Effect of Time on Detection of microRNAs and Prostate Specific Antigen in Suspected Dried Stains in Sexual Assault Crimes

Thesis

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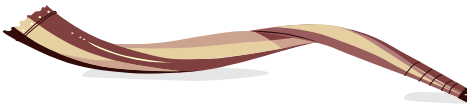

Emad Ahmad

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List of Abbreviations

Abb.	Full term
ALS	Alternative light sources
AP	Acid phosphatase
^{0}C	Degree centigrade
cDNA	Complementary dioxyribonucleic acid
C19MC	Chromosome 19 micro-RNA cluster
CpG	Cytosine phosphate guanine
Cq	Quantification cycle
CT	Computed tomography
ΔΔCT	Delta delta threshold cycle
DHR	Department of Health Research
DNA	Dioxyribonucleic acid
EBV	Epstein–Barr virus
ECWR	Egyptian Centre for Women's Rights
e.g.	For example
etc.	Et cetera (and other things)
FISH	Fluorescence in Situ Hybridization
g	Gram
GHB	Gamma hydroxybutyrate
Gy	Gray
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
HPF	High power field
HPV	Human papilloma virus
Hrs	Hours

Abb.	Full term
HSV-2	Herpes simplex virus type 2
Hz	Hertz
IACP	International Association of Chiefs of Police
IRIN	Integrated Regional Information Network
mE+n	$m\times10^{n}$(m times ten raised to the power of n)
mE-n	$m\times10^{-n}$(m times ten raised to the power of- n)
Min	Minutes
miRNA	Micro-ribonucleic acid
miR	Micro-ribonucleic acid
ml	Millilitre
µl	Microlitre
mm	millimeter
mRNA	Messenger ribonucleic acid
MSRE	Methylation-sensitive restriction enzyme
N	Number
ND	NanoDrop
ng	Nanogram
nm	Nanometer
nSMase2	Neutral sphingomyelinase 2
PCR	Polymerase chain reaction
PID	Pelvic Inflammatory Disease
pg	Picogram
Poly A	Poly- adenylated
pre-miRNA	Precursor micro-ribonucleic acid
pri-miRNAs	Primary micro-ribonucleic acid

Abb.	Full term
PSA	Prostate specific antigen
PTSD	Post-traumatic stress disorder
qPCR	Quantitative polymerase chain reaction
qRT-PCR	Quantitative reverse transcription-polymerase chain reaction
RG	Reference gene
RISC	RNA-induced silencing complex
RNA	Ribonucleic acid
rpm	Revolution per minute
RT-PCR	Reverse transcription end-point polymerase chain reaction
s	Second
SAEK	Sexual assault evidence kit
SD	Standard deviation
siRNA	Short interfering ribonucleic acid
SPSS	Statistical Package for the Social Sciences
STD	Sexually transmitted disease
STI	Sexually transmitted infection
tDMRs	Tissue-specific differentially methylated regions
UNODC	United Nation Office on Drugs and Crime
USA	United States Of America
UV	Ultra-violet
WHO	World Health Organization
WL	Woods lamp
X40	Magnification power of the lens

Abb.	Full term
X g	Times gravity
X-ray	Energetic high-frequency electromagnetic radiation
2x	Two times
5x	Five times
8th	Eighth
10x	10 times
%	Percentage

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Effect of Time on Detection of microRNAs and Prostate Specific Antigen in Suspected Dried Stains in Sexual Assault Crimes

Abstract

Background: In scenes of sexual assault crimes, biological evidence such as blood, hair, saliva, semen and other body fluid stains are of crucial importance and should be collected. Detection of semen depends upon macroscopic examination, fluorescence techniques (use of ultraviolet light to exploit the fluorescent properties of semen), microscopic examination for presence of spermatozoa, detection of seminal acid phosphatase in the vaginal cavity up to 48 hours after intercourse and analysis for presence of prostate specific antigen (PSA) in the vaginal cavity beyond 8 hours following intercourse. **Aim:** This study aimed to investigate the effect of time on detection of micro-RNA markers, prostate specific antigen (PSA) and sperms used for semen detection in seminal stains upon exposure to normal laboratory conditions for different periods, and to examine the effect of vaginal secretions on detection of the studied seminal biomarkers. **Subjects:** This study was performed on samples of semen obtained from seven male volunteers and vaginal swabs obtained from seven female volunteers who were chosen from persons visiting the outpatient clinics of Ain Shams University Hospitals. All subjects were assured about the confidentiality of all data, the findings discovered during examination and preservation of samples. **Results:** This study was significant decrease of PSA levels with increasing periods of exposure to the environment. This was evident in both of seminal stains and mixed seminal and vaginal stains. There was significant increase in the expression of the studied miRNA biomarkers in mixed stains (semen and vaginal secretions) in comparison to their levels in isolated stains (miR-891a in seminal stains and miR-124a in vaginal secretions stains) after exposure to the environment.

Keywords: PSA: Prostate specific antigen, miRNA: Micro-ribonucleic acid.