INTERNATIONAL ASSOCIATION
OF SCIENTISTS & RESEARCHERS

27th-28th
February
2021

SOUVENIR

2ND INTERNATIONAL eCONFERENCE-2021

DNA FORENSICS

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Sherlock Institute of Forensic Science India

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International Association of Scientists & Researchers

GREETINGS FROM THE ORGANIZING DESK

The new era post the global pandemic has affected academics, establishments, and individuals' preparedness worldwide. Forensic Science has an interdisciplinary approach and its true essence can be proved meaningful with collaborative efforts of people present around the globe functioning together as a team. With a vision to bring all the academicians, students, and professionals and share their valuable contemplations, the 2nd International eConference is structured to lead the way through endeavors focused to take Forensic to greater heights. We welcome every science enthusiast to become a part of this revolutionizing effort and explore the technological advancements, scientific researches, and opportunities for everyone to flourish.

Dr. Ranjeet Kr. Singh
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THE ORGANIZER

INTERNATIONAL ASSOCIATION OF SCIENTISTS AND RESEARCHERS (IASR)

IASR is a non-profit organization focused to deliver the updated literature and research work to not only the global scientific and research society, but also to everyone. Providing open access to critically reviewed high-quality research papers and literature, it works with a mission of providing a user- friendly global platforms for researchers, scientists for sharing information, and dissemination of recent ground breaking researches and advancements in various fields working together for the betterment of the world.

About the eConference

Forensic Science has proffered techniques that have leveled up the competence of humankind and are staying up with the trend. At the outset, the International Association of Scientists and Researchers (IASR) in association with the Sherlock Institute of Forensic Science (SIFS) India organizing the 2nd International eConference on "DNA Forensics", 2021. With utmost enthusiasm, the organizing committee invites the young minds and professionals of various disciplines of forensic science and become a part of the first-ever convention organized with the motto of bringing the unrecognized talents, present globally. The program would follow talks by eminent national and international experts accompanied by e-paper presentations, ePoster presentations, discussions, and scientific excellence awards.

Mission Statement

"Committing towards the fact of being a lead-follower of technology with a bold spirit of risk-taking, helping us make our presence noticeable worldwide".

SPEAKER'S PROFILE

DR. HIRAK RANJAN DASH

Scientific Officer, Author
Assistant Chemical Examiner, FSL, Madhya Pradesh

Dr. Hirak Ranjan Dash is currently working as Scientific Officer and Assistant Chemical Examiner at Madhya Pradesh FSL. He has completed his Ph.D in Life Science from the National Institute of Technology, Rourkela. He has outstanding research experience of more than 10 years on molecular biology and DNA Fingerprinting at NIT, Rourkela, Institute of Life Science, Bhubaneswar and National Institute of Cholera and Enteric Disease, Kolkata. He has examined more than 1,050 forensic cases by the technique of DNA profiling. There are numerous National and International research papers published under his name. He has written seven books on various fields of Biotechnology inclusive of forensic DNA analysis. He is also consider as one of the pioneers on India to work on NGS based forensic DNA analysis.

TIFFANY ROY

Forensic DNA Expert
ForensicAid LLC.

TIFFANY ROY, MSFS, JD is a Forensic DNA expert with over fourteen years of forensic biology experience in both public and private laboratories in the United States. She holds degrees from Syracuse University, Massachusetts School of Law, and the University of Florida in the areas of Biology, Law, and Forensic Science. She has processed thousands of DNA samples and thousands of cases over the course of her career. She instructs undergraduates at the University of Maryland Global Campus and Southern New Hampshire University. Roy is a member of the American Academy of Forensic Sciences, the Northeastern Association of Forensic Scientists, and the Massachusetts Board of Bar Examiners. She is a certified Diplomate in the area of Forensic Biology by the American Board of Criminalistics. She currently acts as a consultant for attorneys and the media in the area of forensic biology through her firm, ForensicAid, LLC.

SPEAKER'S PROFILE

HANAN AHMAD ALMULLA

Forensic DNA Expert
Dubai Police

Hanan Ahmad Almulla is a Forensic DNA Expert at Dubai Police. She attained her BSc in Biotechnology from the University of Sharjah in the UAE and her MSc in Bioinformatics from the University of Birmingham in the UK. She is currently a member of the Dubai Police Scientists Council and the Arabic Speaking Working Group of the Forensic Science International Journal for Genetics, working on genetic research and developing procedures that would serve the industry in the United Arab Emirates.

ABY JOSEPH

Assistant Professor
Amity University, Dubai

Mr. Aby Joseph, currently working as an Assistant professor of Forensic science department at Amity University, Dubai, is an internationally recognized forensic science consultant with 23 years of experience with Abu Dhabi and Bahrain Police Forensic Science Departments, His areas of expertise are crime scene investigation, biological evidence examination, and DNA analysis. During his career, he had screened, analyzed, and interpreted thousands of DNA evidence of complex sexual assault, human remains, and homicide evidence, and post-blast (Touch DNA) cases. He is a licensed Molecular Biologist (Ministry of Health, UAE), a professional member of the Chartered Society of Forensic Science, UK, and Honorary Fellow of European society for forensic science also serves as the advisor to the Indian association of criminology and forensic science and Ambassador, wildlife forensic academy, South Africa. Joseph holds a master's degree in Forensic Science with DNA specialization and professionally trained in Crime Scene Investigation, DNA interpretation, DNA Mixture analysis, ISO/IEC: 17025 &17020 QMS, Laboratory Information management system (LIMS) He regularly undertakes in-depth training and continuing professional consultancy in forensic CSI, Biology, DNA, and QMS.

SPEAKER'S PROFILE

DR. G. K. GOSWAMY, IPS

Chief of ATS, Uttar Pradesh
Former Joint Director, CBI

Dr. GK Goswami is an IPS of 1997 Batch UP cadre currently serving as the Chief of ATS Uttar Pradesh. He also served for long as Joint Director in CBI and an expert on organized crimes in UNODC. He also hold prestigious postings such as SSP Lucknow, Varanasi, Moradabad, Noida, Etawaha etc. He is four times recipient of Police Medal for Gallantry, the highest police award of India, conferred by the President of India. He has exceptional academic interest and did PhD from JNU and LU in Chemistry in 1997 and during serving in police, did LLB and LLM with distinction and secured Gold Medals. He is Flex Awardee under the Fulbright Fellowship. Also did second PhD in Law from Tata Institute of Social Sciences, Mumbai. In 2020, he became first Indian to earn DSc in Forensic Sciences and Law from NFSU Gandhinagar. He has been designated as Honorary Professor of Law in various Universities such as National Law University Delhi, National Forensic Sciences University Gandhinagar etc.

PROF. GYANESHWER CHAUBEY

Professor
Banaras Hindu University, Varanasi

Prof. Gyaneshwar Chaubey is currently working as Professor (full), Department of Zoology, Banaras Hindu University, Varanasi, India. He has also had the experience of working as Senior Scientist at Department of Evolutionary Biology, Estonian Biocentre, Tartu, Estonia. He has done his Ph.D. in Molecular Biology. He was selected as the top young researcher to meet the Nobel Laureates in 61st Lindau Nobel Laureates Meeting 2011, Germany. He was also awarded by Gencove USA for free sequencing of 300 Zoroastrian samples. He has also involved in helping students with supervision and mentoring, as he co-supervised 43 post-graduate students in their dissertation in CCMB etc. He has also active memberships in scientific societies as an executive committee member of ADNAT (Association for the promotion of DNA fingerprinting and other DNA technologies) and ISHG (Indian Society of Human Genetics). He has involved in vital responsibilities as an academic and associate editor.

SPEAKER'S PROFILE

DR. VIVEK SAHAJPAL

Assistant Director

Directorate of Forensics Services, Himachal Pradesh

Dr. Vivek Sahajpal is presently serving as the Assistant Director at the Directorate of Forensics Services, Himachal Pradesh. Dr. Sahajpal attained is Masters in Forensic Science from Punjabi University, Patiala, and undertook various pioneering research in the field of wildlife forensics at the Wildlife Institute of India, Dehradun, and attained his Ph.D. Dr. Sahajpal later worked as Research Associate at the Advanced Biotechnology Center, Dubai, United Arab Emirates. Dr. Sahajpal has carried out DNA analysis of more than 2500 cases pertaining to DNA profiling and has also published more than 30 papers in International Journals while contributing to several books. His paper presented at Imperial College London won the best paper award in 2006. With this, he is a member of the International Society for Forensic Genetics. He has also worked in the field of quality management and created the quality management system at State Forensic lab Himachal Pradesh.

DR. NIRAJ RAI

Scientist C & Group Head Ancient DNA Lab

Birbal Sahni Institute of Palaeosciences, Lucknow

Dr. Niraj Rai is a Scientist C and Group Head of the Ancient DNA Lab at Birbal Sahni Institute of Palaeosciences, Lucknow. He has been a Post-Doctoral Research Fellow with Dr. K. Thangaraj at CSIRCCMB, Hyderabad. He has been a visiting research fellow at the University of Cambridge, UK. He has received Young Investigator Award from "International Society of Applied Biology", Croatia, 2015. He has also received Venkatchalla Gold Medal Award for the Year 2019, Young Scientist Award in "36th Annual Conference of the Indian Society of Human Genetics" at Manipal University, Manipal, India, 2011 and UKIERI visiting fellowship award and spent 11 Months at University of Cambridge, UK (2007-2008). He hhas qualified GATE, CSIR-NET and AICEE-JNU. He has supervised 22 post graduate students, and six Ph.D. Students from Institutes in Pune, Chicago, Srilanks and Lucknow.

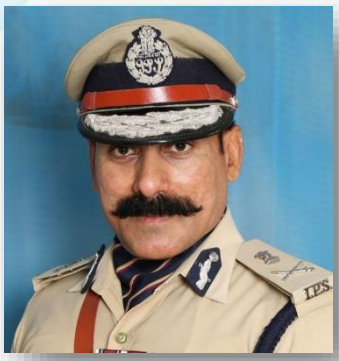
SPEAKER'S PROFILE

DR. ROBERT GREEN OBE

University Reader
University of Kent, UK

Bob is currently Reader in Forensic Science and the Director of Student Engagement within the School of Physical Sciences at the University of Kent, UK. Prior to joining the University he worked within Research and Service Development at the Forensic Science Service and latterly leading the Science and Technology Unit within the Police Standards Unit at the UK Home Office. He is well known for developing and leading the national program of cold case rape investigation – Operation Advance as well as being a national and international speaker on the development of DNA and other biometric databases. He was made an OBE in the Queen's Birthday Honours list of 2008 for his services to forensic science. Over 34 years he has led a large number of consultancies both in the UK and abroad, dealing with science, technology and how we maximise our business processes to get the best from the investment in science.

D. C. SAGAR, IPS



ADGP Police Training and Research Institute
Police Headquarters, Bhopal, Madhya Pradesh

Dinesh Chandra Sagar, IPS is currently serving as ADGP Police Training and Research Institute, Police Headquarters, Bhopal, and has served as Additional Director General of Police, Disaster Management as well as Technical Services, Bhopal, Madhya Pradesh. Previously, he served as the Inspector-General of Police of Balaghat Range, a Naxalite area in Madhya Pradesh and Gwalior. He is awarded the Police Gallantry Medal twice for his achievements. He has also been given Jeevan Raksha Medal and Indian Police Medal for Meritorious Services. As regard from the State Government of Madhya Pradesh, he has been awarded Indira Gandhi Sampradayik Updrav Roktham Aur Souhadra Puruskar, CM's Revolver, Durgam Seva Padak (twice), Internal Security Medal, and Commendation from Chief Election Officer, M.P for his various successful operations and commendable efforts for the Nation. He was appreciated for saving lives of people with proper precautions from COVID-19 for SDRF Home Guards via two tweets by Hon'ble CM, Govt. of MP.

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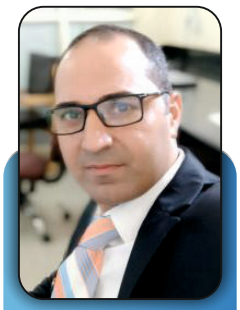

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PAPER CATEGORY

STUDY ON DIFFERENTIAL EXTRACTION PROTOCOLS FOR BETTER LYSIS IN SEXUAL ASSAULT CASE

Akansha Dixit[1, 2], Dr. Ankit Srivastava[1], Dr. Pankaj Shrivastava[3]

[1] Dr. A.P.J Abdul Kalam Institute of Forensic Science and Criminology, Bundelkhand University, Jhansi, U.P, India.

[2] State Forensic Science Laboratory, Jaipur, Rajasthan, India.

[3] DNA Fingerprinting Unit, State Forensic Science Laboratory, Department of Home (Police), Govt. of MP, Sagar, M.P, India.

Abstract

The discovery of DNA profiling is one of the most interesting discoveries till date. Since, its application in law enforcement system, the protocols followed for sample collection from the crime scene and DNA extraction methods from various biological samples are well established. One of the DNA extraction methods is Differential extraction method that separates vaginal epithelial cells and sperm cells from the sperm fraction and is used in cases of sexual assault. The present study is to compare the different concentration of lysis buffers used in differential extraction for better lysis in sexual assault samples. For this study, mock sexual assault samples of blood, semen, semen-free male and female saliva, menstrual blood were prepared, 16 mock samples and 16 swabs were prepared by adding diluted semen to blood, semen-free male and female saliva and menstrual blood. Following the differential methods, these samples were digested with four different lysis buffers (A- buffer, B-buffer, C-buffer and D-buffer). DNA was extracted through the process of phenol-chloroform extraction method. Quantitative analyses of samples were done through qPCR quadruplex assay with the Applied Biosystems TM 7500 Real-time PCR systems. Few samples were genotyped through VeriFiler Plus Amplification kit and PCR products were detected through Genetic Analyser. The present work was discussed with the earlier performed works of similar kinds and conclusion was drawn. The qPCR system shows that the total human DNA and Y-DNA digested with lysis buffer-C are significantly higher as compared to other lysis buffer. Lysis buffer-C shows the best result in minimizing the female DNA carryover and the maximum amount of sperm DNA were recovered. In sexual assault cases, it was important to isolate maximum amount of male DNA to ensure the DNA typing of the male DNA.

Keywords: DNA Profiling, Sexual Assault, Differential Extraction, Total Human DNA, Y-DNA

DETERMINATION OF STABILITY OF DNA IN STORED BLOOD STAIN SAMPLES

Anjali Malik[1], Dr. Sally Lukose[2]

[1]Assistant Professor, Sharda University, Greater Noida

[2]Professor (Dean), Sharda University, Greater Noida

Abstract

Retrieval of deoxyribonucleic acid (DNA) from varied biological fluids and evidences for the purpose of individualization and several other factors is an important task. Deoxyribonucleic acid extraction from different biological fluids is a crucial work to achieve. In forensic case works where the evidences are to be retrieved from diversified conditions that might cause the degradation of sample, resulting in the degrading the quantity and integrity of DNA samples. In many cases where the re assessing of the DNA sample is also to be conducted, it is quite impossible for examiners to get the same outcomes as earlier. Despite of having PCR sensitivity in hand, it is noteworthy that the DNA shows significant degradation depending upon varied environmental conditions. Several factors like storage temperature, storage durations and preservatives used for the purpose of storage affects to acquire the good quality DNA profile. This study was conducted to present a review of the available aspects of impact of collection and storage conditions on the degradation of DNA. The study also provides the insight to the fact that the extraction method being used for the purpose of extraction of DNA plays a vital role in the extraction yield of DNA from the samples. This study provides an approach for an optimum storage conditions and temperatures of the blood samples for the purpose of extraction of good quantity and pure DNA sample for forensic analysis.

Keywords: DNA, Extraction Yield, Degradation, Storage, Forensic Analysis

SALIVARY SIGNATURE IN FORENSIC PROFILING

Dr. Ritika Sharma[1]

[1]PG Student (Final Year) Manav Rachna Dental College, Suraj Kund Faridabad

Email Id: ritikasharma250494@gmail.com

Abstract

Body fluid like saliva are commonly used as investigating tools during assessing of high volume crimes like homicides, cases of sexual assaults, human and animal bite marks, poisoning, hormone identification, and alcohol and drug abuse. Saliva, is a highly complex mixture of cells, enzymes, proteins, and inorganic substances, water (> 99%) in the presence of buccal epithelia cells, enzymes, salts, mucin, and alpha-amylase (α-amylase). Because of its abundancy in human saliva, most of the presumptive tests target α-amylase. Confirmatory assays for saliva are mainly based on immunochromatography and allow to differentiate between human and non-human body fluids. This paper aims to identify role of saliva in comparative and reconstructive identification and propose the concept of salivary signature (SS) in forensics. Since, saliva is been related to forensics, specifically in biologic profiling of individual. Salivary microbiome and biomarkers which together provide pertinent information about lifestyle, behavioural patterns, circadian rhythms, geolocation, cohabitation of individuals, post-mortem intervals, systemic and oral ailments or cancers besides salivary flow and composition. Periodontist regularly deal with saliva and GCF for identifying the markers therefore periodontist can play a crucial part in collecting, storing and analysing the saliva.

Keywords: Saliva, Salivary Signature, Immunochromatography, Periodontist

GENE POLYMORPHISMS IN PERIODONTITIS

Dr. Ruchi Pandey[1]

Abstract

Periodontitis, is an infectious, inflammatory disease affecting the periodontium, the supporting tissues around teeth. Bacteria are believed to play a key role in pathology along with the host response responsible for most of the tissue destruction. Periodontitis is multifactorial in nature and genetic pattern of individual plays a key role. There are many polymorphic patterns seen in patients suffering from periodontitis, depending on the ethnicity. Commonly found polymorphisms associated with periodontitis is in gene coding for IL-1β and IL-1α. Therefore the study of polymorphic pattern can lead to early detection of individuals susceptible to the disease.

Keywords: Periodontitis, polymorphisms, ethnicity

MAXIMUM CRANIAL BREADTH IN SEXING OF CRANIA-MEDICOLEGAL IMPORTANCE

Dr. Ruta Bapat[1]

[1]Associate Professor, Department of Anatomy, Dr D Y Patil Medical College, Nerul

Abstract

Determination of sex is one of the important factor in identifying decomposed bodies and skeletal remains. The correct sex determination is a critical requirement in physical anthropology and medicolegal cases. The maximum cranial breadth were studied. It was found that statistical sex difference in mean values of cranial breadth. The cranial breadth important parameter in sexing of crania.

Keywords: Sexing, Breadth, Crania, Medicolegal

PERIOSCOPE IN DNA FORENSICS

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Abstract

The branch which deals with the health and disease of the periodontium is the field of periodontics. Its contribution is seen in identification of the various facts related to crime scene by DNA fingerprinting including saliva present in oral cavity. Saliva which is present in abundance in oral cavity can be procured from bite marks. The role of DNA is that it is responsible for all the cells activities, yields valuable information in both the healthy and diseased individuals. Periodontology can help in forensics in unfolding mysteries related to any criminal investigation. Aim is to analyze about the branch of science which is involved in analyzing fluids, tissue samples and blood to extract DNA for identification. Blood is a prolific cache for DNA, storage and collection of it requires high level precision and an aseptic environment. As a result of which noninvasive method such as saliva has come into limelight since many years. DNA typing has great potential benefits for criminal and civil justice however, because of the possibilities for its misuse or abuse, important questions have been raised about reliability, validity, and confidentiality. Conclusion was derived from the inputs from searched articles that the field of periodontology could promote forensic research by their methodical approach. Therefore further research in the field of periodontics can add a new horizon to the scope of forensics as multitude of discoveries pertaining to the field of forensics can be seen.

Keywords: DNA fingerprinting, Periodontics, Saliva, Blood, Forensics

FORENSICS AND PERIODONTIUM

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Abstract

Dentistry is contributing massively in the forensic research through innumerable scientific contributions. One such branch of dentistry is Periodontics. Periodontics deals with diseases of the periodontium. In forensic science, Periodontics deals with identification of individuals through morphology and pathology of periodontium and is also utilized for age estimation which includes (periodontal ligament attachment level) periodontosis, root transparency and root length. Langerhen cells, alveolar bone height, gingival marginal recession etc also helps in identification of age and sex of the deceased. A PubMed search was conducted and after reviewing last 10 years articles research question arised,How periodontal tissues are related to forensic science and identification of the deceased? The prime focus of this research is to highlight how a periodontist can contribute to the field of forensic odontology by associating the parameters of his domain, to unravel a crime scene. Conclusion derived was that the field of periodontology that could possibly promote forensic research by their methodical approach. The study of the periodontal structures post mortem can help in the identification, determination of time of death, sex determination along with age estimation of the deceased. The terrorist attacks and natural disasters in which there have been multiple fatalities have reinforced the need periodontists and other forensic odontologists in order to co-ordinate the response to such events properly. Hence a periodontist can make valuable contributions to forensic odontology.

Keywords: Periodontics, Periodontium,Forensic Odontologists,Post mortem,PubMed

THE DENTAL PULP- A ROAD MAP TO FORENSICS

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Abstract

A dental pulp is the innermost part which is housed inside the hard chamber of the tooth. Dental pulp has a good supply of blood vessels, nerves and connective tissue. As the age increases, there are various changes seen in the tooth implementing a direct association between the pulpal tissue and the age of the individual. However, in any unfortunate event where there is a mass destruction and nearly impossible to identify an individual, Forensic Odontology serves as a boon. The tooth is a nearly an indestructible structure owing to its anatomical structure namely enamel and dentine. The tooth can withstand an array of temperature changes or any forceful impact without fully deforming, thereby leaving an evidence for investigation. The dental pulp is the core structure of the tooth and is protected by enamel and dentine. The expanding knowledge in root canal anatomy and advances in endodontic imaging are at the forefront of endodontic research and practice. The identification of dental remains is of prime importance when the deceased person is decomposed, burned, or dismembered. Therefore, through the use of various novel techniques, an Endodontist can play a valuable role in providing strong evidence in an ongoing forensic investigation.

Keywords: Dental pulp, Endodontist, Forensic Investigation

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GENETIC POLYMORPHISM STUDY AT 23 AUTOSOMAL STRS LOCI INCLUDED IN VERIFILER PLUS™ MULTIPLEX IN THE MAHAR POPULATION FROM BASTAR, CHHATTISGARH

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Abstract

The concept of forensic identification has ramped up with the use of wide range of polymorphic markers evolving from the protein polymorphism to the genetic polymorphisms. PCR-based Short Tandem Repeats (STRs) markers, due to their co-dominance nature, high genomic abundance, existence in low-copy regions and pseudo-normal distribution, have become most prevalent polymorphic markers for individual identification in forensic genetics. Several world-wide and nation-wide studies on different castes and tribes have been carried out to ascertain the efficacy of sets of STR loci in discriminating individuals. The current study is an attempt to estimate population parameters on the basis of allele frequencies for a set of 23 polymorphic autosomal STR loci (namely D3S1358, vWA, D16S539, CSF1PO, D6S1043, D8S1179, D21S11, D18S51, D5S818, D2S441, D19S433, FGA, D10S1248, D22S1045, D1S1656, D13S317, D7S820, Penta E, Penta D, TH01, D12S391, D2S1338 and TPOX), Y-indel and amelogenin marker in the Mahar population of Bastar (Chhattisgarh). Blood samples from 51 healthy unrelated individuals were collected and analysed. Multiplex PCR amplification was performed using VeriFiler Plus PCR Amplification Kit (Applied Biosystem, Foster City, USA) and amplified products were genotyped using multi capillary electrophoresis on ABI 3500/3500XL genetic analyser (Applied Biosystem, Foster City, USA) using POP4® polymer with GeneMapper™ *ID-X* Software v1.5. The high level of heterozygosity observed (range 0.661-0.865) for twenty-three STRs system indicates a high level of genetic variation in the population that can be successfully utilized in discriminating individuals. PIC values > 0.5 for all STR loci (range 0.62-0.82) indicating that the analysed system is informative and useful for identification purpose. The power of discrimination (range 0.825-0.951), practically indicates individualizing power these 23 STR loci.

Keywords: Polymorphism, Autosomal STR, Verifiler Plus ™, Mahar, Bastar, Forensic DNA typing, population genetics.

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A REVIEW STUDY ON CURRENT STATUS OF E DNA AND ITS APPLICATION FOR BIODIVERSITY CONSERVATION

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Abstract

To preserve wildlife and maintain balance of ecosystem there is major necessity to protect wildlife and at the same time need to put some strong conservation efforts to save biodiversity which is essentially depend on the monitoring of species and populations to obtain reliable distribution patterns and population size. Such monitoring has traditionally relied on physical identification of species by visual surveys and counting of individuals. However, traditional monitoring techniques remain problematic due to difficulties associated with correct. Hence, there is urgent need for alternative and efficient techniques for large-scale biodiversity monitoring. Environmental DNA (e DNA) – *Genetic material obtained directly from environmental samples (soil, sediment, water, etc.) without any obvious signs of biological source material* – is an efficient, non-invasive and easy-to-standardize sampling approach. Environmental DNA helps to know about extinct species but it is not possible to know easily as we cannot catch the whole organism, so e DNA is certainly useful for getting detail information of hereditary and ecological information of species. We analysed from present review that the taxonomical observation and field report, suggests the important concept of knowledge gaps in e DNA study. It is revolutionary process and important breakthrough in monitoring the living animal. E DNA metabarcoding is one of important factor to assess the communities for purposes ranges from ecosystem and biodiversity restoration to human health and makes it very precious factor and vital for molecular research. Use of e DNA for census or measuring biomass of population, population genetics, genomics analyses via., e DNA other biomolecules are RNA , protein are used as indicator of environmental DNA. The present review report proposes current status of e DNA and its application in conservation and wildlife research.

Keywords: Environmental DNA, Metabarcoding, Genetics, Genomics, Conservation.

ASSESSMENT OF MUTATION RATES IN Y-STRS DNA PROFILING BETWEEN MALE BLOOD RELATIVES IN POPULATION OF U.P.

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Abstract

Short Tandem Repeats on the Y chromosome (Y-STRs) plays a significant role in forensic DNA analysis and paternity testing for identification purpose. Mutations at specific loci on the Y chromosome are proposed to facilitate the identification of male individuals in forensic investigations, but can also result in the incorrect exclusion of biological paternity. Therefore, reliable estimates of mutation rates on Y-STR markers are needed for the proper use of Y-STRs and accurate interpretation of genetic profiles. The present study is based on the estimation of mutation rates in the population of Uttar Pradesh. For this, 51 pairs of blood samples of father-son and brother-brother were collected and DNA was extracted using modified phenol-chloroform method which was quantified by Fluorometer. Amplification of DNA was done using PowerPlex® Y23 Kit as per manufactures guidelines which were later genotyped with 3500/3500XL Genetic Analyzer (Applied Biosystem) and analyzed using The GeneMapper™ ID-X Software v1.5. A total of eleven mutations were observed with an average mutation rate of $9.39x10^{-3}$. The results can be helpful in sexual assault cases, patrilineal familial search of possible perpetrator, missing person's cases or disaster victim identification involving males, in paternity analysis, as well as genealogical studies. In case of paternity and family testing, it would be advisable to use conventional Y-STRs, due to their considerably lower average mutation rate.

Keywords: Y-STR, Mutation, Mutation Rate, Y-chromosome, PowerPlex® Y23

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COMPARATIVE STUDY ON DIFFERENT BUFFERS USED IN FORENSIC DNA ANALYSIS FOR OBSERVING THEIR LYSIS POTENTIAL

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Abstract

The DNA extraction process is the primary process in forensic DNA analysis. Isolation of DNA from blood in adequate quantities is an integral part of forensic analysis. In India, since DNA extraction cannot be performed immediately after the sample collection, therefore blood samples may be stored for years before being processed. Long-term storage of blood can affect the integrity of DNA if it is not done under optimal conditions. Blood samples stored at 4°C for a short period will still yield DNA of acceptable quantity but the blood samples which are stored for a longer period, show some degradable changes, by which we get a lower yield of DNA. Therefore, highly degraded samples often produce incomplete or no STR profiles. In the Phenol-Chloroform extraction method, the mainly used buffers are Forensic Buffer and Stain Extraction Buffer. In this study an advanced Phenol- Chloroform method is used for DNA isolation. We compared the new buffer i.e, MPDB with two other buffers by using the Phenol-Chloroform extraction method. To conduct this study, 68 total blood samples were used out of which 8 fresh,15 three months old, and 45 six months old. These blood samples were extracted using the modified phenol-chloroform method which was quantified by Qubit® 2.0 Fluorometer. Our protocol resulted in an average yield of DNA 20.6 ± 4.82 in Fresh blood samples, 12.12 ± 1.28 in three-month-old blood samples, and 1.84 ± 0.37 in six-month-old blood samples respectively, lysed in MPDB buffer. This buffer gave a higher yield compared to other buffers. The data was further statistically analyzed by using ANOVA and Bonferroni´s multiple comparison test. The results show significant differences in three different buffers. This work showed that comparing the three buffers, by using the modified organic phenol-chloroform protocol, MPDB buffer was more efficient regarding the amount of DNA recovered.

Keywords: *Whole blood, DNA isolation, degradation, high yield, Blood storage, buffeR*

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TARGETING DNA IN FORENSIC ODONTOLOGY

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Abstract

In forensic identification cases, where human remains are extremely damaged or degraded, teeth and bones are often the only available sources of DNA. Advances in DNA extraction techniques and short-amplicon DNA typing have greatly increased our potential to identify human remains previously considered to be too compromised for genetic analysis. Due to their unique composition and location within the jawbones they are largely protected from the environmental and physical conditions that act to accelerate the processes of postmortem decomposition and DNA decay. Gaytmenn and Sweet demonstrated that, even in teeth with pulp present, the DNA yield from the crown is still ten times less than that retrieved from the roots. High cellularity of pulp tissue provides the richest source of DNA in teeth. Various methods have been reported regarding the extraction of DNA from the tooth which includes sectioning of teeth horizontally at the CEJ or vertically up to root tip, scraping and aspiration. Other methods include crushing of the teeth or cryogenic grinding or conventional cavity preparation and retrieval of pulp. The currently performed DNA profile tests are totally reliable and give details about an individual's physical characteristics, ethnicity, place of origin and sex. These tests are also accepted as legal proofs in courts. These tests are: Restriction Fragment Length Polymorphism Typing, STRs Typing, Mitochondrial DNA Analysis, Y-Chromosome Analysis, X-Chromosome STR, Single Nucleotide Polymorphism and Orthograde entrance. The aim of this presentation is to provide a review about the latest techniques in DNA for human identification in the field of forensic odontology.

Keywords: Forensic odontology, DNA typing, Orthograde entrance, STRs typing, Cryogenic

DNA FORENSICS: SIGNIFICANCE IN SEXUAL ASSAULT CASES

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Abstract

DNA evidence has become a routine part of investigating and prosecuting all types of crimes but it is most significant when law enforcement investigates a case of sexual violence. It is an important device in attaining justice for survivors of sexual assault. The present paper deals with various biological, physical, social and legal aspects of DNA analysis in sexual assault cases and related advantages and limitations. The main dimensions of the study are - the benefits of having a sexual assault forensic exam, the personnel and rules regarding conduction of this examination, collection of DNA sample, crime lab, analysis of material and development of DNA profile, the protocol related to handling and use of these evidences in an investigation, and related ethics and laws.

Keywords: Sexual Assault Cases, Forensic Investigations, DNA Forensics, DNA Sample, Ethical and Legal Issues

FORENSIC INVESTIGATION OF A RAPE, SODOMY AND MURDER CASE

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Abstract

The sexual assault with rape, sodomy and murder together is comparatively less and rarely reported. The statistics under such crime head is not available in literature and research studies, but presently, such type of crime is very often reported for various reasons. In one case, a 17-year-old minor girl regularly used to attend private tuition class near her village. One day, after class was over, as usual the girl did not return home and search was made till late night. It was clueless about her where about. FIR was lodged in the local police station. On the following day, a half-naked female dead body was reported lying in the nearby jungle. The dead body was identified to be the same missing girl by the relatives. The investigating officer visited the undisturbed crime scene to collect various incriminating physical evidence for forensic analysis. Moreover, in this case rape and sodomy followed with strangulation of the rape victim girl is the rarest of such rare cases and criminal profile has been discussed suggesting psychological and psychiatric analysis of the sexual offender in such heinous crime.

Keywords: Rape and murder, FIR (First Information Report), Physical evidence, Profile of the criminal, Forensic evaluation, Postmortem report, Psychiatric analysis

EPOSTER CATEGORY

PERSONAL IDENTIFICATION FROM EXAMINATION ANSWER SHEETS: A CHALLENGE

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Abstract

In forensic investigations, different documents including examination of answer sheets have been encountered in many cases pertaining to impersonation, frauds, threats, kidnapping, and extortion etc. where it becomes urgent to identify the perpetrator, who has written these document/answer sheets. The continual improvement in STR (Short Tandem Repeats) profiling in recent years has significantly raised the prospect of identifying the perpetrator from the DNA (Deoxyribonucleic acid) profiles recovered from the touched or shuffled documents. Perpetrators while handling/shuffling the documents, might have used saliva to flip through the pages. There might be possibility of recovering latent prints along with the salivary stains from the paper being handled. Sheded epithelial cells onto the substrates along with the biological fluids such as saliva, sweat can be important source for DNA extraction. Thus, DNA recovery from paper substrates is nowadays becoming a specific area of interest to law enforcement agencies. The current study aimed to recover saliva stains from paper substrates encountered in different fraudulent cases. The selected paper substrate for the present study is examination answer sheets, which are commonly used in schools, colleges, universities and various examinations. The collected samples were processed for DNA profiling. Prior to DNA profiling, the substrates were tested (for salivary Amylase) for the presence of saliva deposited on it. The saliva deposited on the substrates were then subjected to DNA extraction and quantification, followed by amplification with PowerPlex® 21 PCR Amplification Kit (Promega, USA) and PCR (Polymerase chain reaction) products were then analyzed using automated DNA sequencer (ABI 3130, Applied Biosystems, USA). Complete DNA profiles were obtained from the freshly collected paper substrates under study. The enhancement methods used in the study did not interfere with successive DNA extraction and quantification process. Good quality DNA extracted from all the samples under study. Further, studies related to the effect of aging in subsequent DNA profiling from aged and soiled examination sheets is still ongoing.

Keywords: Deoxyribonucleic acid, Examination answer sheet, Impersonation, Saliva and STR (Short Tandem Repeats).

NON-SUICIDAL SELF-INJURIES WITH MALA FIDE INTENT – 5 CASE REPORTS

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Abstract

Non-suicidal self-injury (NSSI) refers to the intentional destruction of one's own body tissues without suicidal intent and for purposes not socially sanctioned and is also referred to various authors as "self-inflicted injuries', 'self-suffered injuries', 'fabricated injuries' etc. The classic picture of NSSI as discussed in the textbooks is uncommon where the perpetrator had professional help. We hereby report five cases of NSSI that presented in the emergency of our institute for medicolegal examination, alleging physical assault. All presented with fractures and challenged the textbook logic. It is important that forensic practitioners identify and note the precise anatomical site of the injury on the body, describe the total number of injuries, their dimensions and the direction and the depth, thoroughly examine the clothes and take into account medical and psychiatric history. A forensic expert has to identify patterns of injuries and mechanisms/manner that can aid in understanding the circumstances that led to them.

Keywords: Non-suicidal self-injury, fabricated injuries, Psychiatric, Assault

AMELOGLYPHICS IN PRIMARY AND PERMANENT DENTITION USING STAINING METHOD- AN INVITRO STUDY

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Abstract

In forensic Odontology, ameloglyphics is the study of enamel rod end patterns. These enamel rod end patterns are unique to an individual tooth of same and different individuals. Enamel is the hardest tissue and has the highest resistance to most environmental effects like fire, acid exposure and decomposition and may be used as forensic evidence. This study was done to evaluate various stains and staining methods in tooth prints under stereomicroscope which could be used as an adjunctive forensic tool in individual identification. Haut et al studied enamel print pattern in deutero malay subrace on female permanent maxillary central incisors and found linear branched type of pattern to be most common. Tooth prints from — 15 freshly extracted maxillary premolar were obtained. 15 different stains were used for staining teeth by soak method and studied under a stereo microscope.12 freshly extracted tooth were used to study three methods of staining the tooth using hematoxylin and toluidine blue stains. Soak method, cotton swab application method, micro tip application method on the buccal/labial surface of the tooth were done and studied under a stereo microscope. 50 freshly extracted teeth were stained using hematoxylin and toluidine blue by soak method 25 each included. In our study, hematoxylin and toluidine blue showed the surface score of 7 out of 9 which was the highest when compared to remaining stains. On comparing 3 different staining methods using hematoxylin and toluidine blue stains in soak method showed superior scores when compared to other two methods. On comparing hematoxylin and toluidine blue staining on both primary and permanent dentition hematoxylin showed mean and standard deviation of 6.4 ±0.669 and toluidine blue showed 6.56 ±0.776 with the confidence interval of 95%. To conclude, Ameloglyphics patterns can be studied by staining the tooth. Hematoxylin and toluidine blue stains can be used for studying the Ameloglyphics pattern. Soak method of staining the tooth can be done to study the pattern. Ameloglyphics patterns can be used as a valuable tool in personal identification using staining methods and shows promising future in forensic Odontology.

Keywords- Ameloglyphics, enamel patterns, staining, invitro study, forensic Odontology

AN UNUSUAL FINDING OF CHOKING IN A CASE OF ALUMINIUM PHOSPHIDE POISONING

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Abstract

Aluminum phosphide is widely used pesticide in India, most preferred chemical utilized for suicidal poisoning. Upon contact with moisture, it yields phosphine gas, the active pesticide content. Gastrointestinal manifestations like nausea, vomiting, and epigastric pain occur rapidly followed by cardiovascular, pulmonary, and neurological symptoms and signs including bradycardia, hypotension, myocarditis, non-specific electrocardiographic changes, pulmonary edema, headache and dizziness in the presence of a stable mental state. A high mortality rate of 50–90% has been reported after ingestion of this poison. It has been reported in case series that gastrointestinal features include hematemesis, vomiting, epigastric pain and dysphagia. Destructive lesions of the oesophagus and stomach, stomach lesions, duodenal erosions, and oesophageal obstruction or fistula were noted in few cases. In the present case report we found a case with alleged history of aluminum phosphide poisoning with a surprising unusual finding of asphyxia due to choking found on autopsy. Further study should be conducted to find out correlation between acute aluminum phosphide poisoning and choking as we found in our case.

Keywords: Aluminium phosphide, pesticide, electrocardiographic, erosions, oesophageal

CYTOMORPHOMETRIC ANALYSIS OF ORAL EXFOLIATING CELLS FOR AGE ESTIMATION

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Abstract

Age is a vital tool in identification of an individual. Forensic odontology largely deals with the identification of individuals. The estimation of the age and sex of the human body is important to the investigators since it can reduce the time taken to compare the body with the missing person's reports and find a possible match. Exfoliative cytology which is a non-invasive procedure has immense potential in age estimation. This study aims to compare the average cell size from oral smears of individuals of varying age groups using cytomorphometric analysis. In this study, 180 oral smears were collected from six sites from normal individuals using cytobrush and wooden spatula. The sample was divided into six age groups (Group 1: 10–20, Group 2: 21–30, Group 3: 31–40, Group 4: 41–50,Group 5: 50-60, Group 6: 61-70). The collected smear samples were stained using papanicolaou stain. The average sizes of the cells were measured using GIMP 2.10 image analysis software. Cytomorphometric analysis revealed a decrease in the average cell size with increase in age. The mean cell size difference was 0.0808mm with SD of 0.01536. Cytomorphometric evaluation of exfoliated oral cells can become a reliable tool for correlation of age. Cytomorphometric analysis of exfoliated cells of oral mucosa can serve as a potential alternative non-invasive procedure in evaluation and correlation of age of an individual compared to the other screening modalities, which are usually either expensive or invasive.

Keywords: Cytomorphometric analysis, age estimation, papanicolaou stain, image analysis, oral exfoliative cytology

NON - DESTRUCTIVE DENTAL PULP EXTRACTION FOR DNA FINGERPRINTING

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Abstract

Teeth are highly mineralized, making them very resistant to damage. Owing to this high resistance, teeth maintain their integrity and have always been considered to be a good source of material for human identification and forensic analysis. They are often the only components containing any DNA likely to help identify decomposed bodies or to study ancient populations. The literature chosen for the poster presentation is "A comparative study of two methods of dental pulp extraction for genetic fingerprinting" by Francoise Tilotta and others. The aim of the study was to compare the quantity and quality of DNA obtained by two pulpal DNA extraction methods. The study was conducted on 32 pairs of teeth. Each pair was made up of the same type of tooth extracted from the same patient at the same time. Teeth from pairs were randomly assigned to one of two groups according to how DNA would be collected: Group A: complete crushing of the tooth and Group B: standard endodontic access. The quantities of DNA obtained by crushing the tooth and by removing pulp by standard endodontic access by trepanation of the occlusal surface and amplified DNA micro-satellites were compared. In the series of crushed teeth, insufficient material for amplification was obtained in 78% of cases and a complete profile was obtained in only 9% of cases. Conversely, for the teeth prepared by trepanation, the profile was complete in 75% of cases and the DNA quantity was insufficient in only 3% of cases. Extracting dental DNA for identification purposes is usually performed after crushing the tooth. The main disadvantage of this method is complete tooth destruction, so further radiographic, anatomical or biochemical studies are no longer possible. Trepanation thus produced superior results in terms of quantity of DNA and the quality of the genetic profiles. Furthermore, it was a conservative procedure that allowed further analyses on the tooth.

Keywords: Forensic, DNA Sampling, Pulpal DNA, Non-destructive DNA Extraction, Trepenation

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HOT TOOTH: DNA QUALITY AND QUANTITY IN INCINERATED TOOTH

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Abstract

DNA is one of the primary identifiers according to INTERPOL. DNA has the most reliable and stable contribution whenever it comes to Identification. But the same concept is challenging when the retrieved remains are that of a burnt or charred body. Different research works has been conducted to assess the quality and quantity of DNA extracted from a burnt remain. Teeth is a good source of DNA. The pulp located inside the pulp chamber of the tooth is a rich source of DNA and serves as an investigating evidence in many cases where DNA from other parts may have huge contamination. Teeth is comparatively resistant to high temperature and chemical changes, thus making it the choice for DNA extraction in incinerated remains. The quality and quantity of DNA from incinerated teeth can be determined on the method used for the extraction, the colour of the teeth. The DNA retrieval approach when compared to ancient samples and incinerated samples is quite different. In cases of ancient samples, the quanity of DNA may be affected due to taphonomic changes but in incinerated remains the main concern is with the heat. The incinerated remains are mostly beyond visual recognition. In developing countries like India, where dental database is yet to be standardized, dental records cannot be relied upon. Only possible means of identification in these cases is DNA matcing. The tested DNA sample results may be kept in the form of a database and whenever next of kin claims for the body, DNA samples can be matched. This review poster aims at discussing various problems associated with DNA retrieval from incinerated remains and give a possible solution, based on review from other published research works.

Keywords: DNA Extraction, Incineration, teeth, identification, forensic dentistry

FATAL SCROTAL TRAUMA-A RARE CASE REPORT

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Abstract: -

The scrotum is relatively protected from severe damage due to its inherent mobility and the presence of cremasteric reflex and tunica albuginea, making testicular trauma uncommon. Contusion/hemorrhage in the scrotal wall may be missed due to its dark pigmented colour. Blunt trauma to scrotum may result in a number of injuries including Hematoma, Hematocele, testicular fracture, testicular rupture, testicular torsion, and epididymitis. One of the case study, a 30 year male, truck driver by occupation was sleeping in cabin of truck near petrol pump on side of road. There, some unknown people came and assaulted him. He sustained injuries primarily located over face, head, thorax, arms, back, thighs. He was immediately brought to nearby sub district hospital for treatment by accompanying person. After primary treatment, he was referred to tertiary care Centre in unconscious state, where he was declared dead. The inquest was prepared by police. Body was sent for postmortem examination. On examination of external genitalia, penis was intact, seminal ejaculation noted, but scrotum was enlarged, contused, bluish red in colour with loss of rugosities on left side .On palpation, it was firm in consistency. On opening scrotum, a dark red coloredhematoma covering the whole scrotum was present, Tunica albuginea was disrupted indicative of rupture of left testes, and Tunica Vaginalis was hemorrhagic but not disturbed. Hematoma was also noted in epididymis and spermatic cord. On dissection, hematoma was noted occupying whole left testicular parenchyma. Death was attributed to blunt trauma to scrotum. Blunt testicular rupture is a rare event that warrants rapid diagnosis and prompt surgical repair. Blunt testicular trauma may be missed during routine autopsy examination. So careful examination of genitalia needed during routine autopsy examination especially in brought dead, assault and accidental death cases.

Keywords: Scrotum, testes, blunt trauma, contusion, and testicular rupture.

PREVALENCE OF ROOT DILACERATIONS IN PERMANENT INCISORS IN CHENNAI POPULATION

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Abstract

In a legal context, forensic dentistry is mainly concerned with the use of teeth and oral structures for identification. In events such as terrorist attacks, aircraft, train and road crashes, and natural disasters such as tsunamis, earthquakes and floods. Various forensic odontology techniques help locate human remains (Disaster Victim Identification-DVI). The most difficult and well-protected structures in the body are dental structures. These structures are immune to decomposition and elevated temperatures and are among the last to break down after death. The primary basis for dental recognition lies in the absence of oral cavities. Certain anomalies can provide identification of victim if ante-mortem records are properly maintained. Root dilaceration is a dental anomaly characterized by an abnormal curvature of the dental root, which can provide good evidence in identification. The study consisted of 107 patients opgs with a total 405 of teeth was examined. The incidence of root dilaceration, each tooth was examined in terms of form (mild, moderate and severe), and the root third with root direction. The prevalence of root dilaceration was 2.6% in 64cases. With distal dilaceration of about 73%. The most prevalent type is moderate type with 67% and with higher incidence on mandibular lateral incisor with 78%. Considering the results dilaceration of tooth can be a tool in forensic dentistry for identification purposes.

Keyword: Dilaceration, prevalence, forensic identification, Ante-mortem report, Disaster Victim Identification

DRUGS OF SEXUAL ASSAULT AND THEIR ANALYSIS

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Abstract

Drug-facilitated sexual assault is the voluntary or involuntary ingestion of a drug by a victim that results in sexual act without consent. It is also known as date rape. Drugs used to facilitate rape may have sedative, hypnotic, dissociative, and/or amnesiac effects, and may be added to a food or drink without the victim's knowledge. These include alcohol, GHB (gamma hydroxybutyrate), ketamine, ecstasy, flunitrazepam etc. The common matrices like blood, urine, saliva, hairs, vitreous humour, vaginal or rectal swabs can be used for detection of these drugs. Some of the drugs used are detectable only for short period of time post administration, some for less than one day post-exposure, while others may be detectable for four or more days after the alleged offence, depending of the screening and confirmation methods. However, these methods are time consuming and less sensitive, hence, there is an important need of rapid and more efficient methods of on spot screening of date rape drugs. Thus, more research is required on modification of older/ development of new methods for simple, rapid and efficient extraction and detection of date rape drugs.

Keywords: Date rape, sexual assault, drug-facilitated sexual assault, ketamine, GHB

PYOGENIC MENINGOENCEPHALITIS IN TBI: AN AUTOPSY CASE STUDY

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Abstract:

Here we describe a case of a male in his mid-thirties with a history of road traffic accident. He received treatment in some hospital and discharged, but a couple weeks later, developed rigidity of limbs, irritability and altered sensorium. He eventually died during the course of his treatment in a tertiary level centre. An autopsy was performed which revealed: two surgically sutured wounds of size 2 cm, one on right frontal region of head 9 cm above medial end of right eyebrow; another 2 cm lateral to it; and multiple abrasion contusions in area of 7cm x 5cm over right side of upper chest, just below clavicle on external examination. Internal Examination revealed diffuse scalp oedema, sub scalp contusion with a fracture of frontal bone from lateral part of left orbital roof towards the right with extra Dural hematoma along. A subdural flattened glistening layer of apple green colour over left frontal lobe, diffuse yellow green coloured pus was found at the base of brain adjacent to optic chiasma, tract, and cavernous sinuses. Pus found on both hemispheres of brain, in foramen magnum and lower part of medulla. One half of the cerebral hemisphere was compressed at places showing cupping effect with areas of contusion necrosis evident on frontal lobe. On removing brain, fracture line with extension towards anterior cranial fossa and cribriform plate evident. One of the lungs and pleura were adherent to chest wall. Mild fatty changes and partial occlusion of LAD was seen in heart. Faecoliths were present in the colon. Liver was yellowish without nodularity. Opinion was given as death due to ante-mortem head injury and its complication (Widespread infection of Brain and Meninges). Findings consistent with history of road traffic accident. Time since death within 12 hours. Hospitalised case. Signs of surgical intervention evident. We feel this case excellently outlines the gross pathology seen in a case of pyogenic meningoencephalitis, which in this particular case was subsequent to a base of skull fracture sustained more than 6 weeks prior to demise.

Keywords*:* Pyogenic meningitis. Fracture skull. Pyogenic encephalitis. Post mortem. Cerebral abscess.

DNA FORENSICS

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Abstract

DNA forensics is the application of DNA technology & the knowledge of DNA genetics which is the practice of forensic medicine and to the power of legal medicine. Cases can be easily solved by DNA, forensic scientists can compare DNA found at a crime scene like blood, hair to DNA sample taken from suspects, if there is no match, they may be able to rule out that suspect. If there is a match police will likely to take a closer look. If we talk about the case study of the murder of Anna Palmer, 1998. So, in this case the crime was heinous, and includes multiple stab wounds to her body, investigators had no witnesses, no apparent suspects. So forensic analysts decided to examine the girl's fingernails for DNA samples. And its works and matched it to a man named Matthew Brock.

Keywords: Forensics, Application, Technology, Medicine, Scientists, Investigators, Heinous.

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EVALUATION OF LATENT FINGERPRINTS USING TITANIUM DIOXIDE NANOPARTICLE POWDER AND HERBAL POWDERS IN DIFFERENT SURFACES-AN OBSERVATIONAL STUDY

Sandra Sagar[1]

Abstract

DNA fingerprinting is a procedure that shows the hereditary cosmetics of living things.It is a strategy for finding the distinction between the satellites areas in the genome. Various methods have been reported for the development of latent fingerprints on different surfaces in the literature. This poster presents a new powdering method which is simple, non-toxic for the development of latent fingerprints that can be employed on different substrates. Arrowroot is a white, flavourless powder most often used to thicken food and is comprised of starches extracted from tropical tubers Maranta arundinacea, the arrowroot plant. Raspberry powder (Rubus idaeus) is also a commonly used food product, mainly for flavouring purposes. The main objective of the present study is to evaluate the latent fingerprints on different surfaces using titanium dioxide, Nanoparticle powder and herbal powders on six different surfaces. Three different powders namely Titanium dioxide powder, Arrow root powder (Maranta arundinacea), dried raspberry powder (Rubus idaeus) were used. Six different surfaces were selected and latent fingerprints were analysed on these surfaces .Latent fingerprint analysis was done using dusting method. For successful developments, powder was applied to a surface by sprinkling powder with the help of brush and lifting the developed prints with help of tapping method. Only ridge patterns stand out from the contrasting background. After waiting for a fraction of seconds, excess of powders adhering to the prints were dusted off to visualize clear prints. Comparative analysis was done for the powders to check for the best results obtained on the selected surfaces. Titanium dioxide powder, Maranta arundinacea and Rubus idaeus showed better results while visualising latent fingerprints.The main advantage was that these powders remained stable and they also had traces while subjecting them for removal.So they can be used for analysis in scenarios where multiple fingerprints are required from a particular crime scene. From the present study, it can be concluded that easily and commonly accessible and less expensive reagents i.e., household kitchen powders could act as a beneficial substitute for decrypting the latent prints.

Keywords: Latent fingerprints, Maranta arundinacea, titanium dioxide, Rubus idaeus

DENTAL DNA FINGERPRINTING IN FORENSICS

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Abstract

The potential forensic applications of DNA analysis in resolving disputed parentage problems, identification of human remains as well as in the individualization of blood and body fluids in crime laboratories are mostly used. But the fast technological advancements in DNA research have revolutionized the field of forensic dentistry. Teeth are amongst the hardest structures of the human body which are resistant to adverse conditions such as incineration, immersion, trauma, mutilation, decomposition and hence, used in forensic investigations. Teeth should be considered for DNA analysis as they are rich sources of quality DNA which can be utilized in all forensic investigations. Tooth roots, which are composed of cementum and dentine/pulp, have been shown to yield more DNA than the crown. A search was conducted and after reviewing last 10 years articles research question arised, how dental DNA fingerprinting is contributing in forensic science? The conclusion derived was that different techniques of identifying individual through dental means are available. Currently there are four types of personal identification circumstances that use teeth, which include comparative dental identification, reconstructive postmortem, dental profiling and DNA profiling. From replication of DNA by PCR, variable number tandem repeats (VNTRs) to single nucleotide polymorphism (SNP) and short tandem repeat (STR) typing of nuclear DNA etc is the most frequently relied upon technique available for human identification. Hence the dental identification of a body may sometimes be necessary due to the circumstances of the death. The contribution of dental DNA fingerprinting should be a topic of concern for advancement of forensic science in identification of deceased.

Keywords*:* Dental DNA fingerprinting, DNA profiling, SNP, VNTRs, forensics

CHILD ABUSE

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Abstract

Child abuse or child maltreatment is physical, sexual, and/or psychological maltreatment or neglect of a child or children, especially by a parent or a caregiver. Child abuse may include any act or failure to act by a parent or a caregiver that results in actual or potential harm to a child, and can occur in a child's home, or in the organizations, schools or communities the child interacts with. The World Health Organization distinguishes four types of child maltreatment: physical abuse, sexual abuse, emotional (or psychological) abuse and neglect. Child abuse can result in immediate adverse physical effects but it is also strongly associated with developmental problems and with many chronic physical and psychological effects, including subsequent ill-health, including higher rates of chronic conditions, high-risk health behaviours and shortened lifespan. Maltreated children may grow up to be maltreating adults. Child abuse is a complex phenomenon with multiple causes. No single factor can be identified as to why some adults behave abusively or neglectfully toward children. Suspicion for physical abuse is recommended when an injury occurs in a child who does not yet move independently, injuries are in unusual areas, more than one injury at different stages of healing, symptoms of possible head trauma, and injuries to more than one body system. A key part of child abuse work is assessment. A few methods of assessment include projective tests, clinical interviews, and behavioral observations. A number of treatments are available to victims of child abuse. However, children who experience childhood trauma do not heal from abuse easily. There are focused cognitive behavioral therapy, first developed to treat sexually abused children, is now used for victims of any kind of trauma.

Keywords: Child Abuse, psychological, World Health Organization

EXTRACTION OF DNA FROM BANANA AND PAPAYA

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Abstract

Isolation of good quality genomic DNA from different plant materials is an important prerequisite for many molecular techniques related to both basic and applied research in the areas of plant molecular biology, crop improvement, biodiversity studies and conservation of genetic materials. Therefore, the need to extract reasonably pure DNA of both good quality and quantity for the downstream successful DNA-based diagnostic techniques is required. In this study, yield and purity of the extracted DNAs, in this study we are using some vim dish washer as our detergent which will extract DNA. In this whole study first we are taking our desired fruits and crushing it with motor and pistol and adding vim to it which is diluted with water then we are incubating it for one hour and after the incubation time we are adding chilled isoamyl alcohol to it in order to separate the DNA from sample. Then and keep it in incubation for one hour and you will find that the DNA has been separated from the sample then slowly extract the DNA from it and add running dye to it and add your sample to the agarose gel and run it in agarose gel electrophoresis and to visualize use UV-transilluminator.

Keywords: DNA, Extracting DNA, Agarosegel Electrophoresis, Isopropyl Alcohol

DNA EXTRACTION FROM DENTAL REMNANTS

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Abstract

Efficient DNA extraction procedures is a critical step involved in the process of successful DNA analysis. Molecular biology techniques can be applied in forensic medicine to deny or confirm the source of ancient bone remains from an archeological site and verify the unknown identity of an individual. Teeth are a skeletal structure that better preserves DNA over time. Due to their anatomy, with a naturally hard mineral composition and low porosity, teeth are more resistant to contamination compared to bone. In this poster we aim to compare a new preparation method and classical method for DNA extraction from teeth. The project of developing a new technique based on the observation that when the teeth are opened without mixing different tissues (enamel, dentin, pulp), the pulp tissue is easier to isolate and it is better preserved. Studies have shown that the new technique based on direct tooth opening to collect dental paste from the endodontic system space without any chemical manipulation, displayed extremely advantageous results in terms of cost, time, quality, and quantity of DNA extracted; which is extremely important in forensic practice.

Keywords: DNA extraction, classical method, forensic medicine, dental remnants

BIOLOGICAL FLUID: SALIVA AS FORENSIC DIAGNOSTIC TOOL

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Abstract

Saliva is a watery fluid, secreted by acinar cells of the major and minor salivary glands. As a complex biological fluid, research and evaluation of its role as a diagnostic and forensic tool has been expanding exponentially in recent times since it's an easily available source from victim, defaulters, parent, child and kins. It is a relevant discriminatory element in forensic biology which plays a critical role in genomics, proteomics, metabolomics, and bioinformatics. It acts as an indicator of salivary gland conditions, aids in detection of toxic substances and drug monitoring. Thus, it can be used as an essential tool used for screening, pre-assuming and confirming salivary substitutes in antemortem and post-mortem which helps in unfolding mysteries of crime. This poster aims at showing different aspects and techniques used which can aid in making saliva a focused diagnostic tool in reconstructing crime scenes, gender identification and blood group antigens etc.

Keywords: saliva, genomics, proteomics, metabolomics, bioinformatics, forensic tool.

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LIP PRINT FURROW BASED PATTERNS – A NEW AVENUE FOR PERSONAL IDENTIFICATION

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Abstract

Establishing a person's identity can be a very strenuous process. Dental, fingerprint and DNA comparisons are probably the most common techniques used in this context. However there are many well-known implanted methods of human identification, one of the most interesting emerging methods of human identification originating from the criminal and forensic practice, is human lips recognition. In spite of its important role in forensic and bio-metric applications, the results of investigations into lip prints are scanty. This is mainly due to the difficulties in analysis of the lips, since they are flexible and pliable therefore successive lip print impressions even those obtained from the same person may significantly differ from one other. The collective name of the forensic investigation techniques in which human lip prints are analysed is cheiloscopy. The area of interest focused on by cheiloscopy is the system of furrows (bifurcations, crossings and other marks) on the human lips. This poster aims to know personal identification using lip prints furrow based patterns. A lip print pattern is proposed for each individual. This pattern contains only such furrows that occur on the greatest number of lip prints obtained from the same person, where these furrows locations and inclinations remain similar across the lip prints obtained. It should be noted that instead of lip photos lip prints are employed, such as it can be obtained at a crime scene. Apart from identifying and evidential use, lip prints may also be used in detection work, being the source of criminalistic information. A lip print at the scene of a crime can be a basis for conclusions as to the character of the event, the number of the people involved, sexes, cosmetics used, habits, occupational traits, and the pathological changes of lips themselves.

Keywords: Lip print furrow pattern, forensics, Cheiloscopy, biometrics, Human/Person identification.

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EXAMINATION OF CONVENTIONAL AND BODY FLUID IDENTIFICATION APPROACHES AND DNA PROFILING

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Abstract

Blood, saliva is highly associated with serious and major crime, especially sexual assault cases and burglary. Blood, as well as saliva, is a highly complex mixture of cells, enzymes, proteins, and inorganic substances. Blood comprises a fluid portion, plasma, and a cellular portion that consists of erythrocytes (red blood cells), leucocytes (white blood cells), and thrombocytes (platelets). Most of the common presumptive tests target hemoglobin (hb). Saliva is mostly composed of water (> 99%) in the presence of buccal epithelia cells, enzymes, salts, mucin, and alpha-amylase (α-amylase), which is responsible for the breakdown of starch. Aim of this poster is to examine the conventional and body fluid identification approaches and DNA profiling. After reviewing many articles question arises that does conventional and innovative body fluid identification approaches and DNA profiling of laundered blood- and saliva-stained pieces of cloths. Results shown were STR profiling seems to be sufficiently sensitive for the individualization of laundered items, there is a lack of approaches for BFI with the same sensitivity and specificity allowing to characterize the cellular origin of challenging, particularly laundered, blood and saliva samples.

Keywords: Saliva, Blood, DNA Profiling, STR (Short Tandem Repeat), Body Fluid Investigation

DNA PROFILING.-THE FAST TRACK COURTS OF FORENSIC INVESTIGATIONS

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Abstract

An increase in murder and rape cases in India and a subsequent surge in tampering of evidence is noted. CRPC, in 2005, revised the Section 53 that, if a case of rape is suspected, specimens for evidence can be collected from both victim (alive or dead) and the accused in order to file a charge sheet. This will help solve cases of rape better. Dental forensics has helped solve a number of cases like the Nirbhaya case, Sheena Bora case, and assassination of Former PM, Mr.Rajiv Gandhi and of Raja of Kanauj. However, in cases where victims who were raped and burnt like the Unnao Rape Case, Hathras Rape Case and Hyderabad Rape case where, on top of the crime committed, tampering of that evidence was profound and that turned out to be dreadful. What happens if most of the commonly available evidence is made extinct? This is where DNA profiling or fingerprinting helps to solve a case. Dental DNA fingerprinting is considered a very reliable method as the dental pulp that contains the DNA is protected by armor of dentin and enamel, which when subjected to extreme conditions, sustain. The role of dental restorations, prosthesis and radiological identification has declined lately in the stream of Forensic Odontology, whereas molecular biology and laboratory procedures are rapidly increasing in efficiency and availability. Therefore application of Dental and oral DNA Fingerprinting in identification of unidentified victims from that of the perpetrator can be useful. In India, lengthy trials tend to delay convictions, leaving the economically backward and the victims with limited resources with no motive to pursue against criminal offence. There have been many scenarios where identification of a deceased victim has taken years, therefore tracking down the perpetrator has taken even more time and no justice has been restored. Usage of DNA fingerprinting will help fasten the identification of severely mutilated human remains.

Keywords: DNA Profiling, Rape, Dental DNA, Molecular Forensic Sciences, Victim Identification

EXTRACTION AND VISUALISATION OF DNA FROM DIFFERENT TYPES OF LEAFY VEGETABLES ROOTS BY CTAB BUFFER

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Abstract

DNA extraction method follows some common steps like lyses, purification and DNA recovery. CTAB Method helps in elimination of macromolecules without affecting the purity of DNA. DNA is extracted from coriander roots, Spinach roots, Fenugreek roots in high quality using this method. The resulting DNA which was extracted had high molecular weight bands by electrophoresis on 1% Agarose gel. The high quality DNA that was extracted was further used for PCR based studies. Observing the agarose gel in the presence of UV light results in the Visualization of bright red orange band of due to the fluorescence of Bromophenol and ethidium bromide.

Keywords: CTAB-Extraction Buffer, DNA extraction, roots, electrophoresis tank, UV Illuminator

A REVIEW ON MODERN TECHNIQUES IN WILD LIFE FORENSICS

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Abstract

Wildlife forensics is a branch of forensic science which is used to examine, identify and compare evidence from crime scenes and to link this evidence with a suspect and a victim, which is specifically related with animal kingdom. Development of biotechnology, forensic DNA identification technology in protection of wild animals has been used more and more widely. These new developments can lead to a greater number of samples being tested in alleged wildlife crimes. The mitochondrial DNA region of the questioned sample was amplified and sequenced using universal primers of cytochrome b gene to determine the forensically informative nucleotide sites to find the species identity. Special emphasis is placed on new developments for identifying species listed in the Convention on International Trade of Endangered Species (CITES) appendices for which reliable methods for species identification may signal and prevent illegal trade . Metabarcoding strategies can be used in processed material containing highly degraded DNA for e.g. the identification of endangered and hazardous species in traditional medicine. Determining the origins of non-human biological material found at crime scenes can increase the possibility of identifying the true culprit by narrowing down the range of suspects The time and resources required to characterized and validate each genetic maker is considerable and in some cases prohibitive . This review is aimed at those conducting human identification to illustrate how research concepts in wildlife forensics science can be used in the criminal justice system, as well as real importance of this type of forensic analysis.

Keywords: DNA, Wildlife, Mitochondrial DNA, Cytochrome b

A REVIEW STUDY ON FORENSIC ENTOMOLOGY

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Abstract:

Forensic entomology is the science of collecting and analyzing evidence to aid in forensic investigations. The determination of the minimum time since death in cases of suspicious death, either by estimating the age of oldest nacrophagous insects that developed on the corpse or by analyzing the insect species composition on the corpse it is the main application of forensic entomology. The morphology of blowfly larvae in comparison with the ambient environment at death scenes, critical information regarding a crime can be acquired through the analysis. For conservation of animals and enhancing the protection of critically endangered species the application of forensic biology techniques combined with other molecular techniques such as DNA analysis etc. are playing very significant role for solving criminal acts . Some arthropods are playing very important part for the post mortem investigation. During corpse investigation on the skin surface under the anal and genital area, third instar larvae of the false stable fly, and the lesser house fly were found. Some adult forms of flies are attracted to both feaces and urine. In some case studies from the face area, larvae of the bluebottle fly were collected .Some maggots species are typical early inhabitants of corpses. With reference to dry human skeletal remains in the state of decomposition many coleopterans have been recognized for providing significant entomological evidence in the medico-legal field. This review is aimed at those conducting insect identification to illustrate how research concepts in forensic entomology can be used in the criminal justice system as well as describing the real importance of this type of forensic analysis.

Keywords: Arthropods, forensic entomology, DNA, Larvae, Post mortem interval

ISOLATION OF DNA FROMDIFFERENT PLANT LEAVES AND RESTRICTION DIGESTION

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Abstract

Different varieties of flowering plant leaves will be collected from the surroundings and DNA will be extracted from the flowering plant leaves by using CTAB method. The extracted DNA will be run through the agarose gel for quality analysis then equal amount of all DNA s will be adding the restriction enzymes to perform the restriction digestion and further we analyze the restriction pattern by agarose gel electrophoresis. Based on the DNA restriction fragment length polymorphism flowering plant varieties will be identified. The extraction of DNA from plants the starting point for genotype analysis the approach to preparation of DNA from plants is determined by the species, the type of tissue or sample available and the analysis required on the DNA from the leaf of a cereal analysis using a robust test may require very different technique from that required for isolation of DNA from the bark of tree for amplified fragment length fragment length polymorphism analysis.

Keywords: CTAB, Agarose Gel, Polymorphism, Genotype

PIGEON GENETICS

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Abstract

Study of heredity or study of genes known as Genetics is focused on genes which are chemical substances, known as Deoxyribonucleic Acid or DNA. In content to pigeon genetics, some traits that vary among pigeon breeds also vary among numerous natural species of birds, providing model for understanding genetic mechanisms that control variation in the wild. There are classical experiments by academic geneticists and hobbyists alike suggesting the genetic architecture for many traits is relatively simple, thereby increasing the likelihood of identifying genes responsible for differences among breeds. Analysis of genome in animals is used for many different applications, for example Kinship analysis, breeding estimation, identification of breed registries as well as speciation. Biologists from evolutionary field are looking for variation in pigeons once again using modernised tools for whole-genome sequencing for the identification of molecular mechanisms through which inherited characteristics vary. And like Darwin, they are studying pigeons not for the sake of understanding pigeons, but to help understand how evolution works in general. Pigeons serve as model organisms which are easy to breed and study in the lab, promising for helping us understand not only simple but also complex characteristics. When scientists work out the molecular mechanism of feather pigmentation in pigeons, for example, they gain insight into how genes work together to produce complex and varied phenotypes. Following the sae, this study can be applied to understand other complex characteristics, including human diseases. The study focuses on knowing the count of species of pigeons in a particular area or region. It is implemented in wildlife forensics to determine the population in particular area that might inhabit genetic variation as well. It can also be applied to know the connection of mobile network towers with the genes of birds.

Keywords: Pigeonetics, Modernised genetics, Kinship analysis, Registries.

THE DNA TECHNOLOGY REGULATION BILL IN INDIA

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Abstract

The DNA Technology has both civil & criminal uses in today's society. The DNA Technology (Use & Application) Regulation Bill, 2019 was introduced in Lok Sabha by the ministry for science & Technology on July 8, 2019. This Bill provide the rules & regulation for the use of DNA technology to establish the identity of person. The Bill is aimed at regulating DNA technology usage for establishing the identity of person in respect of matters which are laid down in the IPC, and also offences under other laws. There are 60 countries where there is a legal provisions for the use of DNA technology to investigate criminal cases. The schedule includes DNA testing for matters related to establishment of individual identity. DNA pattern will be kept in the DNA bank & it kept confidential. The data only used whenever required for any purpose in national interest, police interest in forensic interest.

Keyword: DNA technology, Offence, DNA bank, DNA bill, Identity

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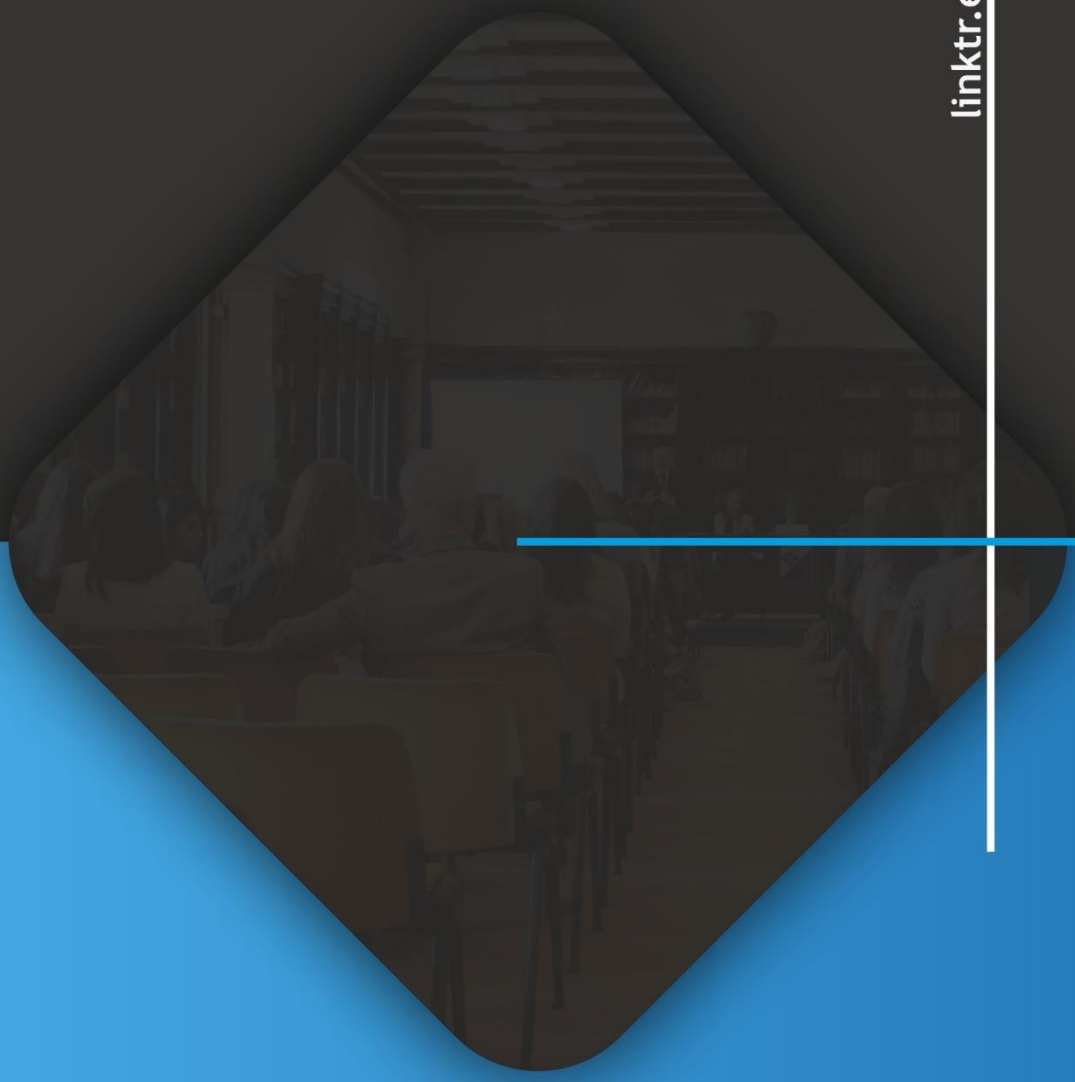

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