# بسم الله الرحمن الرحيم


MONA MAGHRABY


# شبكة المعلومات الجامعية

# التوثيق الالكتروني والميكروفيلم

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# جامعة عين شمس

# التوثيق الإلكتروني والميكروفيلم

# قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

# يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

***MONA MAGHRABY***

# Prevalence of Human Papillomavirus (HPV) and Distribution of Genotypes (6, 11, 16 and 18) among Egyptian Women

Thesis

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Sahar Abdel-Rahman Ibrahim Abdel-Razek

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# List of Abbreviations

| Abb. | Full term |
|---|---|
| *AAHS* | *Amorphous aluminum hydroxyphosphate sulfate* |
| *bp* | *Base pair* |
| *CDC* | *Centers for Disease Control and Prevention* |
| *CIN* | *Cervical intraepithelial neoplasia* |
| *CTLs* | *Cytotoxic T cells* |
| *DCs* | *Dendritic cells* |
| *E* | *Early* |
| *EMENA* | *Extended Middle East and North Africa* |
| *EV* | *Epidermodysplasia verruciformis* |
| *G1* | *Gap 1* |
| *HIV* | *Human immunodeficiency virus* |
| *HPV* | *Human papillomavirus* |
| *HR* | *High-risk* |
| *HS* | *Highly significant* |
| *HSIL* | *High-grade lesions* |
| *HSPGs* | *Heparin sulfate proteoglycan* |
| *ICTV* | *International Committee on the Taxonomy of Viruses* |
| *IFN* | *Interferons* |
| *Ig* | *Immunoglobulin* |
| *IL-8* | *Interleukin 8* |
| *IQR* | *Interquartile range* |
| *L* | *Late* |
| *LBP* | *Liquid base Pap technology* |
| *LCR* | *Long control region* |
| *LCs* | *Langerhans cells* |

# List of Abbreviations cont...

| Abb. | Full term |
|---|---|
| *LR* | *Low risk* |
| *LSIL* | *Low-grade lesions* |
| *MCP-1* | *Monocyte chemo-attractant protein -1* |
| *MHC* | *Major histocompatibility complex* |
| *NS* | *Non-significant* |
| *ORF* | *Open reading frame* |
| *Pap* | *Papanicolaou-stained* |
| *PVs* | *Papilloma viruses* |
| *Rb* | *Retinoblastoma* |
| *RFLP* | *Restriction fragment length polymorphism method* |
| *S* | *Significant* |
| *SD* | *Mean, Standard deviation* |
| *SIL* | *Squamous intraepithelial lesions* |
| *SPSS* | *Statistical package for social sciences* |
| *STI* | *Sexually transmitted infection* |
| *Th1* | *T helper 1* |
| *TNF-α* | *Tumor necrosis factor-alpha* |
| *VLPs* | *Viral-like particles* |

# INTRODUCTION

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) ***(Centers for Disease Control and Prevention, 2017).*** Over 100 different types of HPV exist, and some are likely to cause more complications than others. The epidemiological classification of cervical cancer-associated HPV types describes 15 types as carcinogenic or high-risk (HR) (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 73 and 82) and 12 types as low-risk (LR) (6, 11, 40, 42, 43, 44, 54, 61, 70, 72, 81, and CP6108) ***(Sontakke et al., 2019).***

Low-risk HPV types cannot cause cervical cancer but cause genital warts that are very common and highly infectious. High-risk types of HPV are greatly associated with cancer cervix. Of these, HPV-16 and HPV-18 are the two most common HR HPV types. They are responsible for 70 %, of cervical cancer cases worldwide ***(Barton et al., 2019).***

Cervical cancer ranks as the 3rd leading cause of female cancer in the World. Cervical cancer is the 2nd most common female cancer in the women aged 15 to 44 years in World ***(Bruni et al., 2019).*** Most of deaths caused by cervical cancer occur in developing countries. Cervical cancer ranks as the 14th most frequent cancer among women in Egypt and the 11th most frequent cancer among women between 15 and 44 years of age ***(Ghorab et al., 2019).***

There are three commercially prophylactic vaccines available; these are Cervarix (a bivalent vaccine against HPV-16 and HPV-18), Gardasil (a tetravalent against HPV-6, 11, 16, and 18), and Gardasil 9 (9-valent vaccine against HPV6, 11, 16, 18, 31, 33, 45, 52, and 58) ***(Chan et al., 2019).***

In developing countries such as Egypt HPV vaccine is not part of the routine immunization programs and is regarded as a costly vaccination. Over 25 million women over 15 years old are at risk of developing cervical cancer in Egypt ***(Gohar et al., 2019).***

# AIM OF THE WORK

To study the prevalence of HPV and the type distribution of genotypes (6, 11, 16 and 18) in cervical specimens from Egyptian females attending gynaecological outpatient clinic in Ain shams Obstetrics and Gynaecology hospital.

# REVIEW OF LITERATURE

## Human Papillomavirus (HPV)

Human papillomaviruses (HPVs) are a group of small non-enveloped, epitheliotropic, circular double-stranded DNA viruses that infect mucosal and cutaneous epithelia in humans. HPVs cause benign lesions, such as genital warts as well as malignant lesions, such as cancers of anogenital, oropharyngeal and cutaneous epithelia ***(Martora et al., 2019)***.

Failure of tissue culture of the virus had limited its studies, until mid-1970s, when the molecular cloning and recombinant DNA technologies had enabled us to study their biological and biochemical properties. The molecular cloning of HPV genome had led to the recognition of multiple HPV genotypes and their close association with human cancers ***(Bernard, 2005).***

**Morphology and Structure of HPVs:**

HPV is a small, non-enveloped virus, 55 nm in diameter**.** The virus has a single double stranded circular DNA molecule and icosahedral capsid ***(Sontakke et al., 2019).***

**HPV genome:**

The HPV genome is a single double stranded DNA molecule about 8kbp in size. It is divided into three regions: