Deoxyribonucleic Acid
DSP	: Deputy Superintendent of Police
Etc	: et cetera
Ibid	: Same reference
MLJ	: Malayan Law Journal
MPL	: Multi Probes Locus
n.pb	: No Publication
n.pl	: No Place
P	: Page
PBUH	: Peace be upon Him
PCR	: Polymerase Chain Reaction
PCR-STR	: Polymerase Chain Reaction-Short Tandem Repeat
RMP	: Royal Malaysia Police
SPL	: Single Probes Locus
Trans	: Translator / Translated by
Vol	: Volume

CHAPTER ONE

CHAPTER ONE

DNA PROFILING: THE NEW SCIENCE OF IDENTITY

1.1 Introduction

DNA Profiling is a revolutionary new technique that has been implemented in forensic laboratories all over the world. As one of the developing country, Malaysia has been implementing the technology of forensic science including DNA profiling to crack down criminals in this country. It has also enabled also more effective strategies to solve numbers of crime within a shorter time.

1.2 *Deoxyribonucleic Acid: A Medical Perspective*

1.2.1 Definition

DNA is an abbreviated form for *Deoxyribonucleic Acid*. It is a complex chemical substance found in the nucleus of each cell which carries information required for the development of an individual. The DNA of every individual with the exception of identical twins is unique.¹ DNA is the molecules carrying the body's genetic information. DNA is double-stranded in the shape of a double-helix.²

According to Stedman's Medical Dictionary, DNA is a chromo nucleic acid the type of nucleic acid containing deoxyribose as a sugar component and found principally in the nuclei (chromatin, chromosomes) of animal and vegetable cells, usually loosely bound to protein (hence termed deoxyribonucleo protein) considered to be the autoreproducing

¹ Malaysia, Department of Chemistry. 25 Oct 2005. "What is DNA?". *DNA Profiling-The New Science of Identity*. [http:// www.kimia.gov](http://www.kimia.gov). (in English). p.1

² Richard Saferstein. 2001. *Forensic Serology- Criminalistics, an Introduction to Forensic Science*. New Jersey: Pearson Prectise Hall. 7th edition. p. 354

component of chromosomes and of many viruses and the repository of hereditary characteristic.³ This definition infers that DNA also can be found in all living organism.

It is noteworthy here that every human body has chemical substance and carries genetic information embodied in a cell. Every person has different DNA and the DNA of every person with the exception of monozygotic twins is unique. It is no wonder if the identification of someone may be traced out within a short period.

1.2.2 Sources

DNA is made up of millions of cells. It is everywhere in human body including in hair, saliva, skin and blood. These particles make up a code that is used to tell people apart. Only materials that are biological in nature are subject to DNA analysis.

The forensic scientists mention the biological materials that may be successfully separated and analyzed are blood and bloodstains, semen and seminal stains, tissue, bones and organs, hair with follicles and other biological material such as saliva, urine, tears and perspiration provided they contain sufficient cells with DNA.⁴

They also take advantage of the advance of DNA technology using biological material in the individualization. The search for genetically controlled blood factors in bloodstains for example, is abandoned in the characterization of biological substance by selecting regions of our DNA. It has now significantly altered the role crime laboratories play in criminal investigations.⁵

³ *Stedman's Medical Dictionary*. "Deoxyribonucleic Acid". Philadelphia: Lippincott William & Wilkins. 24th Edition. p. 377.

⁴ Malaysia, Department of Chemistry. "Sources of DNA". *DNA Profiling-The New Science of Identity*. <http://www.kimia.gov>. (in English). p.1.

⁵ Richard Saferstein. *Forensic Serology- Criminalistics, an Introduction to Forensic Science*. p. 320. See also see **Appendix C- Location of DNA**

The majority of forensic scientists believe that the biological material such as blood, semen, tissue, saliva and other biological material provide invaluable information in the medico-legal investigation. They may be easily destroyed by the surrounding environment, high temperature, moisture and bacteria. Therefore, it should be kept in the place of safety.

Among successful biological substances are blood and bloodstains. The assessment of blood and bloodstains at the crime scene, on the bodies, clothes and weapons may derive information regarding the time of death, the manner of death and may infer the evidence and the relationship between the victim and the suspect. The blood or bloodstains sample taken by the forensic investigators will then be sent to DNA laboratory.⁶

Before sending the samples of blood or bloodstains to the DNA laboratory, it must be dried properly at room temperature to preserve the nature of the *hemoglobin*. *Hemoglobin* is a red blood cell protein responsible for transporting oxygen in the bloodstream and the coloring of blood.⁷ Exposure to the high temperature including direct sunlight and heat will be denaturing *hemoglobin*. Such stains may be eliminated by fruit juices, coffee, paint, lipstick, nail polish etc.

During sample collection, stains on large heavy material such as doors, windows and furniture should be cut off. If that is not possible, the stains may be transferred on to a moist filter paper. Wet stains in large quantities may be soaking on filter paper and to be dried. Alternatively, loose sand may be used to absorb large quantities of fluid blood. Stains present on the body should be transferred on to a filter paper moist with normal saline. The stains on finger nails are collected by clipping the nails. Each material is described, labelled and packed separately.⁸

⁶ William G.Ecrt & Stuart H.James. 1993. *Medico legal Aspects of Blood Evidence-Interpretation of Bloodstain Evidence at Crime Scene*. n.pl: CRC Press. 1st Edition. p. 85

⁷ *Collins Cobuild-Learner's Dictionary*. 1996. "Hemoglobin". London: HarperCollins Publishers. 1st Edition. p. 493

⁸ P.V.Guharaj. n.d. *Blood and Bloodstain: Collection, Preservation and dispatch- Forensic Medicine*. India: Orient Longman Limited. 1st Edition. p.252

A great number of cases received in a DNA laboratory like sexual offences making it necessary to examine exhibits for the presence of semen or seminal stains. Semen and seminal stains are important parts of the investigation in rape, sodomy, bestiality and other sexual offences. The normal male will release 2.5 until 6 milliliters of seminal fluid normally during an ejaculation. Fresh ejaculation is alkaline (PH 7.5 until 8), yellowish white in colour with a characteristic odour. Each milliliter of seminal fluid contains 100 millions or more spermatozoa.⁹

Any samples of semen or seminal stains will be sent to DNA laboratory for analysis. Any material stains with semen such as clothes, face tissues and other should be dried properly before being packed. Seminal stains must be contamination free. If vaginal content are also examined, the specimen should be obtained from the posterior fornix. Several vaginal smears should be made at the same time on clean glass slides.

The smears should be immersed immediately in a fixative which contains equal quantities of absolute alcohol and ether. Suspect stains on pubic or perineal hair should be collected by clipping the hair. Dry stains on the skin are gently scraped off with a scalpel. Every item should be labelled separately before dispatch.¹⁰

1.2.3 Nature

From day to day, the forensic science plays an important role to crack down the criminals. Scientifically and legally speaking, the application of DNA technology has substantially proved its accurateness and has assisted prosecution in proving a *prima facie* case.

⁹ Richard Saferstein. *Forensic Characterization of Semen-Criminalistics, an Introduction to Forensic Science*. p.342

¹⁰ P.V.Guharaj. *Semen and Seminal stains: Collection, Preservation and Dispatch-Forensic Medicine*. p.270

The cells in the human body called *chromosome* carries the genetic information. Each cells contained about 100,000 genes. The gene is the fundamental unit of heredity. It instructs the body cells to make proteins that determine everything from hair colour to our susceptibility to diseases. Each gene is composed of DNA specifically designed to carry out a single body function.¹¹

DNA is the material that carries all the genetic information for inheritance from generation to generation.¹² In actual terms, DNA molecule is a *polymer* or a long chain molecule made up of repeated unit called *nucleotides*. The *nucleotides* are a molecule of sugar bound to containing phosphorus and another containing nitrogen. Each sugar molecule has one of four types of nitrogen compound molecules called *based* attached to it. These are *adenine*, *cytosine*, *guanine* or *thymine*. The complete chain contains millions of these bases and uses these four basic building blocks in different combinations to draw up the blueprint for a complete living organism.¹³

1.2.4 *Double-Helix: The Structure of DNA*

The structure of DNA called *Double-Helix* was discovered by James Watson and Francis Crick at Cambridge, England in 1953. This successful discovery led them winning Nobel Prize for physiology. Today, *Double-Helix* was acceptable as a foundation component of DNA.¹⁴

DNA is not built like a twisted ladder. The helix is an inherent feature of the DNA molecule. DNA molecule is actually composed of two DNA strand coiled into a double-helix resembling 2 wires twisted around each other and the double-helix configuration

¹¹ Richard Saferstein. *The Indispensable Forensic Science Tool-Criminalistics, an Introduction to Forensic Science*. p.361

¹² Robert R.Ogle, Jr. 2004. *Crime Scene Investigation and Reconstruction- Introduction to Physical Evidence*. New Jersey: Pearson Prentice Hall.1st Edition. p. 133.

¹³ David Owen. 2000. *Hidden Evidence- DNA: the Ultimate Identifier*. London: Timelife Books. 1st Edition. p. 200

¹⁴ Ibid. p. 201. See also **Appendix D-The Structure of DNA**.

was to place base *Adenine* (A) opposite *Thymine* (T) and *Guanine* (G) opposite *Cytosine*(C). Finally, Watson and Crick were found the puzzle of the *double-helix* and introduced the elegant picture of DNA.¹⁵

The aforementioned structures show that DNA contains two halves. The two halves held together by hydrogen bond, a sort of electrical attraction between partially negative atoms on the one side with the partially positive atom on the other side. A single such piring would not hold the molecule together well, but several million such bonds a quite effective.¹⁶

1.2.5 Forensic Science and DNA Profiling: A Historical Discovery

The forensic science was introduced by a Frenchman, Dr. Edmund Locard around early 1900. He explained three basic principles dealing with forensic science namely the suspect, the victim and the crime scene. Better known as "*Locard's Exchange Principle*", it directs the exchange of materials between two objects that occurs whenever they come into contact with one another.¹⁷

Around early nineteenth century, Germany biologists discovered the *acid nucleic* and *long chain polymers nucleotides* which are the main substances in the DNA. Around 1869, Johann Friedrich Miescher identified a weakly acidic substance of unknown function in the nuclei of human white blood cells. This substance will later be called *deoxyribonucleic acid*, or DNA.¹⁸

¹⁵ Richard Saferstein. *DNA: The New Forensic Science Tool-Criminalistics, an Introduction to Forensic Science*. p.355

¹⁶ n.a. 2004. "DNA Helix." *Estidotmy*. Utusan Malaysia. (35): December. p. 20

¹⁷ Laupa Junus. 2004. "Dr. Edmund Locard Bapa Sains Forensik." *Estidotmy*. Utusan Malaysia. (35): December. p. 26

¹⁸ n.a. 29 Nov 2005. "The Historical of DNA". *Milestones in Biotechnology*. <http://www.accessexcellence.org>. (in English). p.1.

In 1943, the American scientist, Oswald Avery proved that the DNA carries the genetic information. Since the discovery, the DNA has been accepted as genetic molecule.¹⁹ Erwin Char Gaff, a biochemist, reported that DNA composition is species-specific; which means, that the amount of DNA and its nitrogenous bases varies from one species to another. Char Gaff found that the amount of adenine equals the amount of thymine, and the amount of guanine equals the amount of cytosine in DNA from every species.²⁰

Stanley Cohen and Herbert Boyer combined their efforts to create recombinant DNA. This technology will be the beginning of the biotechnology industry. After a few years, Herbert Boyer confounds Genentech, the first firm founded in the United States to apply recombinant DNA technology.²¹

Years after years, the DNA profiling has revolutionized forensic science since its introduction in 1986. The molecular biology of DNA forensic analysis was first developed by Prof. Sir Dr. Alec Jeffreys for a sexual assault case in England. The terms 'DNA Fingerprinting' and 'DNA profiling' now all refer to the same technique. Dr. Jeffreys discovered that the repeated DNA structures he was studying had the same core sequences; the variation he observed was unique to each individual. When this approach is applied on a slightly larger scale, each individual would have a unique pattern, distinguishable from all others. This forms the basis of current DNA forensic testing.²²

¹⁹ Hidayah Mohhammad. 2005. "*Rencana-DNA bukti kukuh jejak penjenayah*". Berita Harian. 8 October. p. 18.

²⁰ n.a. "The Historical of DNA". *Milestones in Biotechnology*. <http://www.accessexcellence.org>. (in English). p.1

²¹ Ibid.

²² n.a. 25 Oct 2005. "Forensic Testing". *Independent Forensic of Illinois*. [http:// www.IFI.com](http://www.IFI.com). (in English).p.1

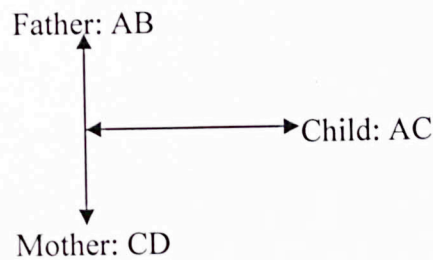
1.3 DNA Profiling as Tool of Investigation

1.3.1 Types and Applications of DNA Profiling

The new revolution of DNA discovered by Prof. Sir Dr. Alec Jeffreys opened a new way to the investigators around world nowadays to obtain any evidence and help them to seek correlation between the forehand facts and the crime itself. The use of DNA Profiling is not restricted to demonstrate the link between an individual and material arising from the commission of a crime. Indeed, DNA profiling is also useful for the investigation to determine verdict in the case of maltreatment.

In the paternity case, the investigator will carry out a several biological substance from the parent and the child. After that the substance will makes up a DNA profile using *Polymerase Chain Reaction-Short Tandem Repeat (PCR-STR)* profiling technique. When comparisons made between parent and child, the inheritance of these factors can be directly link between the generations.²³ The example is shown below:

Figure 1.1: Inheritance Factors between Parent and Child



Based on Figure 1, Factor A is inherited from the father and the Factor B is from the mother. Therefore, the man would possibly be the father of the child.

²³ n.a. 2005. "Family Relationships". *The Significance of DNA*. [http:// www.lgc.com](http://www.lgc.com). (in English). p.1.

A research has shown that probability of paternity not less than 99.9% when DNA profiling technique is employed.²⁴

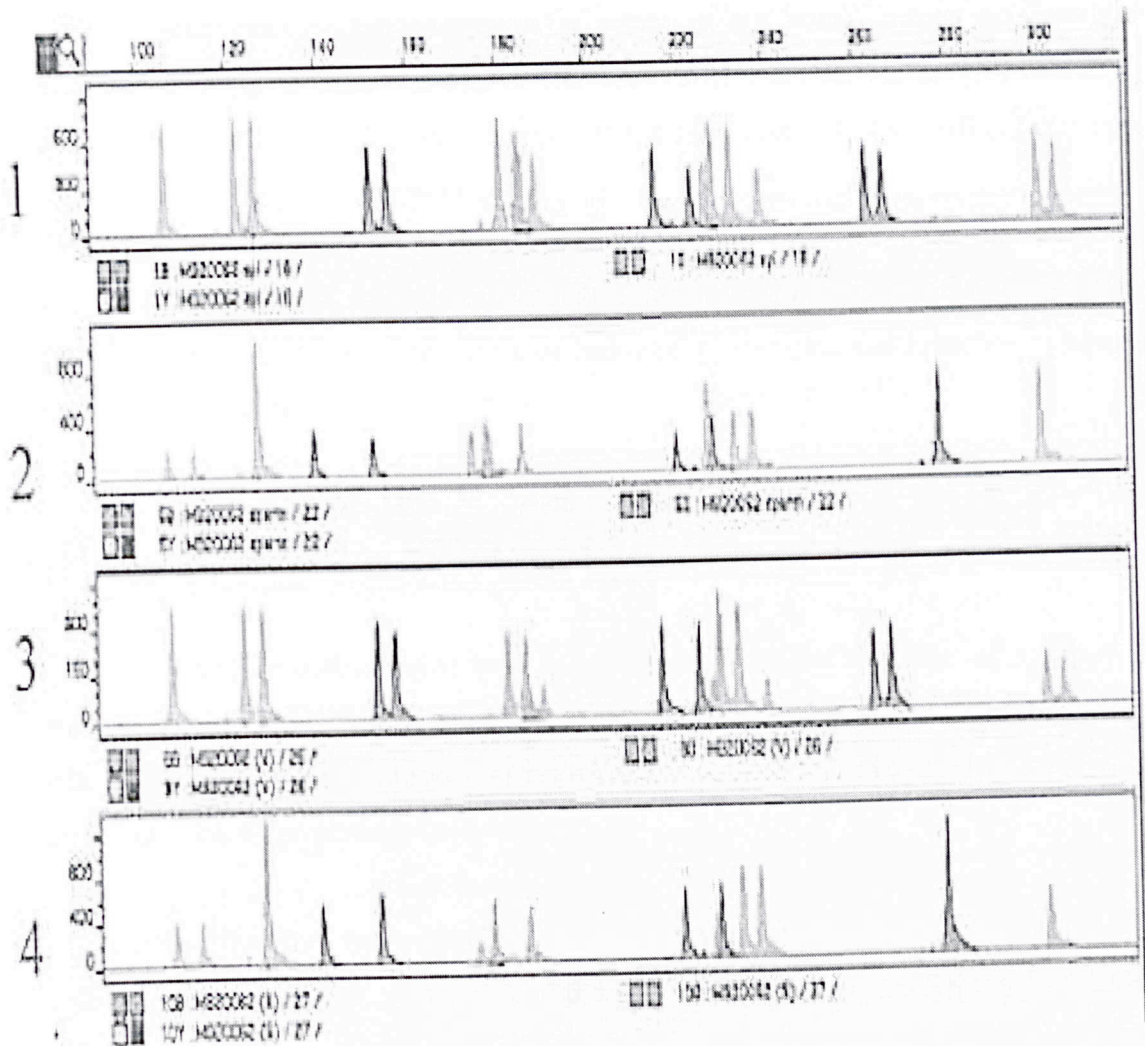
In criminal cases involving murder and rape, the forensic investigators will carry out samples of biological substances including hair, semen, blood, saliva and tissue taken out from the victim and in the vicinity of the crime scene. The substances will be labeled and packed separately before being sent to the laboratory. The *Polymerase Chain Reaction-Short Tandem Repeat* (PCR-STR) technique will apply to makes up DNA profile. Evidence from the crime scene and the profile of the suspect will then show relationship between them and useful evidence for the crime.²⁵

Below is the sample of the application of DNA profiling. It is apparent that evidence from crime scene in the second row matched the forth row, DNA profile of suspect.

²⁴ Malaysia, Department of Chemistry. "Interpretation of Result". *DNA Profiling-The New Science of Identity*. [http:// www.kimia.gov](http://www.kimia.gov). (in English), p.2.

²⁵ Hidayah Mohamad. "Rencana -DNA Bukti Kukuh Jejak Penjenayah". *Berita Harian*. p. 18.

Figure 1.2: Interpretation of Result



Source: Chemistry Department of Malaysia website.²⁶

Aside that, this technique may also enable the identification of victim. Particularly in cases like victim of aircraft crash, earthquake, flood and tidal waves.

²⁶ Malaysia, Department of Chemistry. "Interpretation of Result". *DNA Profiling-The New Science of Identity*. <http://www.kimia.gov>. (in English). p.3.

1.3.2 Challenges in DNA Profiling

It is a standard practice for laboratories conducting DNA analysis to comply with laboratory procedures and to be accredited by a qualified accreditation body. Over nearly twenty years since forensic DNA first entered the courtroom, DNA profiling has now become apparent in various jurisdictions.

The grounds of challenge to the use or admissibility of DNA evidence fall under three broad categories: human error, scientific or technical challenges, and breaches of human or constitutional rights.²⁷

a) Human error

What is the most reputable claim here is not directed against the flaw of analysis or science. It is rather on human actors involved at various stages; from the method of collecting sample at the crime scene to laboratory to courtroom have erred in some way, either unconsciously or perhaps deliberately.

As DNA testing becomes more sensitive, there is a grave likelihood of contamination of a sample by other biological material. If there is enough DNA on fingerprints, or in condensation left on a pane of glass, or in the saliva left on a glass after someone has drunk from it or on a cigarette butt after someone has smoked it, to obtain a usable profile, then the chance that the defendant's DNA, somehow found its way into the sample other than during the process of committing the offence. Having in place demonstrable processes for minimizing the potential for contamination is important.

²⁷ Interpol General Secretariat. 2003. "Areas of Challenges - Challenges to DNA in the Courtroom". (Paper). *Interpol's 3rd International DNA Users' Conference*. Lyon, France. 19-21 November. p.6

The most commonly error found are mishandling or mislabeling of the samples. It may occur when the investigators are unaware of or while the collecting of samples. Besides, misinterpretation of the test results. There are it may arise from discernable error of the compliance of the appropriate laboratory procedures.²⁸

b) Technical/ Scientific Error

There has not been any doubt cast on the theoretical underpinnings of DNA profiling, or its ability to assist identifying the source of a DNA sample. After an initial period when challenges focused on the transferring of the technique from the laboratory to the crime scene, these types of challenge now centre on the statistical presentation of the results, on the validity of aspects of PCR based techniques, and on the qualifications of the presenting witness. Technical or scientific challenge in DNA profiling includes statistical, non-disclosure of technical detail and or scientific peer view processes challenge in expert witness.²⁹

c) Human rights/Breach of constitutional rights

Most jurisdictions³⁰ provide protection of a citizen's right to privacy, right to be secured from unreasonable search, seizure and to a fair trial. However, a variety of legislative provisions in different jurisdictions have allowed for the compulsory provision of biological samples either upon arrest upon a Court being satisfied of sufficient suspicion on reasonable grounds, or after conviction of a qualifying offence. Violation of such constitutional protections may result to the exclusion of the DNA evidence derived from the biological samples obtained by the police.³¹

²⁸ Ibid. p.7

²⁹ Ibid. p.11

³⁰ For instance, United State (United States Constitution), New Zealand (Bill of Rights Act) and Canada (Canadian Charter of Rights and Freedoms).

³¹ Interpol General Secretariat. Areas of Challenges - Challenges to DNA in the Courtroom. p.16

1.3.3 DNA Profiling Techniques

Before DNA profiling technique called *Polymerase Chain Reaction-Short Tandem Repeat* (PCR-STR) technique was introduced, Prof. Sir Dr. Alec Jeffreys invented the origins of DNA profiling, *Multi Locus Probes* and *Single Locus Probes*.

Multi Locus Probes (MPL) technique offered a significant advance on the conventional blood grouping techniques that were then the order of the day. The profiles produced by the MPL method were complex pattern of up to sixteen or more bands. With chance of one in four people sharing any band, the likelihood of two unrelated people having the same of sixteen bands has been calculated at one in many millions. While MPL method proved to be highly discriminating, it was not very sensitive. The technique worked best on those materials such as semen, which were able to yield relatively large amount of chromosome DNA. This was complemented by the ability to separate the DNA from semen from other sources such as vaginal material or blood.³²

Problems associated with the MPL technique were reduced by the introduction of the *Single Locus Probes* (SLP) method. This method resulted in far simpler profiles of just two bands or sometime even only one. This simplification of the profile was accompanied by a large reduction in discrimination such that it was necessary to combine the result from four or more independent SLPs to get back to the discriminating power of the MLP method. This apart, the improved sensitivity of the SPL method meant that result could now be obtained from smaller amount of material which resulted in DNA profiling being applied to a much wider range of crime.³³

³² WDS MacLay. 1996. *The origins of DNA Profiling, Multi Locus Probe-Clinical Forensic Medicine*. Greenwich: Medical Media. 2nd Edition. p. 210

³³ Ibid. *The Introduction of Single Locus Probes*. p.211

The quest for increased sensitivity also led forensic scientist to look at the novel *Polymerase Chain Reaction* (PCR). *Polymerase Chain Reaction* is a technique for replicating or copying a portion of a DNA strand outside a living cell. This technique led to millions of copies of the DNA strand.³⁴ Small quantities of DNA or broken pieces of DNA found in crime scene evidence can be copied with the aid of a DNA polymerase.

In 1994, the Forensic Science Service launched a new PCR based method of DNA profiling which analyzed areas of DNA known as *Short Tandem Repeats* (STR). This technique called *Polymerase Chain Reaction-Short Tandem Repeat* (PCR-STR) and DNA laboratory all over world used this analytical technique at present. This up-to-date technique involves using of a multiplex system where the profile for a total of fifteen genetic loci is obtained while also being able to determine the gender of the sample source. The PCR-STR technique has high discriminating power. Thus, the probability that two individuals possess the same DNA profile is in the region of one in several million people.³⁵ Technique is proven fast, efficient and accurate.

³⁴ Richard Saferstein. *DNA: The New Forensic Science Tool-Criminalistics, an Introduction to Forensic Science*. p.359

³⁵ Malaysia, Department of Chemistry. "Interpretation of Result". *DNA Profiling-The New Science of Identity*. [http:// www.kimia.gov](http://www.kimia.gov). (in English). p.3.

1.4 *Al-Qarinah*: An Islamic Perspective

1.4.1 Definition

Al-qarinah is one type of evidence that was impliedly used to prove verdict on the allegation made by Yusuf a.s. His brother claimed that Yusuf was mauled by wolves. *Al-qarinah* is known as circumstantial evidence. Circumstantial evidence involves a series of facts, although not the fact at issue, tent, through inference, to prove fact at issue. This type of evidence is usually a chain of circumstances from which a fair assumption can be made as to the validity of the fact at issue.³⁶

The word *al-qarinah* is derived from the term (قَرَنَ) that means to join one thing to another or be together.³⁷ A Muslim scholar, Ahmad Fathi Bahansi defined *al-qarinah* means the together, accompanies or related. It also means a thing which explains something.³⁸

According to Abdul Karim Zaidan, *al-qarinah* is indeed wide and all-embracing as it cover anything which may be used as proof evidence to establish the existence or non-existence of thing. This means that the existence and non-existence of a thing may be established by *qarinah*.³⁹

Two elements shall exist to prove the preserve of *qarinah*. Firstly there must be apparent facts as the basis of arguments. Secondly, there is a nexus between apparent and invisible fact.⁴⁰

³⁶ Robert R.Ogle, Jr. *Introduction to Physical Evidence-Crime Scene Investigation and Reconstruction*. p. 1

³⁷ *Qamus Alfaz Al-Quran Al-Karim*. 1983. "Qarinah". Jeddah: Mu'assah Iqra'. 1st Edition. p.520. (Arabic-English).

³⁸ Mahmud Saedon A. Othman. 2003. *Al-Qarinah: Circumstantial Evidence- An Introduction to Islamic Law of Evidence*. Kuala Lumpur: The One Press. 3rd Edition. p. 118

³⁹ Ibid. p.119

⁴⁰ RK Nathan. 1993. *Methods of Proof in Islam (Qarinah)-A Practical Approach to Evidence in Malaysia and Singapore*. Singapore: Butterworth Asia Reed International. p. 296

1.4.2 Dalil from Al-Quran and As-Sunnah

(a) Dalil from Al-Quran

Primary reference for Syariah rulings is provided in the *al-Quran* and *as-Sunnah*. It is evident from two *ayah* mentions in *Surah Yusuf*. Allah said to the effect that:

“They stained his shirt with false blood. He said: “Nay, but your minds have made up a tale (that may pass) with you. (For me) patience is most fitting: Against that which ye assert, it is Allah (alone) whose help can be sought...”⁴¹

This *ayah* stated that the Prophet Yusuf’s brother told his father, Prophet Ya’cob that the Prophet Yusuf was mauled by the wolves. His brother brought with them shirt of full bloodstains as an evidence of the death. Instead, his father strongly believed the Prophet was still alive since it was nowhere found any torning effect at the Prophet’s shirt. Indeed, Yusuf’s brother just created fabrication of the story.

In the next *ayah*, Allah s.w.t mentioned to the effect:

“So they both raced each other to the door, and she tore his shirt from the back: they both found her load near the door. She said: “What is the (fitting) punishment for one who formed an evil design against thy wife, but prison or a grievous chastisement?” He said: “it was she that sought to seduce me from my (true) self.” And one of her household saw (this) and bore witness, (thus) “if it be that his shirt is rent from the front, and then is her tale true, and he is liar!” “But if it be that his shirt is torn from the back, then she tell liar and he is telling the truth...”⁴²

⁴¹ Al-Quran. Surah Yusuf 12:18. (All Quranic translation in this writing is based on Professor. Dr Syed Vickar Ahamed (trans). *Interpretation of the Meaning of the Glorious Qur’an*. New Jersey: Holmdel.

⁴² Al-Qur’an. Surah Yusuf 12:25-27

This *ayah* is another application of *al-qarinah* concluded that it was Zulaikha, who committed molestation against Prophet Yusuf.

(b) Dalil from As-Sunnah

In several occasions derived from *as-Sunnah*, the Prophet (pbuh) applied *al-qarinah* as one of the proof of evidence. As regard to paternity, the Prophet (pbuh) decided on the basis of *qiyafah*. Judgment which was based on *qiyafah* is closely related to *qarinah* as *qiyafah* relies on circumstantial evidence to establish the paternity of a person. The Righteous Caliph also applied *qiyafah* as a mean of proving paternity. Imams Malik, Ahmad, Syafie and other concurred that the application of *qiyafah* resembles to the application of *qarinah* as well.⁴³

The Companions of the Prophet (pbuh) had also on other occasions given their Judgement on the basis of *al-qarinah*. Ibn Qayyim recounts that ‘Umar r.a had once imposed the *had*⁴⁴ of *zina* on a woman who become pregnant without having a husband, according to the *qarinah* which is self-evident.⁴⁵

‘Umar r.a and also ‘Abdullah bin Mas’ud r.a had at one time imposed the *had* of liquor drinking on the basis of the smell of liquor on the breath of the accused, or the contents of the suspect’s vomit in which liquor is found.⁴⁶

⁴³ Mahmud Saedon A. Othman. *Al-Qarinah: Circumstantial Evidence-An Introduction to Islamic Law of Evidence*. p.123

⁴⁴ Had (plural Hudud) is offence and penalty prescribed by Allah

⁴⁵ Muhamad Abdel Haleem, Adel Omar Sherif & Kate Daniels. 2003. *Criminal Substantiation and the Role of Circumstantial Evidence- Criminal Justice in Islam; Judicial Procedure in the Shariah*. London: I.B. Tauris & Co Ltd. p. 124

⁴⁶ Mahmud Saedon A. Othman. *Al-Qarinah: Circumstantial Evidence- An Introduction to Islamic Law of Evidence*. p.125

1.4.3 Application of *Al-Qarinah* in Death and *Qisas*

In general, crime of murder can be proved through *Shahadah* or *Iqrar*, the stronger admissible evidence. Nevertheless, some of Muslim Scholars are of the opinion that a murder can be proven by way of *qarinah* but *qarinah* may be a *lauth* (circumstantial evidence) which will entitle the family of the victim to demand the process of *qasamah*.⁴⁷ It may happen on someone is going into the empty house. Immediately after a man has come from the house with fear and haste, and with a bloodstained knife in his hand. If it is seen a person with his throat recently cut off, there is no doubt the man leaving the house in haste is the murderer of the person lying with his throat cut.⁴⁸ Based on this argument, the majority of the Ulama' have held that the family of the victim should take an oath fifty times accusing the suspect as the victim. Imam Malik and Ahmad opined that the suspect could then be put to death while Imam Syafie opined the *diyyah* should be paid by the suspect.⁴⁹

Ibn Qayyim and Ibn Gharas were of the view that *qarinah* is an admissible evidence in murder just it is as admissible in *hudud* and the other offence.⁵⁰ According to Malik and Ahmad, murder may be proved by the circumstantial evidence (*al-qarinah*). In this connection Allamah Ibn Al-Qayyim wrote:

*“If a person was found murdered and another person was standing beside his dead body with a blood-stained knife in his hand, there is no doubt that the same person had killed him especially when any enmity is know between them”.*⁵¹

⁴⁷ Ibid. p. 129

⁴⁸ Effendi, Ismail Haqqi. n.d. *The Mejelle: Being an English Translation of “Majallah el-Ahkam-I-Adliya’ and A Complete Code of Islamic Civil law.* C.R.Tyser (Trans). Kuala Lumpur: The Other Press.

⁴⁹ Mahmud Saedon A. Othman. *Al-Qarinah: Circumstantial Evidence-An Introduction to Islamic Law of Evidence.* p. 130

⁵⁰ Ibid.

⁵¹ Prof. Dr. Anwarullah. 1999. *Circumstantial Evidence in Murder- Principles of Evidence in Islam.* Kuala Lumpur: A.S.Noordeen. 1st edition. p.112

Qarinah is so widely used in Islamic Jurisprudence that it can be part of *bayyinah*, be part of a course of action or a charge and be part of the grounds of judgment.

This modern society, *qarinah* has an important role to solve crimes such as *qisas*, *mu'amalat* and *hudud*. Ibn Qayyim's opinion with regard to *qarinah* should strongly be taken into account as it would assist us in expanding the Islamic Law of Evidence to meet the ever increasing crime.

1.5 Legal Position of DNA Profiling in Civil and Syariah Cases as Scientific Evidence

1.5.1 Relationship between Medicine and Law

Law and medicine may both be viewed as professions of well-being; one for the well-being of society, the other one for the well-being of physical and emotional health. But where law is process-directed, medicine is effort-directed. The two need not conflict but they often do. The use of medical testimony and that of allied basic sciences has traditionally been more satisfactory in criminal cases rather than civil cases. This is simply a reflection of the fact that most sciences involved in criminal cases are more capable of exact demonstration than the clinical specialties involved in civil cases.⁵²

Any human activity that gives rise a dissension must ultimately be referred to the arbitrament of the law. With the increasing complexity of life and the astonishing march of scientific progress, the lawyer's role as a final mediator of man's temporal affairs has not grown easier.⁵³

⁵² Samuel Polsky. 1956. *Inter Relation of Law and Medicine- The Medical Legal Reader*. New York City: Oceana Publication. Vol. 6. p.185

⁵³ *Ibid.* p. 11

1.5.2 DNA Profiling as Scientific Evidence in Civil Cases

Since DNA profiling was introduced as scientific evidence, the authorities around the world accepted it as one of the admissible evidence in court. The role of DNA profiling in criminal is resemble to its function in the case of fingerprinting identifications used by the forensic expert prior to the introduction of such technique.⁵⁴ DNA has become a very important tool in solving crimes when no fingerprinting can be found.

In an interview in local science journal, Prof. Dr. Norazmi Mohd Noh mentioned:

*“The DNA test is very sensitive, until the criminal make confession of guilt when the DNA test like DNA profiling is applied”. Indeed, it is very hard to free from any charge after the court request for the DNA test.*⁵⁵

The admissibility of DNA as the primary evidence not merely as corroboration at the courtroom was certified by Judge in the most developed countries today like England, America and other Western countries.⁵⁶

In the case of **Public Prosecutor v. Syed Muhamad Faysal bin Syed Ibrahim**,⁵⁷ VT Singham, Judge of the Ipoh High Court said:

“In the case where DNA evidence is relied on by the prosecution, the court’s function is to asses the evidence in relation to all other non-statistical evidence. DNA profiling, if accepted by the court, merely established that the suspect could be the offender, not that he of she is the offender. In this instant, the circumstantial evidence adduced by the prosecution did not irresistibly point toward the

⁵⁴ Kamal Maslih. 2005. “Fokus- Wajah Boleh Diubah Tetapi Bukan Cap Jar”. Utusan Malaysia. December. p. 2

⁵⁵ Interview with Prof.Dr.Norazmi in Estidotmy Journal. *Utusan Malaysia*. (35): December. p. 8

⁵⁶ Hussein Omar Khan, DSP. 2006. “Legal Position of DNA Profiling in Malaysia”. (Personal Interview). 23 January.

⁵⁷ [2004] 4 AMR 287

accused's guilt, and since DNA evidence should not be considered in isolation, it did not assist the prosecution's case."

The scientific evidence tendered before the court must be clear. It is not surprising that the evidence of technology with such enormous potential brings intense pressure in terms of its implementation and the commercial interest.⁵⁸

Expert opinion becomes relevant:

*"When the court has to form an opinion upon a point of foreign law or of science or art, or as to identify or genuineness of handwriting or finger impressions, the opinion upon that point of person specially skilled in that foreign law, science or art, or in question as to identify or genuineness of handwriting or finger impressions, are relevant fact"*⁵⁹

The Judge may call for expert to give testimony if needed. Expert opinions may include scientists, lawyers, doctors, chemists and others. Thus, the evidence represents by scientists; particular DNA testing is admissible in courtroom.

Indeed, evidence of chemist is recognised for giving evidence during court proceeding.⁶⁰

⁵⁸ P. J. Lincoln, Dr. 1993. "DNA on Trial". *The Criminologist*. West Sussex: Barry Rose Law. Vol. xvii. p. 152

⁵⁹ Section 45 (1) of the Evidence Act 1950 (Act 56).

⁶⁰ Section 399 (2) (c) of the Criminal Procedure Code (Act 593).

1.5.3 DNA Profiling as Scientific Evidence in Shariah

Sheik Nizâr Al-Shu`aybî, a Shaqîq City Courthouse judge⁶¹ said before talking on the application DNA evidence in Islamic Law, one should first understand about two types of punishment provided under Islamic criminal law namely prescribed punishment⁶² and the other one is discretionary punishment.⁶³

Prescribed punishment includes stoning the married adulterer, put in exile the unmarried adulterer and other *hudud* offences. All these kinds of punishment are fixed and subject to no modification. It is only Allah who has the ultimate power light. However, repent may be sought for the offence committed. This scenario primarily due to the reason to preserve the five *maslahah*; life, religion, mind, property and lineage. Therefore, DNA analysis has no application in this kind of punishment unless there is direct evidence. Direct evidence is the primary and sole evidence to prove the case of *hudud* and *qisas*. The burden of proof lies upon prosecution to prove the case beyond any shadow of doubt.⁶⁴

While discretionary punishments apply where Islamic law is silent as to its sentencing principles. On that basis, the judge may exercise his discretion to impose punishment after taking many factors into consideration.

⁶¹ Sheikh Nizâr al-Shu`aybî. 2005. "DNA Analysis as Court Evidence in Criminal Cases". *Al-Fatawa (Islamic Law)*. [http:// www.islamtoday.com](http://www.islamtoday.com). (in English). p.1.

⁶² Hudud is offence and penalty prescribed by Allah S.W.T

⁶³ Qisas is the law of equality, retaliation.

⁶⁴ Mahmud Saedon A. Othman. *Al-Shahadah: Evidence by Testimony- An Introduction to Islamic Law of Evidence*. p.74

The Islamic Law Complex of the Islamic World League has decreed that:

"...there is no legal objection to using DNA analysis in criminal investigations and in considering it as evidence in the crimes that do not obligate the court to carry out a prescribed punishment. This can be gleaned from the hadith "Avoid prescribed punishments when there are doubts". This would offer justice and security for society and help to ensure that the criminal is punished and the innocent released, which is an important objective of Islamic Law". ⁶⁵

According to Kelantan Evidence Enactment 1991:

"Evidence may give in any proceedings of the existence or non-existence of every fact in issue and of such other facts as are hereinafter declared to be Qarinah and of no other..." ⁶⁶

This section shall not enable any person to give evidence of a fact which he is disentitled to prove by the law relating to civil procedure.

The Mejjelle has also stated:

"A complete presumptive proof is an inference which attains the degree of positive knowledge..." ⁶⁷

⁶⁵ n.a. 2005. "Islamic Law Complex of the Islamic League". [http:// www.islamtoday.com](http://www.islamtoday.com) (in English)

⁶⁶ Section 5 of the Kelantan Evidence Enactment 1991 (No.2/1991).

⁶⁷ Article 1741 of the Mejjelle-An English Translation of Majjalah el-Ahkam-I-Adliya.

1.6 Conclusion

The aforementioned discussions explain that DNA can be found in all living organism and today becomes an important tool in investigation. Beside that, a DNA also known as circumstantial evidence and Islamic law of evidence known as *al-qarinah* as well.

Improvements in DNA profiling have regulated in a major reappraisal of the position of some other types of biological evidence, particularly in blood grouping. Methods that were the mainstay of forensic biology only ten years ago are now being phased out with only a restricted capability being retained to deal with exceptional cases.

Beside that genetic profiling is becoming a factor not only in the way criminal investigator think but also the way of suspects prepare. Rapists often aware of the power of DNA, more frequently wear condoms. Burglars more often wear gloves. Assailants of various types more often try to clean up after themselves. Hence, it is almost impossible to commit a violent crime without some exchange of biological material. Criminals leave DNA on their victims or at crime scenes in the form of sweat, semen, saliva, blood or skin cells. Something as small and unnoticed as a fallen eyelash can pinpoint the person who shed it. Careful and timely collection and preservation of evidentiary material is critical.⁶⁸

⁶⁸ Please see Appendix I: CSI Dedah Rahsia Forensik Kepada Penjenayah

CHAPTER TWO

CHAPTER TWO

ROYAL MALAYSIA POLICE COLLEGE AND FORENSIC LABORATORY OF ROYAL MALAYSIA POLICE

2.1 Introduction

Today, the forensic science becomes a challenge field especially to seek evidence of crimes. In modern technology era, it is no wonder if criminals are becoming cleverer in term of the knowledge and application of high-tech instrument. For example, a suspect may not leave out any mark at crime scene. They used glove to cover up their fingerprinting. This means the process to find out evidence from the crime scene is getting more difficult. And the other side, a suspect might be burn the victim's body after he raped and killed to evanesce whether the fingerprinting or the biological substance which he leave on the victim's body such as seminal stain, hair etc.

Since the forensic scientists realize the benefits of using DNA in investigation especially in crime, each country all over the world today establish a responsible body. United Kingdom for example, National DNA Database (NDNAD) was established to collect the data of Britain's people DNA. Therefore, any arrest of suspect, their DNA were taken and kept under the NDNAD's control.

The practice of forensic science where there is has been more than 100 years; particularly for the application of fingerprinting. It was introduced in Malaysia on 1909 and the first fingerprinting system were used called "*Henry Fingerprinting System*" introduced by Sir Edward Henry on 1901. However, William Lance Conlay, the first Royal Malaysia Police Criminal Registrar introduced "*Conlay Fingerprinting System*" which was most efficient then before. On 1996, the computerization system known as "*Malaysia Automated Fingerprinting Identification System*" (MAFIS) was introduced.