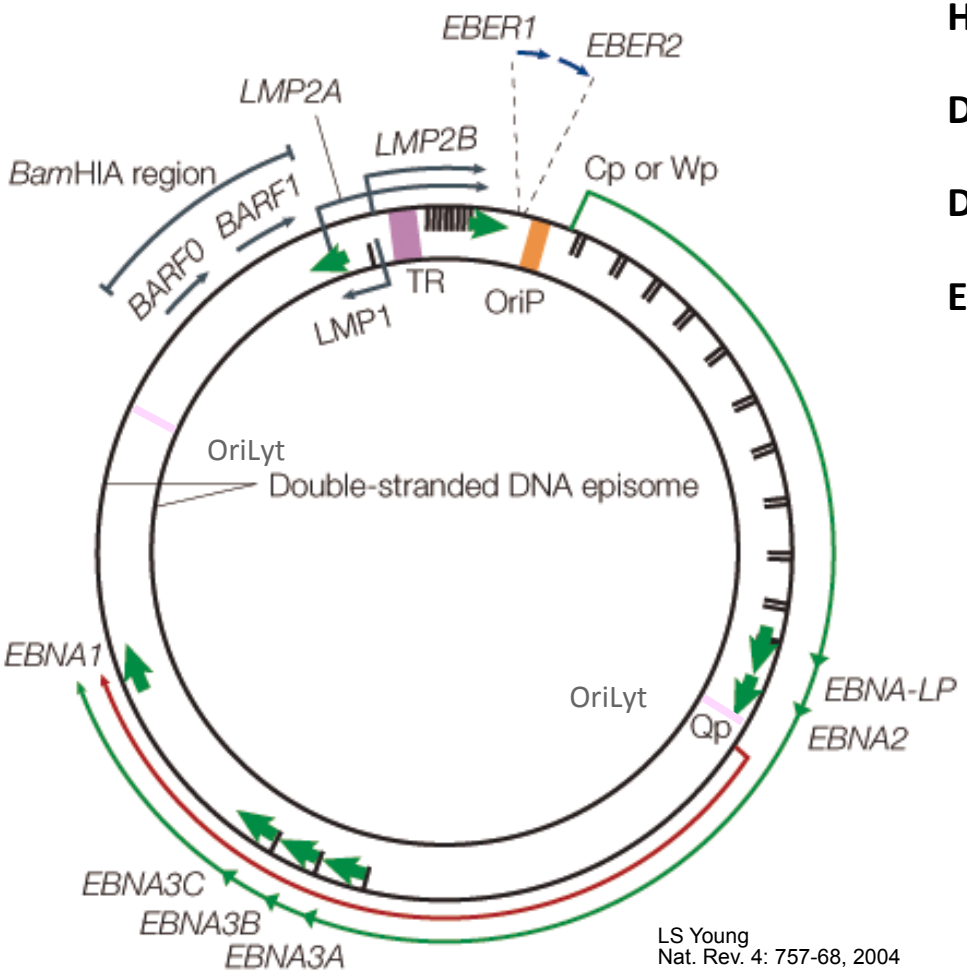
Epstein-Barr Virus (EBV)



LS Young
Nat. Rev. 4: 757-68, 2004

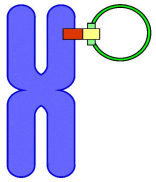
EBV genome and latent genes

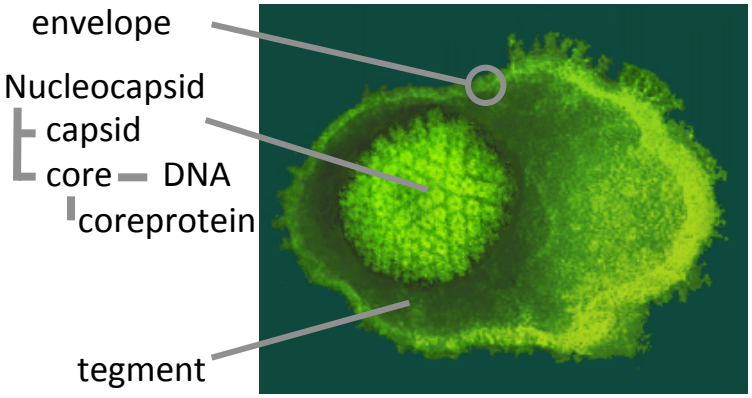
Human tumor virus

Double stranded DNA virus (180 kb in size)

Different types of replication origin (oriP, oriLyt)

EBV genome binds to host chromosomes





Linda Stannard
Department of Medical Microbiology
University of Cape Town

Virion of herpes virus

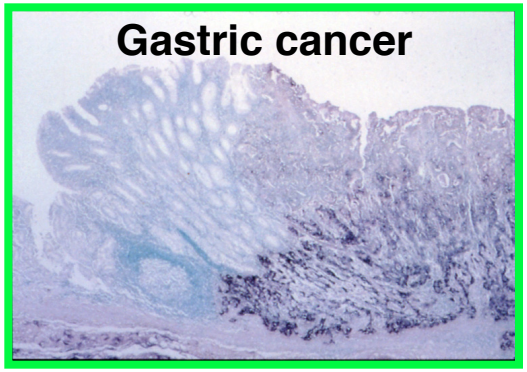
Number of patients bearing EBV associated cancer (2011)

Cancer	No. of cases	No. of cases attributable to EBV
Burkitt lymphoma		
Sporadic	400	**100**
Endemic	7,800	**6,600**
Gastric carcinoma	933,900	**84,050**
Hodgkin lymphoma	62,400	**28,600**
Nasopharyngeal carcinoma	80,000	**78,100**
Total		**197,450**

JI Cohen ***Sci. Transl. Med.*** 3(107): 107fs7, 2011.

EBV associated cancers & types of latency

Latency I



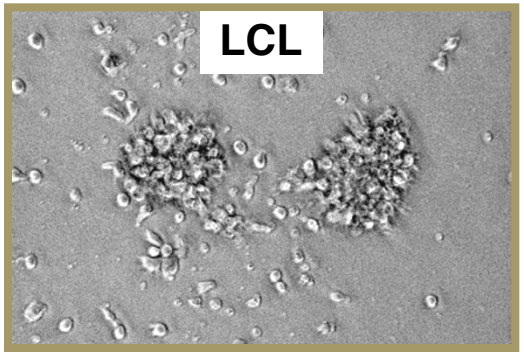
Gastric cancer

Burkitt lymphoma

Latency III

Lymphoblastoid cell line (LCL)

Post-transplant lymphoma



EBNA1

EBERs

BARTs

LMP2A

LMP2B

LMP1

EBNA2

EBNA3A

EBNA3B

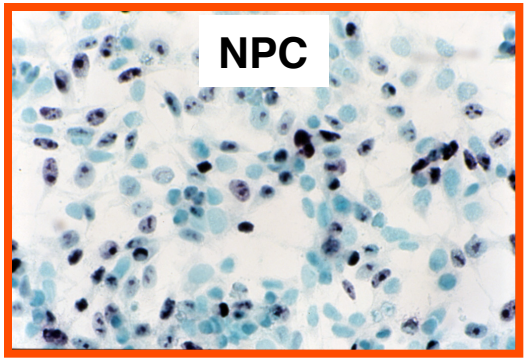
EBNA3C

EBNALP

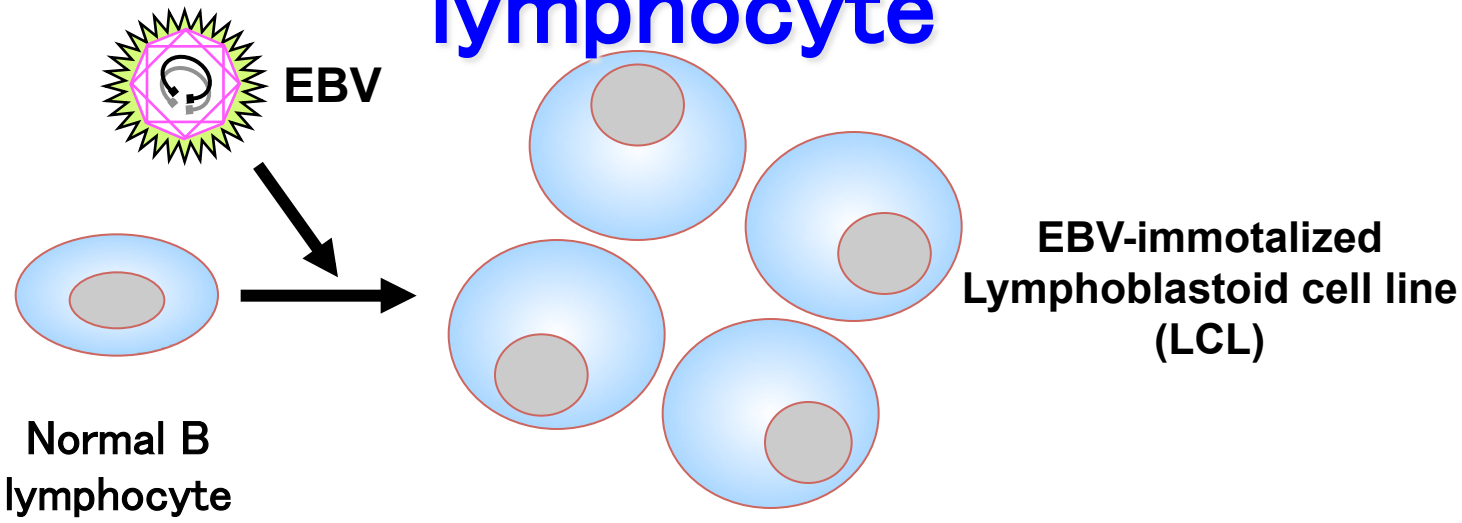
Latency II

Nasopharyngeal carcinoma (NPC)

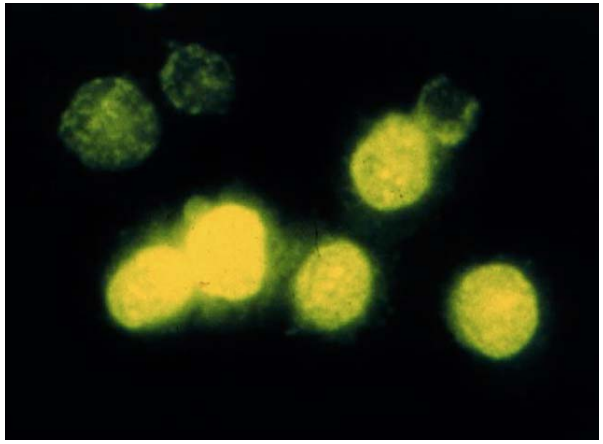
Hodgkin disease



EBV infection immortalizes B lymphocyte



LCL(EBNA1 +)



EBV latent genes

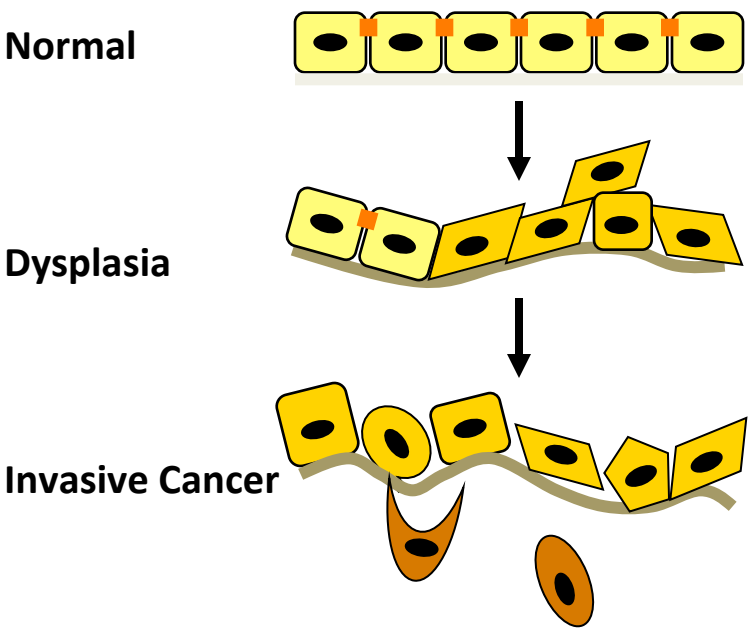
6 EBV nuclear antigens
(EBNAs 1, 2, 3A, 3B, 3C and LP)

3 latent membrane proteins
(LMPs 1, 2A and 2B)

untranslated RNAs
(EBER 1, EBER 2, BART miRNAs)

Others
(BHRF1, BARF1)

Genesis of EBV-associated epithelial tumors



Epithelial cells form monolayer construct by tight junction and adherent junction, which make cell polarity.
Cell polarity is important to protect molecular permeation, to form cell to cell communications, and to receive signals from outside of cells, etc.

Epithelial to mesenchymal transition (EMT) is an initial stage of cancer progression, where epithelial cells no more form tight junction important for its functions, but acquires mesenchymal cell phenotype.

Progression of EMT is accompanied by malignant transformation of cancer cells. Cancer cells stop to grow as a mass, but start to migrate individually to other organs.