

# **VIRAL STIs**

## **Human Papillomavirus**

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# SESSION OUTLINE

- Introduction
- Etiology
- Epidemiology
- HPV – virology, transmission, epidemiology, presentation, investigations, treatment, prevention
- HBV....

# DEFINITIONS

- **STI = Sexually Transmitted Infection:**
  - Transmitted through sexual contact, may cause disease elsewhere in the body
  - Includes STDs
  - *E.g. HIV, HBV, HPV, Syphilis, Gonorrhoea, etc.*
- **STD = Sexually Transmitted Disease:**
  - Transmitted through sexual contact AND cause disease within the genitourinary tract.
  - *E.g. HPV, HSV, Syphilis, Gonorrhoea, etc.*

# BURDEN

- A million people acquire an STI every day
- A majority of STIs are asymptomatic
- 500 million people get ill from 4 major STIs every year:
  - *chlamydia, gonorrhoea, syphilis & trichomoniasis*
- Globally, 500 million people have HSV 2 (genital herpes)
- 600 million people have HPV (causes warts & cancers)

# LONG TERM EFFECTS OF STIs

- GUT complications – *infertility, ectopic pregnancy, etc.*
- **Malignancy** – Genitourinary, oropharyngeal, Liver
- **Chronic**/lifelong infection
- **Vertical** transmission
- Increased risk for **HIV**
- Disease in other **organs** – CNS, CVS
- Psychological effects/ **Stigma**

# ETIOLOGY

- Bacterial – e.g. *N. gonorrhoeae*, *T. pallidum*, etc.
- Parasitic – *T. vaginalis*, pubic lice, scabies
- **Viral:**
  - **Human Immunodeficiency virus (HIV)**
  - **Human papillomavirus (HPV)**
  - **Human herpes viruses (HHVs)**
  - **Hepatitis B Virus (HBV)**
  - **Hepatitis C virus**
  - **Some VHF (e.g. Zika, Ebola)**

# PORTALS OF TRANSMISSION

- Oral
- Vaginal/Penile
- Anal
- Direct Skin to skin contact

# MODES OF TRANSMISSION

## ***HIGH RISK***

- Sexual intercourse: Anal, vaginal, oral,
- Blood & blood products (unscreened)
- Vertical transmission
- Sharing needles (PWIDs – People who inject drugs)
- Tattooing & body piercing



# MODES OF TRANSMISSION

## **NO RISK OR LOW RISK**

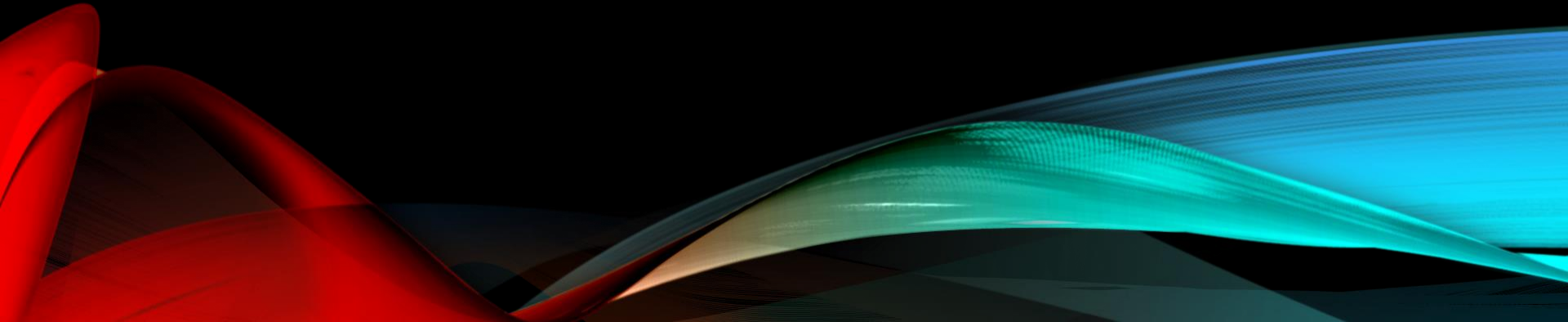
- Abstinence
- Hugging
- Kissing
- Sharing cutlery
- Sitting on toilets



# VIRAL VS BACTERIAL STIs

<b>Viral STIs</b>	<b>Bacterial STIs</b>
e.g. HIV, HPV, HSV, HBV	Gonorrhea, Syphilis, Chlamydia, LGV, Chancroid
No cure for most, Medication for symptoms only	Can be cured with antibiotics
Can be passed to others for the rest of your life	If untreated, can cause PID, scarring, infertility, etc.

# Human Papillomaviruses



# Human papillomaviruses (HPV)

- **Family:** Papillomaviridae
- Small (8 kBp), circular dsDNA virus
- Non-enveloped
- Over **120** genotypes so far,
- About **40** genotypes affect anogenital region
- Linked to *anogenital, oropharyngeal* cancers

# CLASSIFICATION OF HPV

**A. ICTV classification:** genera, species, genotypes

**B. Classification as per Viral Tropism**

## 1. Cutaneous

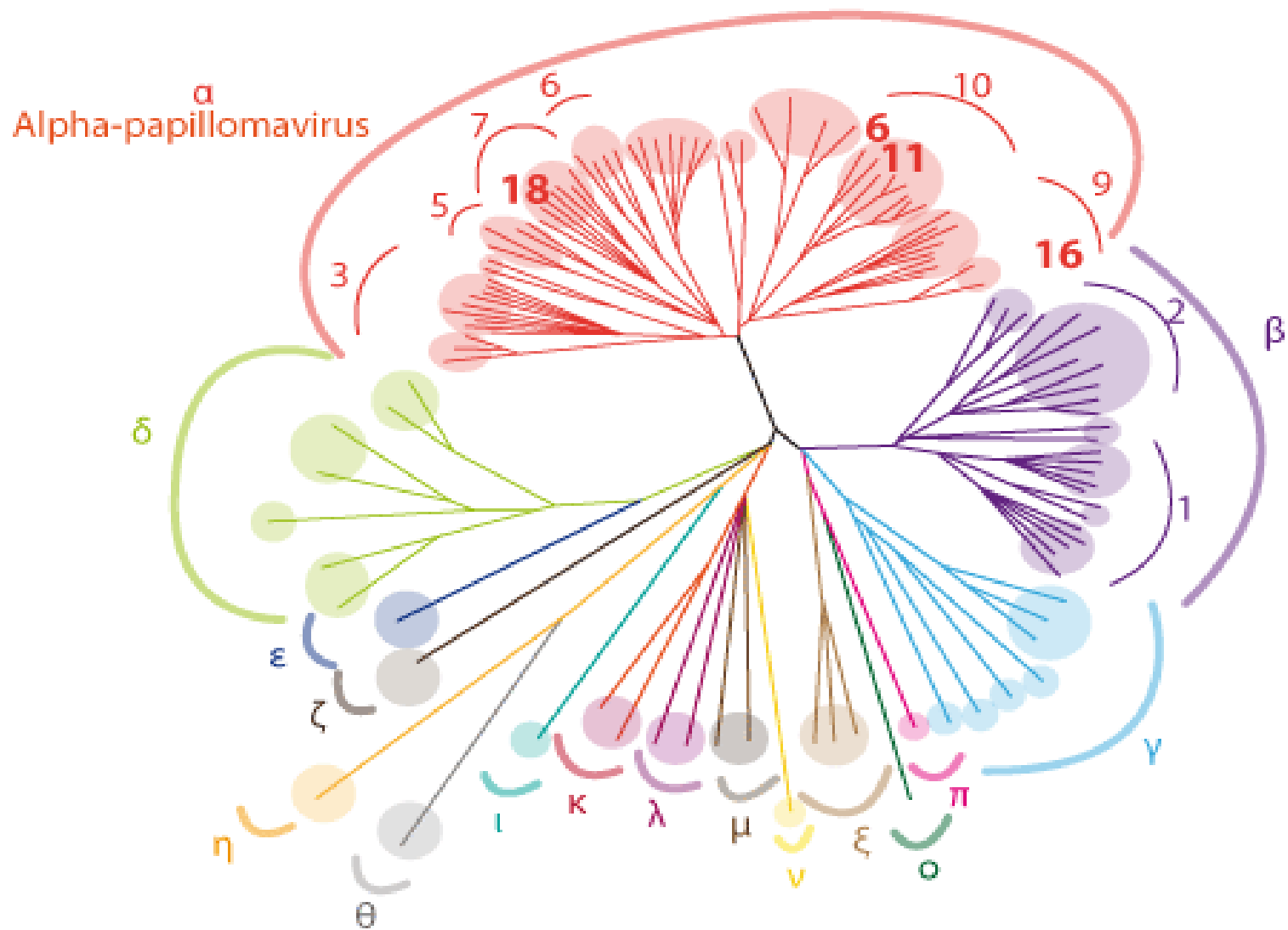
- Cause skin/plantar/palmar warts

## 2. Mucosal:

- Cause anogenital/oropharyngeal warts
- Classified as **High-risk** or **Low risk** genotypes

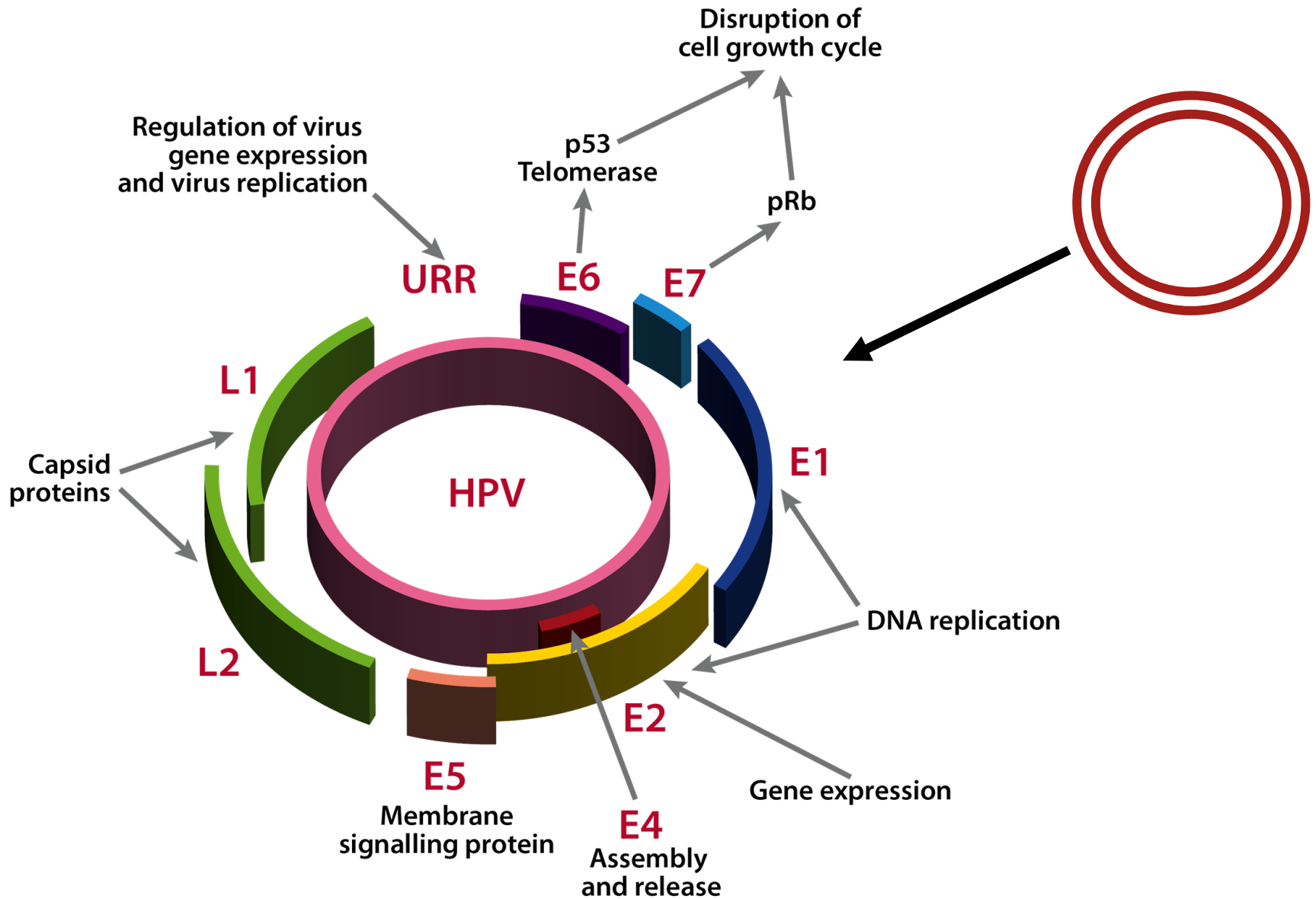
# CLASSIFICATION BY RISK

- **High risk:** HPV 16, 18, 33, 58, etc.
  - Associated with several malignancies:  
*(Anogenital, oropharyngeal cancers)*
- **Low risk:** Associated with warts
  - Cutaneous warts: HPV 1, 2, 4, 7 etc.
  - Genital warts: HPV 6, 11, etc.



*A phylogenetic tree of human papillomaviruses*

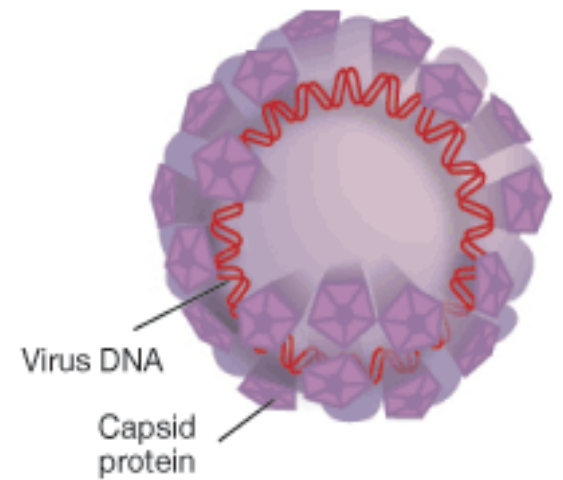
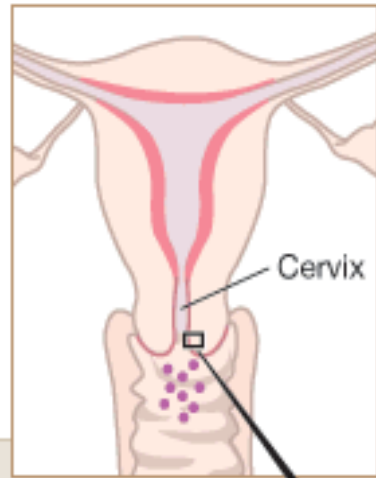
# HPV GENOME





# Cervical Cancer

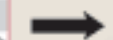
## Pathogenesis



Infection by HPV



Weeks



HPV in epithelial cells

~90% heal within two years

10-30 years



HPV DNA integrated into tumour cell DNA



0.8% develop cancer

Invasive cancer

The Nobel Committee for Physiology or Medicine 2008 Illustration: Annika Röhl

Harald zur Hausen

# HPV EPIDEMIOLOGY

- Commonest STI in both men & women
- Asymptomatic in a majority of cases
- **Risk Factors:** Early coitarche, Multiple sexual partners, Concomitant STDs
- After infection:
  - 90% within 2yrs,
  - 10% develop epithelial neoplasia,
  - <1% develop Ca Cervix

# HPV EPIDEMIOLOGY

- Transmission:
  - Sexual
  - Direct contact
  - Vertical transmission
- Prevalent in 12% of all women worldwide;
  - 34% for Eastern Africa;
  - Kenya – 40%
- Bimodal: peaks at 25yrs and 55 yrs

# HPV EPIDEMIOLOGY

## In cervical cancer:

- HPV 16 is present in 50-75% of cases
- HPV 18 in 12-25% of cases
- 30% of cervical cancers - due to **non-HPV 16 & 18** types

## Warts

- HPV 6 & 11 present in 90% of all anogenital warts

# CLINICAL MANIFESTATIONS

- **Warts:**
  - Anogenital Warts (*condyloma acuminata*)
  - Mucosal Warts (Non-anogenital): *Oral, laryngeal, etc.*
  - Cutaneous (skin) Warts: *verruca vulgaris, verruca plana*
- **Cancers:** *anal, genital, oral, pharyngeal*
- Epidermodysplasia verruciformis



Common wart

ADA



Flat warts



Epidermodysplasia  
verruciformis



# CUTANEOUS WARTS



Plantar  
wart



© ADA



**a**



**b**



# SIGNS & SYMPTOMS

- **Most infections are asymptomatic**
- Varied presentation
- Anogenital:
  - Various surfaces: vagina, labia, vulva, penis, etc.
  - Smooth or keratotic
  - Usually painless
  - $\pm$  pruritus / bleeding

# LABORATORY DIAGNOSIS

1. Nucleic Acid detection: HPV DNA typing, E6 & E7 mRNA
2. Cytology: *Pap smears*
3. Tissue biopsy and histology e.g. colposcopy
4. Visual inspection: VIA/VILI

# TREATMENT

- Aims to reduce symptoms
- Not curative
- Treatment dependent on site/extent of lesions
- Recurrence is common
- Retreatment often necessary

# TREATMENT...

## 1. Pharmacologic agents:

- Immune modifiers: Imiquimod, INF- $\alpha$
- Cytotoxic agents: Podofilox, Podophylin, 5FU
- Keratolytic agents – Salicylic acid, Trichloroacetic acid (TCA)

# TREATMENT...

## 2. Surgical ablation

- Simple excision
- Cryosurgery
- Electrosurgery
- Laser ablation
- Cavitron Ultrasonic Surgical Aspiration (CUSA)

# PREVENTION

## 1. Health education

## 2. Safe sex practices:

- Abstinence
- Delay coitarche,
- Mutual monogamy
- Condoms are partially protective

## 3. HPV vaccines

# HPV VACCINES

## 1. Bivalent (Cervarix<sup>®</sup>)

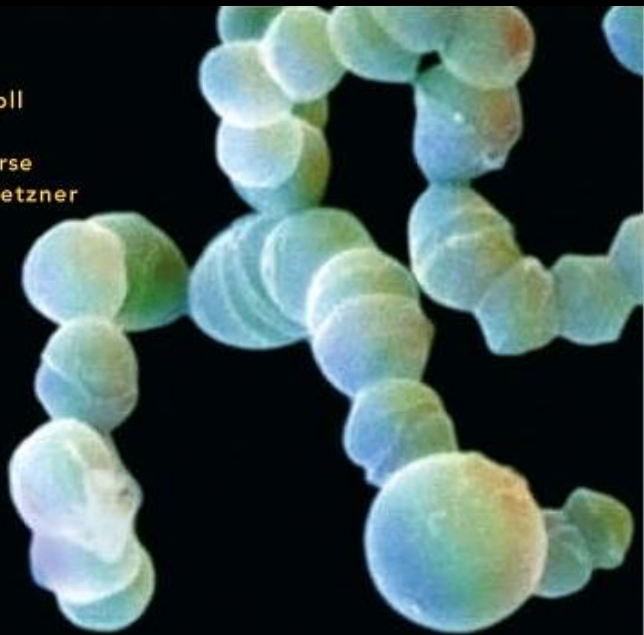
- HPV 16 & 18

## 2. Quadrivalent (Gardasil<sup>®</sup>)

- HPV 6, 11, 16 & 18

## 3. Nonavalent Vaccine

- HPV 6, 11, 16, 18, 31, 33, 45, 52 & 58



Geo. F. Brooks  
Karen C. Carroll  
Janet S. Butel  
Stephen A. Morse  
Timothy A. Mietzner

Jawetz, Melnick & Adelberg's

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# QUESTIONS??



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