EPSTEIN BARR VIRUS

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Introduction

- Epstein–Barr virus (EBV) is a double-stranded DNA virus
- Belongs to Herpesviridae family (γ-herpesvirus)
- Also called Human Herpesvirus-4 (HHV-4)
- Infects B lymphocytes and epithelial cells
- One of the commonest oncogenic viruses

Structure

- Enveloped virus
- Icosahedral nucleocapsid
- Double-stranded linear DNA
- Envelope contains viral glycoproteins

Mode of Transmission

1. Mainly by saliva → called “kissing disease”
2. Also through:
3. Blood transfusion
4. Organ transplantation

Cell Tropism & Receptor

Infects B cells via CD21 receptor (C3d complement receptor)Also infects oropharyngeal epithelial cells

Pathogenesis

1. EBV enters B lymphocytes via CD21
2. Causes polyclonal B-cell proliferation
3. Infected B cells express:
4. EBNA (Epstein-Barr nuclear antigen)
5. LMP-1 (Latent membrane protein-1) → acts like CD40 → promotes B-cell activation
6. Host immune response:
7. $CD8^+$ cytotoxic T cells control infection
8. Activated T cells appear as atypical lymphocytes (Downey cells)

Diseases Caused by EBV

1. Infectious Mononucleosis

Common in adolescents & young adults

Clinical features:-

- Fever
- Sore throat
- Generalized lymphadenopathy
- Splenomegaly

Hematology

- Absolute lymphocytosis
- Atypical lymphocytes (Downey cells)

Serology

- Heterophile antibody positive (Paul–Bunnell test)

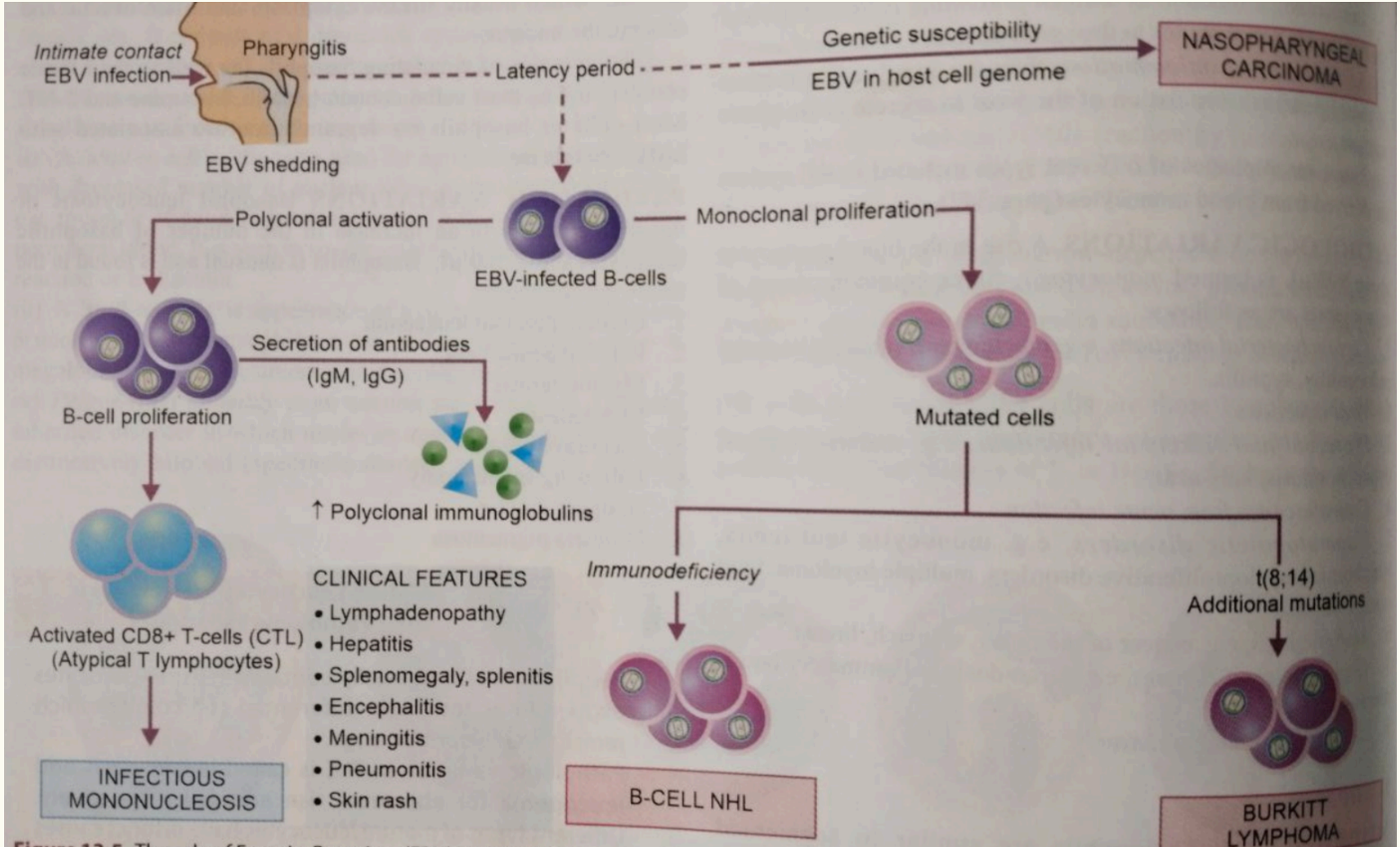


Figure 13.5 The role of Epstein-Barr virus (EBV) in the pathogenesis of infectious mononucleosis, nasopharyngeal carcinoma and Burkitt lymphoma and B-cell NHL. (NHL, non-Hodgkin lymphoma; CTL, cytotoxic T lymphocytes).

2. Burkitt Lymphoma

Highly associated in African (endemic) type

Translocation: t(8;14) → c-MYC activation

“Starry sky appearance” histologically

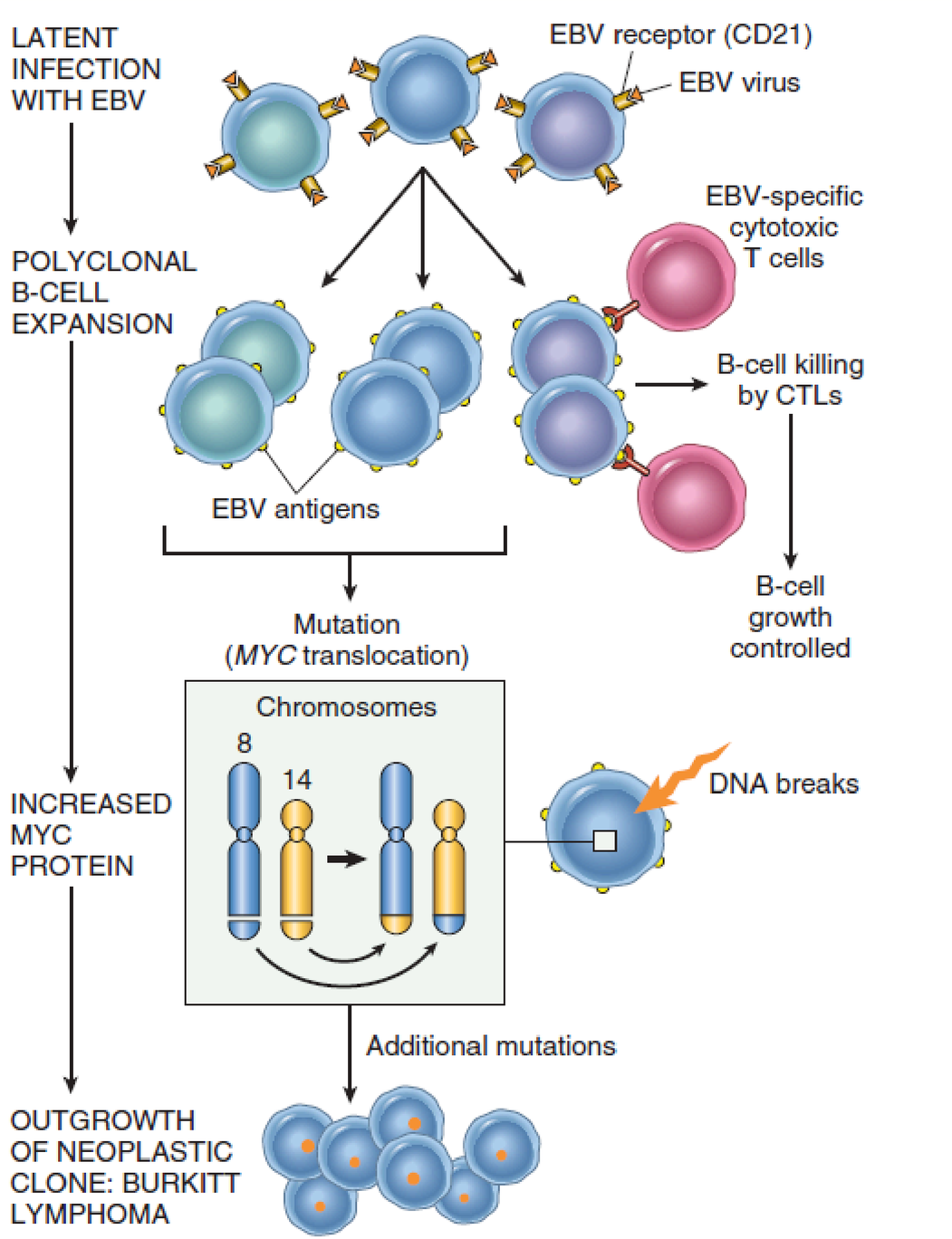
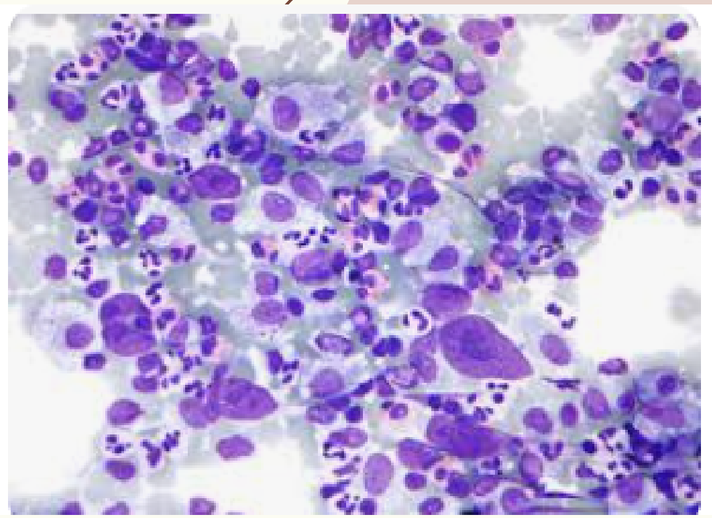


Fig. 6.34 Possible evolution of EBV-induced Burkitt lymphoma.

3. Hodgkin Lymphoma
Especially mixed cellularity type
EBV genome found in Reed–Sternberg cells



4. Nasopharyngeal Carcinoma
Common in Southern China
Strong EBV association
Elevated IgA antibodies to EBV antigens

5. Post-Transplant Lymphoproliferative Disorder (PTLD)
Due to immunosuppression
Uncontrolled EBV-driven B-cell proliferation

IMMUNOSUPPRESSED PATIENTS ALSO ARE AT INCREASED RISK FOR DEVELOPING VIRUS-INDUCED TUMORS, SUCH AS EPSTEIN-BARR VIRUS (EBV)–INDUCED LYMPHOMAS

Laboratory Diagnosis

- Heterophile antibody test – Positive
  EBV-specific antibodies
- Anti-VCA IgM → acute infection
- Anti-VCA IgG → past infection
- PCR for EBV DNA (special cases)

Prevention & Treatment

- No vaccine available
- Treatment is supportive
- Avoid contact sports → risk of splenic rupture

THANK YOU