An Update of Human Papilloma Virus (HPV)

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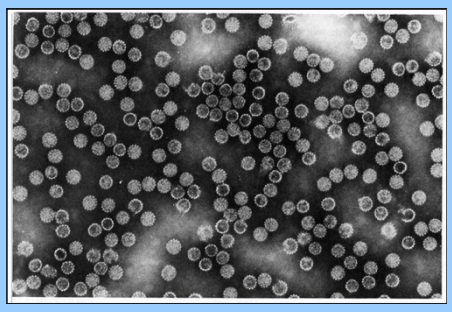
The Human Papilloma Virus

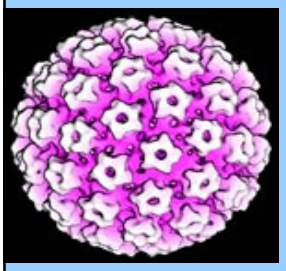


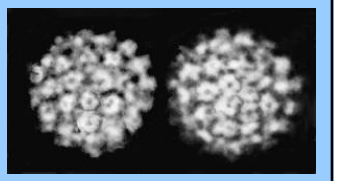
Shah, KV. Sexually Transmitted Diseases, 1990

The Virus

- Cannot be propagated in tissue culture or laboratory animals
- MOLECULAR BIOLOGY
- Multiple types > 100 up to 170 types – genomics study
- Small 55nm
- 7900 base pairs
- Double stranded DNA virus
- Round shell resembling a golf ball

Human Papilloma Virus



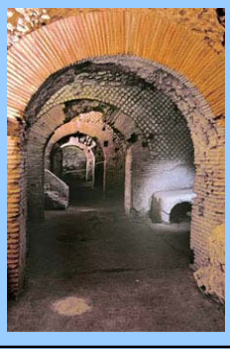


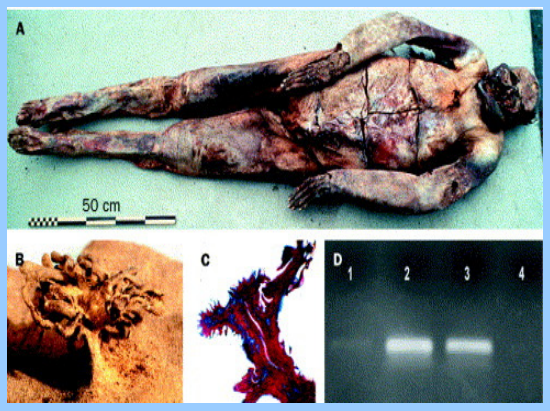
Introduction

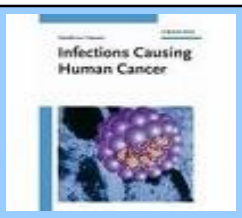
- MOST common STI in humans
- Infected persons are usually asymptomatic
- Species and host specific – human only reservoir
- Been described since antiquity

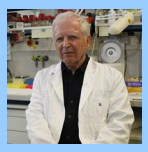
Mary of Aragon 1503 -- 68

Basilica Saint Domenica Maggiore in Naples









HPV Classification and Characteristics

- 2/3 of Americans harbour at least 1 HPV – Human Microbiome project
- Species and tissue specific
- Induces both benign and malignant disease

Benign HPV-Associated Disease

Common warts

Laryngeal papillomas

Condylomata acuminata

Diseases Associated with HPV (Benign)

- Warts – 1, 2, 3, 7, 10
- Respiratory papillomata – 6, 11
- Condylomata accuminata – 6, 11

Diseases Associated with HPV (Malignant)

- Head and neck carcinoma
- Squamous cell carcinoma of the oesophagus
- Anogenital carcinoma
- Rectal carcinoma
- Vulva carcinoma
- Vaginal carcinoma
- Oropharyngeal carcinoma
- Adenocarcinoma of the cervix

- SQUAMOUS CELL CERVIX CARCINOMA

HPV and Malignancy

- 2nd most common cancer among women in SA

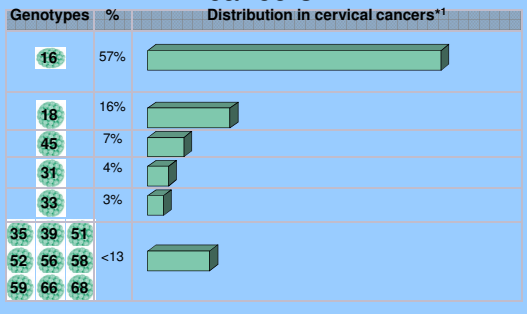
- Most common cancer of women in Africa

Diseases Associated with the Cervix

- Epithelial tumours
- Mucosal HPV infections: latent, asymptomatic, subclinical or clinically obvious

- LOW risk HPV subtypes - HPV 6 & HPV 11
- INTERMEDIATE risk HPV subtypes
- HIGH risk HPV subtypes – 16, 18, 33, 45, 31

Among all hrHPVs, HPV16/18 alone cause over 70% of all cervical cancers



* Includes multiple and single infections
[1] Munoz N, *et al. Int J Cancer* 2004; 111:278-285

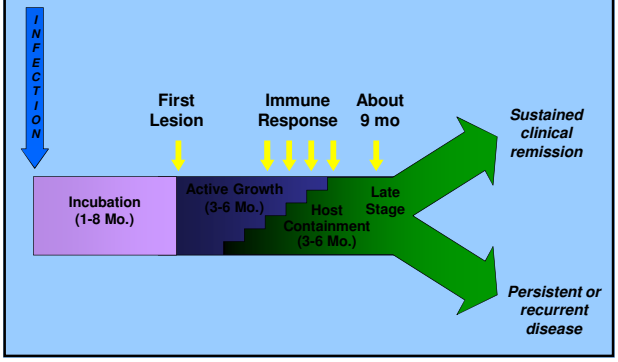
Natural History & Epidemiology of HPV and the Cervix

- Sexual contact
- Vertical transmission

Inoculation → Incubation (1-8 mnths) → First lesion → Active growth & immune response → Host containment → Late stage:

* Sustained clinical remission
* Persistent or recurrent disease

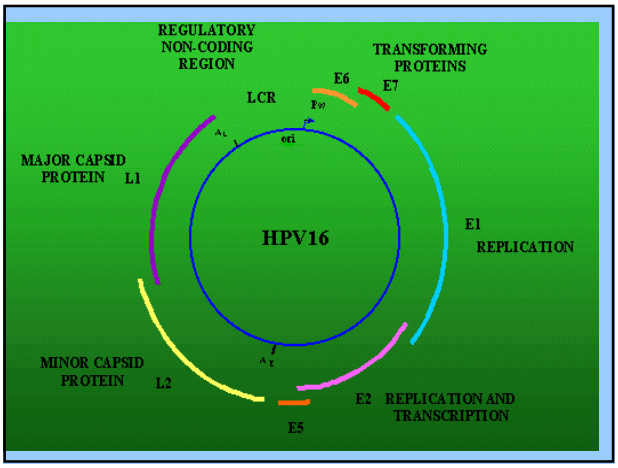
Natural Course of HPV Infection

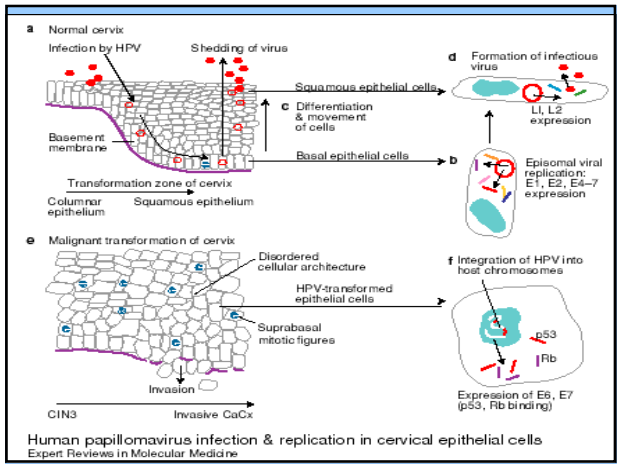


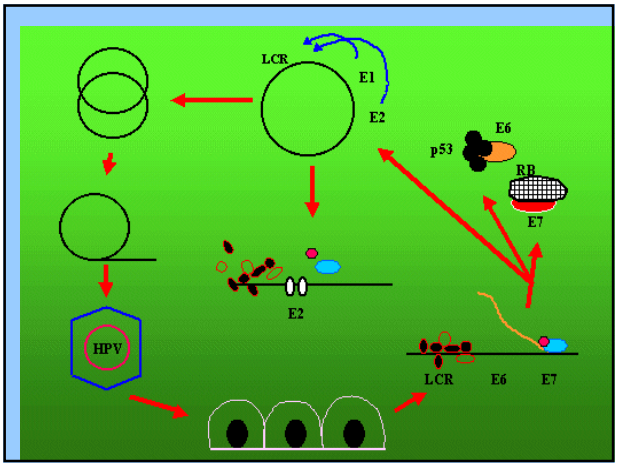
Pathogenesis of HPV

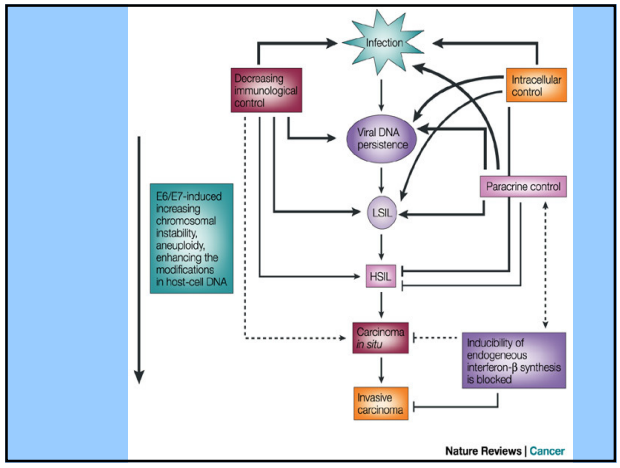
- Genome exists in an episomal (circular) configuration divided into 3 regions:

  Upstream Regulatory Region (URR)
  Early Region (E)
  Late region (L)









Malignant transformation

- HPV alone does NOT cause malignant transformation
- Co-factors include:
  * sexual activity
  * ultraviolet radiation
  * pregnancy
  * folate deficiency
  * immune suppression
  * smoking

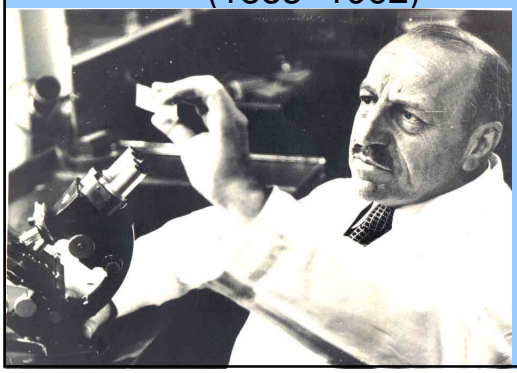
Prevention of Cervical Cancer

Based on 2 principles:

1 Screening for pre-malignant cervical cancer conditions

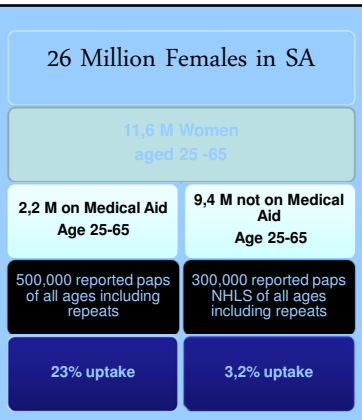
2 Preventing the infection with Human Papillomavirus (HPV)

Georgios Papanikolaou (1883- 1962)



Pap Smear Limitations

- Poor sensitivity
- Labour intensive test with subjective human interpretation
- Fails to detect Adenocarcinoma
- Poor uptake by the population



http://www.statssa.gov.za/publication/PO3O2/PO3O22O11.pdf
Council of medical aids – annual report

Prevention

Professor zur Hausen unlocked 2 doors in the prevention scenario:

1.Screening using modern molecular techniques

2.Vaccination possibilities

Molecular Techniques for Screening

- Viral DNA
- Viral mRNA E6/E7 integration

Vaccines

IMPORTANCE OF VACCINES!!

HPV Viral Like Particles (VLP L1) & adjuvant

2 vaccines available 16/18 & 16/18/6/11

Very exciting and dynamic field Thanks for Listening!!