

DNA EVIDENCE IN PATERNITY CASES

De Ungria MCA

DNA Analysis Laboratory, Natural Sciences Research Institute
University of the Philippines, Diliman, Q.C. 1101
Email: mcadu@uplink.com.ph

• Introduction

Deoxyribonucleic acid or DNA testing is the most accurate form of testing to prove paternity or exclude paternity when the identity of the biological father is under dispute. DNA- based paternity testing has been requested to support claims for child support, inheritance, immigration and for peace in the family. More recently, DNA tests had been used to dispute false paternity claims that have already been decided in favor of the child's mother prior to the submission of DNA evidence in US courts¹.

Traditionally, paternity is determined using one or a combination of any of four procedures namely: 1) a *prima facie* case where the woman testifies that she had sexual relations with the man; 2) affirmative defenses where the putative father claims he is impotent or that another man had relations with the child's mother; 3) a presumption of legitimacy if the child was born within a valid marriage; and 4) physical resemblance between an alleged father and the supposed child². In addition, either party may present results of serological tests, e.g. ABO and MN blood typing to support their respective claims. In *Raymund Pe Lim vs Joanna Rose Pe Lim et al*³, the Supreme Court recognized the novelty of DNA technology at the time. It stated:

'DNA being a relatively new science, it has not yet been accorded official recognition by our courts. Paternity will still have to be resolved by such conventional evidence as the relevant incriminating acts, verbal and written, by the putative father'.

In more recent years, the use of selected DNA markers has become the procedure of choice over blood typing because of the increased level of polymorphism and the less susceptibility of DNA molecules to degradation compared to proteins. The molecular stability of DNA is particularly important when dealing with environmentally challenged samples, e.g. exhumed bones and degraded tissues. Of the different methods of DNA analysis, STR (Short Tandem Repeat) typing is currently the most widely used because this method allows unambiguous scoring of DNA profiles, rapid processing and analysis⁴. This paper reports the background behind STR based testing and the use of this type of DNA evidence to evaluate disputed parentage issues in Philippine courts.

¹ <http://www.ejfi.org/Courts>

² *Herrera v Alba et al*, GR148220, 15 June 2005

³ *Raymond Pe Lim v Joanna Pe Lim et al*, GR 112229 18 March 1997

⁴ Butler, J. M. (2001). *Forensic DNA Typing: Biology and Technology Behind STR Markers* (San Diego, Academic Press).

- **Admissibility of DNA Evidence in Philippine Courts**

The Supreme Court first recognized to the existence and availability of DNA technology in resolving disputed parentage cases in *Tijing v Diamante et al*⁵. In this case, the couple Tijing and a Mrs. Angelita Diamante, simultaneously claimed to be the parents of a child. Based on other evidence already presented such as information on the child's birth and the apparent inability of the respondent Diamante to bear a child, the Supreme Court affirmed the decision of the Regional Trial Court and reversed the ruling of the Court of Appeals by granting custody of the child to Edgardo A. Tijing and Bienvenida R. Tijing. In addition, the Supreme Court included the option of DNA testing if the respondent Diamante chooses to further her appeal for the custody of the child. In the decision, it stated:

'Parentage will still be resolved using conventional methods unless we adopt the modern and scientific ways available. Fortunately, we have now the facility and expertise in using DNA test for identification and parentage testing. The University of the Philippines Natural Sciences Research Institute (UP-NSRI) DNA Analysis Laboratory has now the capability to conduct DNA typing using short tandem repeat (STR) analysis. ...For it was said that courts should apply the results of science when completely obtained in aid of situations presented, since to reject said result is to deny progress. Though it is not necessary in this case to resort to DNA testing, in (the) future it would be useful to all concerned in the prompt resolution of parentage and identity issues'.

However, it is in the landmark case of *People v Vallejo*⁶ where the Supreme Court first admitted DNA evidence previously presented at trial. Vallejo was convicted of raping and later killing a 9-year old child. The analysis used did not employ the basic principles of parentage testing as DNA extracted from crime scene evidence was directly compared to the DNA of a known suspect (direct matching). In *Vallejo*, DNA obtained from vaginal swabs taken from the child was found to be consistent with that of the accused. Although statistical evaluation of the weight of matching DNA evidence, e.g. random match probability value that provides a certain measure of the strength of the DNA match over random chance, was not reported, the Supreme Court admitted the DNA evidence and subsequently used it together with other evidence to convict the accused. This decision paved the way for the general admissibility of DNA evidence in Philippine courts although the relevancy and the integrity of data generated must be studied on a case by case basis. In the decision, the Supreme Court laid down the essential admissibility requirements that must be established to render DNA evidence admissible:

'In assessing the probative value of DNA evidence, therefore the courts should consider, among other things, the following data: how samples were collected, how they were handled, the possibility of contamination of samples, whether

⁵ *Tijing v Diamante* GR125901 ,8 March 2001

⁶ *People v Vallejo* GR 144656,9 May 200

proper standards and procedures were followed in conducting the tests, and the qualification of the analyst who conducted the tests.'

It was the case *People v Yatar*⁷ where the Supreme Court admitted DNA evidence in parentage cases, albeit the use of this type of analysis was not immediately evident. *People v Yatar* is a rape-homicide case wherein biological samples collected from the body of the 16-year old victim were kept for two years prior to the conduct of DNA tests. To generate the DNA profile of the victim, bloodstains on her clothing that were found at the crime scene were submitted for laboratory testing. In addition, a reverse paternity DNA test was performed using reference samples collected from her parents to verify that the DNA profile generated from the bloodstain was that of the victim and not due to contamination because of prolonged storage. Knowledge of the correct DNA profile of the victim was essential because the vaginal swab collected from her were composed of more than one DNA profile. Hence generation of a reference victim's DNA profile facilitated the identification of the non-victim DNA on the vaginal swab which is that of the perpetrator, provided the evidence was properly handled and not contaminated. Moreover, the victim's DNA profile confirmed that the slides containing the vaginal smear stored at room temperature in the local hospital were part of the set of evidence relevant to the case. The Supreme Court admitted the procedures and the interpretation of DNA evidence presented at the Regional Trial Court, and highlighted the utility of DNA evidence, when properly collected, handled and stored, to assist in the prompt and fair resolution of cases:

'Admittedly, we are just beginning to integrate these advances in science and technology in the Philippine criminal justice system, so we must be cautious as we traverse these relatively uncharted waters. Fortunately we can benefit from the wealth of persuasive jurisprudence that has developed in other jurisdictions. Specifically, the prevailing doctrine in the US has proven instructive.

In *Daubert v Merrell Dow*, it was ruled that pertinent evidence based on scientifically valid principles could be used as long as it was relevant and reliable. Judges, under *Daubert*, were allowed greater discretion over which testimony they would allow at trial, including the introduction of new kinds of scientific techniques. DNA typing is one such novel procedure.

Under Philippine law, evidence is relevant when it relates directly to a fact in issue as to induce belief in its existence or non-existence. Applying the *Daubert* test to the case at bar, the DNA evidence obtained through PCR testing and utilizing STR analysis, and which was appreciated by the court a quo is relevant and reliable since it is reasonably based on scientifically valid principles of human genetics and molecular biology.'

Although the resolution of questioned paternity is normally a civil issue, it may also play an important role in criminal cases such as those involving rape when the victim also claims that the accused is the father of her child born out of the rape (criminal paternity). The first such case where DNA evidence was used was *People v Paras*⁸ where

⁷ *People v Yatar* GR150224, 19 May 2004

⁸ *People v Paras* Criminal Case no.85974-85978 5 May 1999

blood typing and DNA profiling results conclusively excluded the accused from being the father of the victim's child. To the trial court, the date of the last incidence of rape stated by the victim is important since the child was born 10 months after the said date. According to the trial court, 'these facts would be in violation of the rule of nature'⁹. This situation was further reinforced by the results derived from DNA analysis.

'The results of the laboratory examination, the inconsistencies of the victim's testimony and the testimony of the victim's mother as well as other evidences presented by the defense in Court on the whereabouts of the accused during the stated time and dates of the incidences of rape cast a very serious doubt in the mind of the court as to the guilt of the accused, Victoriano Paras, on the five information(s) of rape filed against him.

'WHEREFORE, premises considered, this court on reasonable doubt, acquits, Victoriano Paras, on the five information(s) of rape filed against him. Cost de oficio.'

In *People v De Villa*¹⁰, the Supreme Court was less open to the use of DNA evidence in a criminal paternity case at the post-affirmation stage. In *People v De Villa*¹¹, the accused was convicted of raping his 13-year old niece by affinity which led to the birth of a child. Upon review, the Supreme Court changed the sentence to *reclusion perpetua* because of the failure to include relationship in the information and ordered the accused-appellant De Villa to pay for civil indemnity, moral damages, cost of the suits and the support of the child¹². In 2003, the family of the accused-appellant managed to get biological samples from the victim's child and De Villa and submitted these samples for DNA-based paternity testing. Results of the DNA tests excluded the accused from being the biological father of the child. The counsel of the accused then filed a motion for *habeas corpus* and petition to re-open the case for the presentation of new evidence with the Supreme Court. In reply, the Supreme Court issued a Resolution advising defense counsel to write a Memorandum on the case. During the preparation of the said Memorandum, the defense counsel asked Mr. Christopher Asplen, former Executive Director of the US National Commission on DNA Evidence, to write a commentary that detailed developments in the use of post-conviction DNA testing in the US, UK and elsewhere. In addition, Mr. Asplen, who has extensive experience in Post-Conviction DNA tests in the US, reviewed the entire Memorandum, particularly on the issue of whether or not the DNA paternity test in petitioner's case would be exonerative, prior to its submission to the Supreme Court. It stated¹³:

'In the trial court's Decision of October 17, 1995, the petitioner's conviction is clearly based on the connection between the alleged rape of the victim and her pregnancy. First in the Court's recitation of the 'Version of the Prosecution', the trial court includes the statement, '...(w)hile accused succeeded in inserting his penis inside her vagina...resulting in the pregnancy of Aileen...'

⁹ Ibid

¹⁰ *People v De Villa* GR 124639 February 2001

¹¹ *People v De Villa* Criminal Case No. 107520-H 17 October 1995

¹² Ibid 10

¹³ *Reynaldo De Villa v Director of the New Bilibid Prison* GR 158802 11 July 2003.

Second, in its reference to a case illustrating the benign effect of late reporting of an incident, the trial court states that, '(i)n at least one case, we observed that if the complainant did not become pregnant she probably would never have revealed that she had been raped by her uncle'. Third, the court ordered petitioner to support the child.

These three considerations prove the materiality of the paternity of the victim's child. If petitioner De Villa's paternity of Leahlyn Mendoza can be categorically and scientifically disputed, this Court's judgment in *People v De Villa* finding petitioner De Villa guilty of rape must be reviewed and reconsidered.

...The nature of scientific evidence is such that it cannot be considered inferior to the testimony. If shown to be reliable and admissible, scientific evidence - which, by nature is neutral and objective as opposed to testimony, which by nature, would contain inherent biases- must be considered to have greater persuasive weight than testimony.'

In the response to the petition for *habeas corpus*, the Supreme Court wrote¹⁴:

'Coupled with the prayer for the issuance of a writ of habeas corpus, petitioner seeks a new trial to re-litigate the issue of the paternity of the child Leahlyn Mendoza. Recently in the case of *People v Alberio*, we ruled that the fact or not of the victim's pregnancy and resultant childbirth are irrelevant in determining whether or not she was raped. Pregnancy is not an essential element of the crime of rape.

It must be stressed that the issue if Leahlyn Mendoza's paternity is not central to the issue of petitioner's guilt or innocence. The rape of the victim Aileen Mendoza is an entirely different question, separate and distinct from the question of the father of her child.'

This decision continues to be discussed in many legal circles, locally and internationally¹⁵.

In *People v Paras* and *People v De Villa*, the DNA evidence provided, conclusively excluded the accused from being the biological father of the child (paternity exclusion). The alternate scenario is when an alleged father is not excluded (paternity inclusion) and the weight of matching DNA evidence needs to be evaluated using the appropriate statistical analysis and population database¹⁶. In *Herrera v Alba et al.*¹⁷ the Supreme Court provided a practical formula to resolve issues related to judicial interpretation of matching DNA evidence in disputed parentage cases. The decision stated:

¹⁴ *Re : De Villa v Director New Bilibid Prison* GR158802 17 November 2004

¹⁵ De Ungria, M. C. A., Sagum, M. S., Te, T. O., Diokno, M. S. I., Diokno, J. M. I., and Asplen, C. H. (2005). Post-affirmation DNA test in the Philippines: A Case Study. Paper presented at: 17th Conference of the International Association of Forensic Sciences (Hong Kong, China).

¹⁶ Buckleton, J. S., Triggs, C. M., and Walsh, S. J. (2005). *Forensic DNA Evidence Interpretation* (Boca Raton, CRC Press).

¹⁷ *Ibid* 2

'It is not enough to state that the child's DNA profile matches that of the putative father. A complete match between the DNA profile of the child and the DNA profile of the putative father does not necessarily establish paternity. For this reason, following the highest standard adopted in an American jurisdiction, trial courts should require at least 99.9% as a minimum value of the Probability of Paternity ('W') prior to paternity inclusion. W is a numerical estimate for the likelihood of paternity of a putative father compared to the probability of a random match of two unrelated individuals. An appropriate reference population database, such as a Philippine population database, is required to compute for W. Due to the probabilistic nature of paternity inclusions, W will never equal to 100%. However, the accuracy of W estimates is higher when the putative father, mother and child alone.

DNA analysis that excludes the putative father from paternity should be conclusive proof of non-paternity. If the value of W is less than 99.9%, the results of the DNA analysis should be considered as corroborative evidence. If the value of W is 99.9% or higher, then there is refutable presumption of paternity. This refutable presumption of paternity should be subjected to the Vallejo standards.¹⁸

- **Basic Principles of DNA testing**

DNA typing is based on the uniqueness of the overall genetic make-up of an individual, except identical twins¹⁹. Basic to the understanding of the complexity of DNA typing is the concept of the cell. A cell is the building unit of an organism made up of its component parts, which includes the nucleus that functions as the cell's command center, and several hundreds and thousands of mitochondria that functions as the powerhouse of the cell. DNA resides in both the nucleus (nuclear DNA) and the mitochondria (mitochondrial DNA).

The nucleus houses the DNA that codes for genetic information responsible for most cellular processes. Several DNA molecules comprise genes which in turn are located in minute bodies called chromosomes. In humans, there are 23 pairs of chromosomes within a cell thus making up a total of 46 chromosomes (22 pairs of autosomal chromosomes and 1 pair of sex chromosomes). Sex chromosomes define the sex of a person: XX for females and XY for males. Some chromosomal regions contain repeating units of the same type of DNA molecule. One group of these markers is known as Short Tandem Repeat or STR markers. The number of repeating units in individuals may vary and may be used to identify the source of a biological sample. STR markers included in the tests are selected based on the following criteria: 1) DNA markers are highly polymorphic in a given population; 2) reactions are robust to allow DNA typing of degraded samples; and 3) molecular procedures involved have been validated and optimized²⁰.

¹⁸ Ibid 6

¹⁹ Jeffreys, A. J., Wilson, A. V., and Thein, S. L. (1985). Individual-specific fingerprints of human DNA. *Nature* 316, 76-79.

²⁰ Butler, J. M. (2001). *Forensic DNA Typing: Biology and Technology Behind STR Markers* (San Diego, Academic Press).

DNA typing for paternity is done by first carefully extracting the DNA from the biological samples submitted by the alleged father, child with mother (paternity trio) or in the absence of the mother's sample (paternity duo). The DNA pattern from the child is analyzed given those of his mother (if available) and alleged father. The DNA type contributed by the child's real biological father should be observed in the alleged father. Then, the probability that the alleged father is the father of the child is calculated as a ratio between that of the alleged father and any random male in the population. Notably, testing without the mother's DNA profile (motherless case) was found to be less informative and five times more prone to paternity inclusions when testing seven STR markers than when the maternal DNA profile is made available²¹. The current DNA Laboratory set-up at UP-NSRI uses 13-20 STR analysis which includes the FBI defined Combined DNA Identification System (CODIS) markers for DNA typing. At the UP-NSRI DNA Laboratory, the lack of information brought about the absence of the mother's DNA profile in motherless cases is minimized by increasing the number of DNA markers of the alleged father and child that are tested to 20 markers compared to the standard 16 markers for paternity trio cases.

A mismatch suggests that the alleged father is excluded as the biological father of the child. In some cases, mutation results in a false mismatch between real fathers and their children²² hence the standards accepted in most laboratories is to require a minimum of two mismatches prior to excluding a man from potentially fathering the child. On the other hand, a match between the DNA profile of the alleged father and the child does not necessarily establish paternity, but may be due to chance matches between totally unrelated individuals. To estimate the likelihood of paternity over non-paternity, a Probability of Paternity (*W*) is calculated based on the DNA profile of the father, mother and child. The Supreme Court had prescribed the minimum value of 99.9% for *W*²³.

- **Other types of DNA tests**

In some situation, biological sample from the alleged parent may not be available, e.g. the alleged parent is deceased or could not be located. Hence, alternative approaches must be used to resolve civil issues. One such approach is the use of paternally inherited Y chromosomal DNA markers to trace paternal lineages using a Y-chromosome

²¹ De Ungria, M. C. A., Frani, A. M., Magno, M. M. F., Tabbada, K. A., Calacal, G. C., Delfin, F. C., and Halos, S. C. (2002). Evaluating DNA tests of motherless cases using a Philippine genetic database. *Transfusion* 42, 954-957.

²² Mertens, G., Mommers, N., Heylen, H., Gielis, M., Muylle, A., and Vandenberghe, A. (1997). Allele frequencies of nine STR systems in the Flemish population and application in parentage testing. *Int J Legal Med* 110, 177-180.

²³ *Ibid* 2

database²⁴. Since this marker is male-specific, an individual's Y chromosome that he inherited from his father, is passed on to his son and to his son's son, as well as all the sons of his brother²⁵. Note that by itself the use of Y-chromosomal STR typing is less discriminating than autosomal STR typing. However the combined use of both Y and autosomal markers provide a very powerful tool for male identification. This strategy has been used in the identification of exhumed remains of the child victims of the Paco fire tragedy of 1998 using reference samples provided by their parents²⁶.

In parallel, an individual's mitochondrial DNA originated entirely from his mother. Hence mitochondrial DNA technology is being used and further developed to assist in more complex cases of identification, e.g. victims of mass disaster tragedies, when no ante-mortem sample is available and reference samples for comparisons are provided by the victim's mother or other maternal relatives.

• Paternity testing in the Philippines

Short Tandem Repeat (STR) technology for performing DNA analysis for forensic purposes is currently being used by four laboratories here in the Philippines namely those of the National Bureau of Investigations (NBI), the Philippine National Police (PNP), St. Lukes Medical Center (SLMC) and the University of the Philippine Natural Sciences Research Institute (UP-NSRI) for criminal and civil cases (www.dnaforensic.org). Of the four laboratories, the NBI, PNP and UP-NSRI accept civil as well as criminal cases, albeit the UP-NSRI laboratory is requested to conduct more DNA tests on civil disputes rather than criminal cases. The SLMC laboratory only accepts tests to resolve civil issues. In addition, the establishment of a Philippine population database is available for statistical evaluation of DNA evidence²⁷. Unfortunately, none of the four Philippine laboratories is accredited by any local or international agency tasked to evaluate whether existing procedures satisfy the Vallejo

²⁴ Lessig, R., Willuweit, S., Krawczak, M., Wu, F., Kim, W., Henke, L., Henke, J., Miranda, J., Hidding, M., Benecke, M., *et al.* (2003). Asian on-line Y-STR Haplotype Reference Database. *Legal Medicine (Tokyo) Suppl 1*, S160-163.

²⁵ Gusmao, L., Butler, J. M., Carracedo, A., Gill, P., Kayser, M., Mayr, W. R., Morling, N., Prinz, M., Roewer, L., Tyler-Smith, C., and Schneider, P. M. (2005). DNA Commission of the International Society of Forensic Genetics (ISFG): an update of the recommendations on the use of Y-STRs in forensic analysis. *Int J Legal Med.*

²⁶ Calacal, G. C., Delfin, F. C., Tan, M. M., Roewer, L., Magtanong, D. L., Lara, M., Fortun, R. R., and De Ungria, M. C. A. (2005). Identification of exhumed remains of fire tragedy victims using conventional methods and autosomal/Y-STR DNA profiling. *Am J Forens Pathol Med* 26, 285-291.

²⁷ De Ungria, M. C. A., Roby, R. K., Tabbada, K. A., Rao-Coticone, S., Tan, M. M., and Hernandez, K. N. (2005). Allele frequencies of 19 STR loci in a Philippine population generated using AmpFISTR multiplex and ALF singleplex systems. *Forensic Science International* 152, 281-284.

admissibility standards set down by the Supreme Court²⁸. The UP-NSRI DNA Analysis Laboratory, with funding from the UP Center for Integrative Studies, is currently working on formulating a national strategy for the local accreditation of forensic DNA laboratories in the Philippines to address this issue. Meanwhile in the absence of a local accrediting agency to assist in the evaluation of laboratory standards used to generate DNA results, the gate-keeping task of the Court to admit or not to admit DNA evidence based on its relevance to a specific case, also includes the responsibility to scrutinize the application of the scientific method to ensure an error-free analysis.

- **Conclusion**

With the rapid development of DNA-based paternity testing, it is inevitable that DNA evidence will be used more and more to support or argue against paternity in Courts of Law. Initially, strength of paternity tests lies primarily in its power to exclude the wrong man. However, the rapid development of STR typing technology has also increased its power to identify real fathers thus providing objective evidence for a fair and swift resolution of civil and criminal cases.

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²⁸ Ibid 6