



Role of DNA in Biological Evidence and their Advancements

Khaled Mukherjee*

Department of Medicine, University of New Haven, West Haven, USA

DESCRIPTION

DNA, or deoxyribonucleic acid, is a molecule that carries the genetic information of living organisms. DNA is composed of two strands of nucleotides, which are made of a sugar, a phosphate, and a nitrogenous base. The four types of bases are Adenine (A), Thymine (T), Cytosine (C), and Guanine (G). The two strands are held together by hydrogen bonds between complementary bases: A with T, and C with G [1]. The sequence of bases determines the genetic code, which instructs the cells how to make proteins and perform other functions.

It is a type of physical evidence which contains DNA or other biological molecules, such as proteins or lipids [2,3]. Biological evidence can be used to identify individuals, determine relationships, establish paternity, diagnose diseases, and reconstruct ancestry. Biological evidence can also provide information about the circumstances of a crime, such as the time of death, the cause of death, the manner of death, and the presence of injuries or substances.

The biological evidence can be found in various forms and sources, such as blood which is a fluid that circulates in the body and transports oxygen, nutrients, hormones, and waste products. Red blood cells, white blood cells, platelets, and plasma are all found in blood. Blood can be typed by the presence or absence of antigens on the surface of red blood cells. The four main types of blood groups are A, B, AB, and O [4-7]. The blood can be analyzed for DNA by extracting it from white blood cells or other cells present in blood stains.

Saliva is a fluid that is secreted by the salivary glands in the mouth and helps with digestion and lubrication. Saliva contains enzymes, antibodies, electrolytes, and cells. Saliva can be analyzed for DNA by extracting it from cells or other molecules present in saliva stains. Semen is a fluid that is produced by the male reproductive organs and contains sperm cells and other components. Semen can be analyzed for DNA by extracting it from sperm cells or other molecules present in semen stains.

Sloughed skin cells are dead or dying cells that are shed from the surface of the skin. Sloughed skin cells can be analyzed for DNA by extracting it from the nuclei of the cells [8,9].

Hair is a filamentous structure that grows from follicles in the skin. Shaft, root, and bulb make up the structure of hair. Hair can be analyzed for DNA by extracting it from the root or the bulb, which contain cellular material. Hair can also be analyzed for other characteristics, such as color, texture, length, and shape. Urine is a fluid that is excreted by the kidneys and contains waste products and metabolites. Urine can be analyzed for DNA by extracting it from cells or other molecules present in urine stains [10]. Faecal material is a solid or semi-solid substance that is expelled from the digestive tract and contains undigested food, bacteria, and other components. Faecal material can be analyzed for DNA by extracting it from cells or other molecules present in faecal stains.

Biological evidence can be collected from various locations and surfaces, such as crime scenes where crimes occurred or the evidence related to crimes can be found. It also contains biological evidence in different forms and amounts, depending on the nature and duration of the crime. Crime scene investigators must follow proper procedures to identify, document, preserve, collect, package, transport, and store biological evidence [11]. Victims are persons who have been harmed or killed by crimes. Victims can provide biological evidence from their bodies or clothing. Victims can also provide biological samples voluntarily for comparison or exclusion purposes. Suspects are persons who are believed to have committed or participated in crimes. Suspects can provide biological evidence from their bodies or clothing. Suspects can also provide biological samples involuntarily through court orders or warrants [12]. Witnesses are persons who have seen or heard something related to crimes. Witnesses can provide biological evidence from their bodies or clothing. Witnesses can also provide biological samples voluntarily for comparison or exclusion purposes.

Correspondence to: Khaled Mukherjee, Department of Medicine, University of New Haven, West Haven, USA, E-mail: khal@ven.edu

Received: 02-Jan-2023, Manuscript No. JCMS-23-20271; **Editor assigned:** 05-Jan-2023, Pre QC No. JCMS-23-20271 (PQ); **Reviewed:** 18-Jan-2023, QC No JCMS-23-20271; **Revised:** 24-Jan-2023, Manuscript No. JCMS-23-20271 (R); **Published:** 31-Jan-2023, DOI: 10.35248/2593-9947.23.7.212.

Citation: Mukherjee K (2023) Role of DNA in Biological Evidence and their Advancements. J Clin Med. 7:212

Copyright: © 2023 Mukherjee K. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

REFERENCES

1. Cheng AS, Bayliss SJ. The genetics of hair shaft disorders. *J Am Acad Dermatol.* 2008;59(1):1-22.
2. Brooks EM, Cullen M, Szytyda T, Walsh SJ. Nuclear staining of telogen hair roots contributes to successful forensic nDNA analysis. *Aust J Forensic Sci.* 2010;42(2):115-122.
3. Aregger M, Kaskar A, Varshney D, Fernandez-Sanchez ME, Inesta-Vaquera FA, Weidlich S, et al. CDK1-cyclin B1 activates RNMT, coordinating mRNA cap methylation with G1 phase transcription. *Mol Cell.* 2016;61(5):734-746.
4. Carlile TM, Rojas-Duran MF, Zinshteyn B, Shin H, Bartoli KM, Gilbert WV. Pseudouridine profiling reveals regulated mRNA pseudouridylation in yeast and human cells. *Nature.* 2014;515(7525):143-146.
5. Bajpai D, Banerjee A, Pathak S, Jain SK, Singh N. Decreased expression of DNA repair genes (XRCC1, ERCC1, ERCC2, and ERCC4) in squamous intraepithelial lesion and invasive squamous cell carcinoma of the cervix. *Mol Cell Biochem.* 2013;377:45-53.
6. Wu J, Liu J, Ji A, Ding D, Wang G, Liu Y, et al. Deep coverage proteome analysis of hair shaft for forensic individual identification. *Forensic Sci Int Genet.* 2022;60:102742.
7. Rohland N, Glocke I, Aximu-Petri A, Meyer M. Extraction of highly degraded DNA from ancient bones, teeth and sediments for high-throughput sequencing. *Nat Protoc.* 2018;13(11):2447-2461.
8. Dimitrova DG, Teyssset L, Carre C. RNA 2'-O-methylation (Nm) modification in human diseases. *Genes.* 2019;10(2):117.
9. Kang H, Zhang Z, Yu L, Li Y, Liang M, Zhou L. FTO reduces mitochondria and promotes hepatic fat accumulation through RNA demethylation. *J Cell Biochem.* 2018;119(7):5676-5685.
10. Goodwin C, Higgins D, Tobe SS, Austin J, Wotherspoon A, Gahan ME, et al. Singleplex quantitative real-time PCR for the assessment of human mitochondrial DNA quantity and quality. *Forensic Sci Med Pathol.* 2018;14:70-75.
11. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2019. *CA Cancer J Clin.* 2019;69(1):7-34.
12. Zeng MY, Miralda I, Armstrong CL, Uriarte SM, Bagaitkar J. The roles of NADPH oxidase in modulating neutrophil effector responses. *Mol Oral Microbiol.* 2019;34(2):27-38.