HSV e Banche degli Occhi

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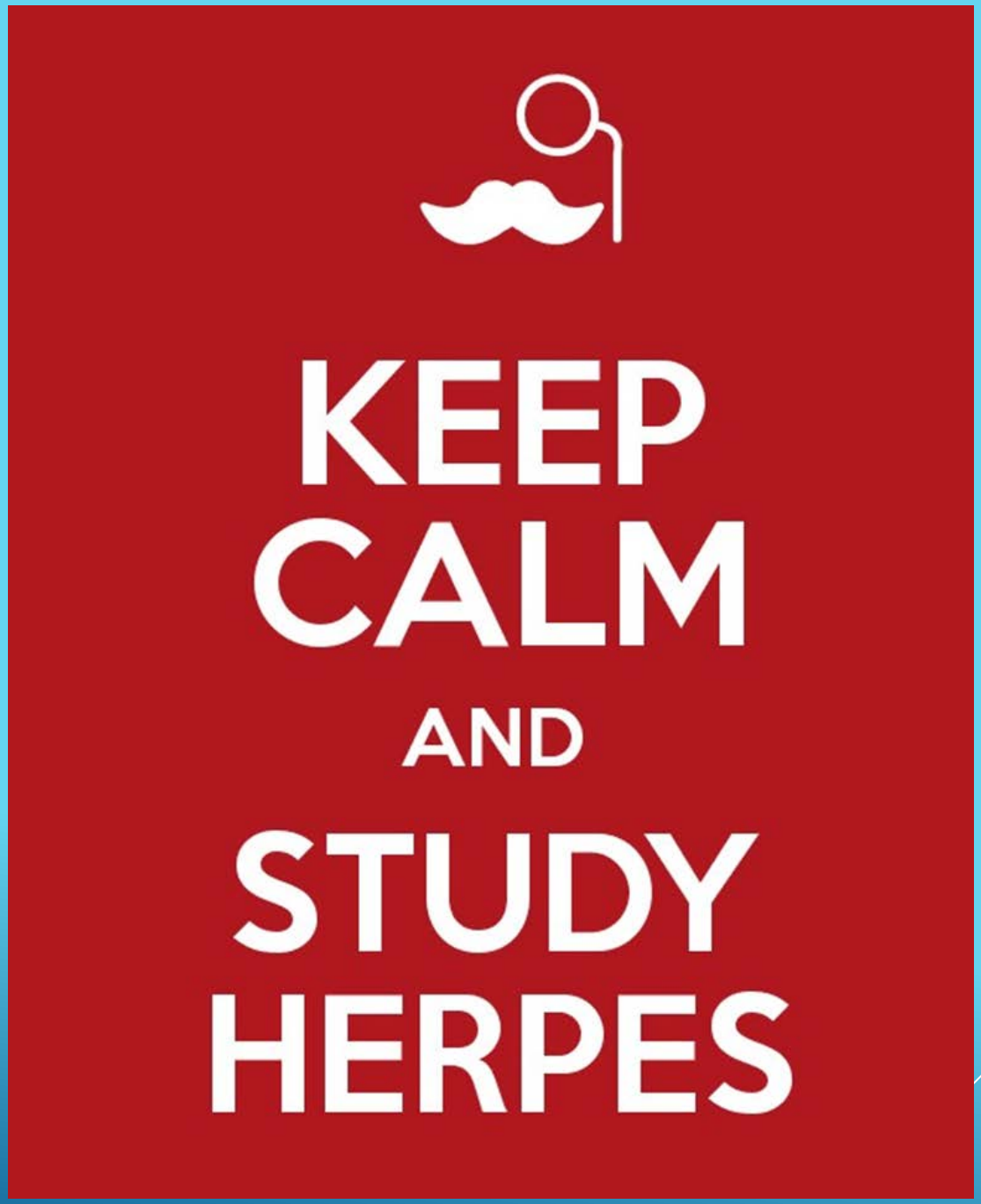
SURGEON NOTIFICATION


KEEP
CALM
AND
STUDY
HERPES

HERPES SIMPLEX EPIDEMIOLOGY

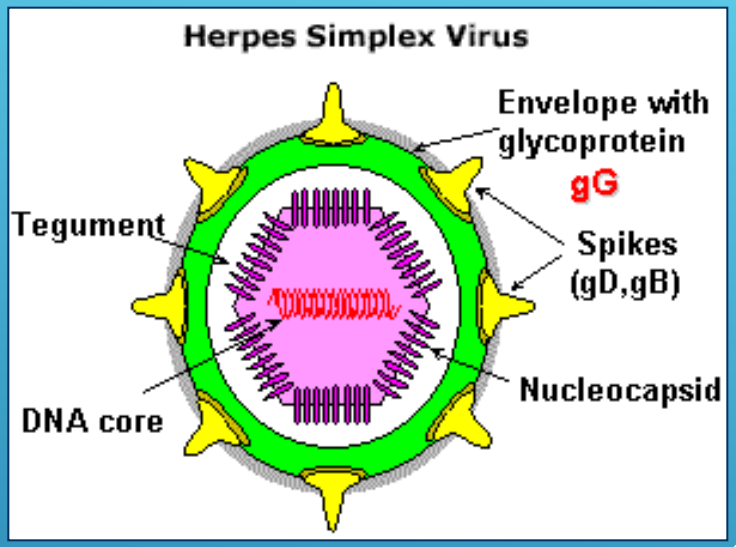
HERPES SIMPLEX VIRUS 1-2

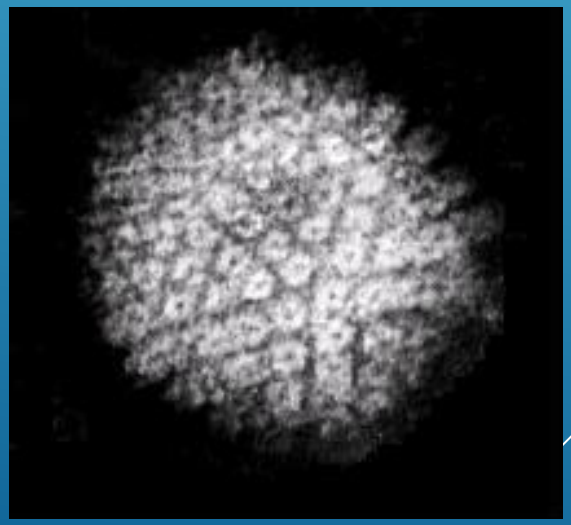
- Doubled-stranded DNA
- Icosahedral capside
- Same family as:

  Varicella Zoster,

  Epstein-Barr,

  Cytomegalovirus





HSV EPIDEMIOLOGY

- HSV is endemic in virtually every human society throughout the world.
- Humans are the only natural reservoirs for HSV.
- Different ethnic populations can have specific DNA polymorphisms to the extent that HSV may be used as a marker for human populations.

Herpes Simplex Virus Epidemiology and Ocular Importance

Thomas J. Liesegang, M.D.

Cornea 20(1): 1–13, 2001.

HSV EPIDEMIOLOGY

- HSV-1 can be detected by polymerase chain reaction (PCR) in the trigeminal ganglia of 18.2% of cadavers of people up to 20 years of age, which increases to reach almost 100% in cadavers of people at least 60 years of age.
- The estimated prevalence of a HSV-1 infection is approximately 150 per 100.000 population.


Herpes simplex virus infection in the media of donor corneas during organ culture: frequency and consequences

ULRIKE SENGLER, THOMAS REINHARD, ORTWIN ADAMS, CATHARINA KREMPE, RAINER SUNDMACHER

Eye (2001) 15, 644–647 © 2001 Royal College of Ophthalmologists

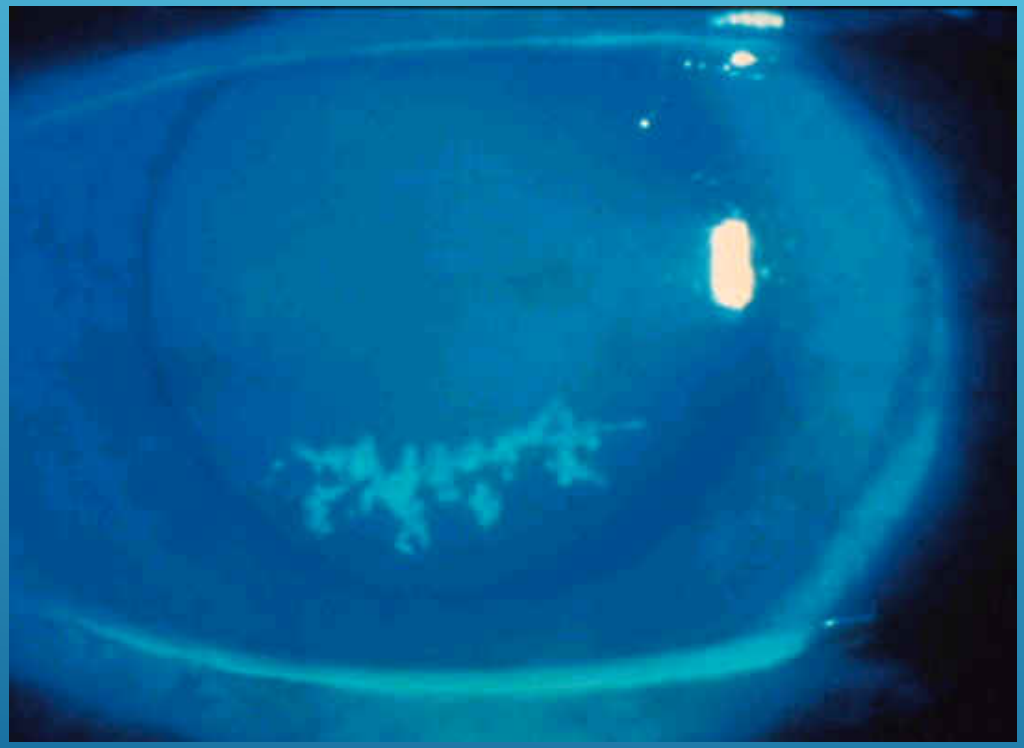
HSV BEHAVIOR

- HSV-1 is more likely to inhabit the trigeminal ganglia and HSV-2 the sacral ganglia, explaining the orofacial and genital herpes infections.
- No ganglion site preference: there must be local host factors characterizing the frequency of recurrence of HSV-1 in the facial area and HSV-2 in the genital area.

Herpes Simplex Virus Epidemiology and Ocular Importance

Thomas J. Liesegang, M.D. *Cornea 20(1): 1–13, 2001.*

HSV-1 HERPETIC KERATITIS



Epithelial dendritic ulcer
(fluorescein staining)

- HSV-1 replicates in epithelial, endothelial cells and keratocytes.
- In donor cornea the pre-mortem stress would serve as a trigger of reactivation of latent virus within the trigeminal ganglion, resulting in viral shedding in the corneal tissue.

HSV & EYE BANK

Detection on donor corneas

- 10/24 HSV-1 DNA detected by PCR.
- 0/24 HSV-1 isolated on animal model.

J Med Virol. 1995 May;46(1):75-80.

Herpes simplex virus DNA in normal corneas: persistence without viral shedding from ganglia.

Openshaw H[1], McNeill JI, Lin XH, Niland J, Cantin EM.

Detection on donor corneas

- 2/83 HSV-1 350-bp DNA detected by PCR.
- 0/83 HSV-1 isolated on Vero cell culture.

Jpn J Med Sci Biol. 1997 Aug-Oct;50(4-5):151-60.

Screening of human corneas for herpes simplex virus by tissue culture and polymerase chain reaction.

Biney EE[1], Orrett FA.

Detection on storage medium

- 7/451 HSV-1 DNA detected by PCR.
- 0/7 corneas in organ culture showing loss of endothelial cells or cytopathic changes.

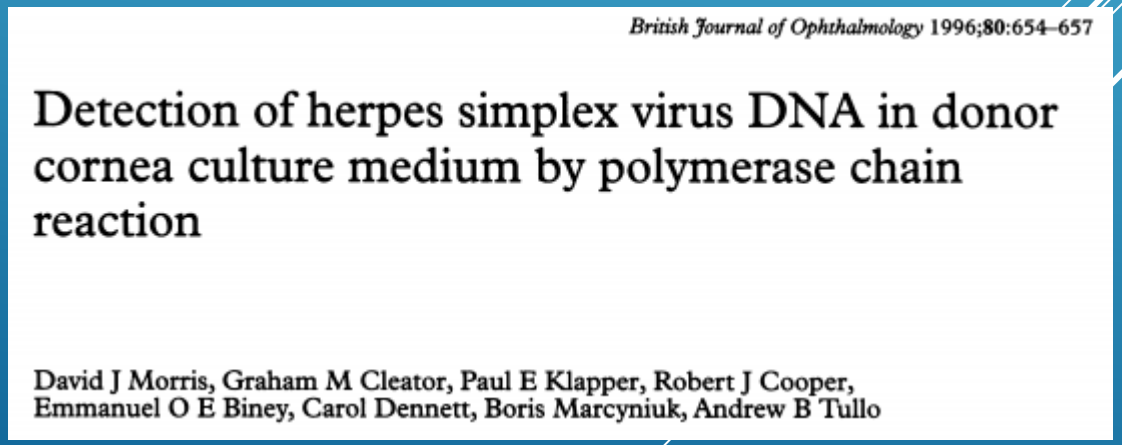
J Med Virol. 1997 Jul;52(3):320-5.

Low rate shedding of HSV-1 DNA, but not of infectious virus from human donor corneae into culture media.

Garweg JG[1], Boehnke M.

Detection on storage medium

- 3/80 HSV-1 DNA detected by PCR.
- 0/80 HSV-1 isolated by Vero cell culture.
- 0/3 post op. herpetic infections.



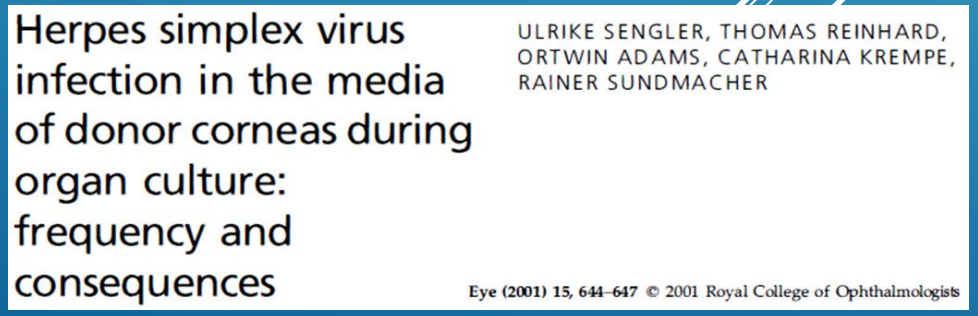
British Journal of Ophthalmology 1996;**80**:654–657

Detection of herpes simplex virus DNA in donor cornea culture medium by polymerase chain reaction

David J Morris, Graham M Cleator, Paul E Klapper, Robert J Cooper, Emmanuel O E Biney, Carol Dennett, Boris Marcyniuk, Andrew B Tullo

Detection on storage medium

- 12/112 HSV-1 DNA detected by PCR in corneas showing endothelial necrosis >50% (tot. 199).
- 7/12 HSV-1 DNA + confirmed by HeLa cell culture.
- 0/117 HSV-1 DNA detected by PCR in corneas showing endothelial necrosis ≤50% or suitable for transplantation.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HSV-1 and LONG TERM STORAGE (31-37°C)

If there is active HSV-1 in the donor cornea, replication of the virus in organ culture without the limiting influence of the immune system comes close to virus cultivation and causes **epithelial and endothelial necrosis**.

Endothelial necrosis can be easily detected by staining with trypan blue solution.

HSV-1 and SHORT TERM STORAGE (4°C)

Virus replication is also likely to occur at 4°C, but severe endothelial necrosis might not yet have occurred at the time of examination of cornea in eye bank.

Therefore, the cold storage is less 'safe' in detecting cytopathic changes due to herpetic viral replication.

CONCLUSIONS

How can we avoid the transplantation of donor corneas with HSV-1 replication?

Donor related prevention

- Physical inspection of the donor.
- Exclude donors with recent or previous clinical history of herpetic keratitis.
- Accurate disinfection of donor cornea with I-PVP before recovery rapidly inactivates HSV.

Cornea related prevention

Discard corneas showing diffuse endothelial necrosis and/or epithelial defects and discard the fellow cornea, even if it looks suitable for transplantation.

How can we avoid the transplantation of donor corneas with HSV-1 replication?

Long term storage (organ culture) may serve as a 'screening method' in detecting HSV-1 replication.

The viral donor-to-host transmission can almost be excluded if assessment of the endothelium is performed both throughout the culture period and shortly prior to transplantation.


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Thanks for your attention!