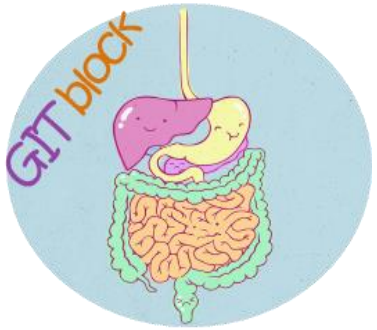





# Lymphoproliferative disorders

NOTE : THIS TEAMWORK DON'T VIEW EVERYTHING IN THE SLIDES ONLY THE IMPORANT THINGS NOTED BY THE DOCTORS

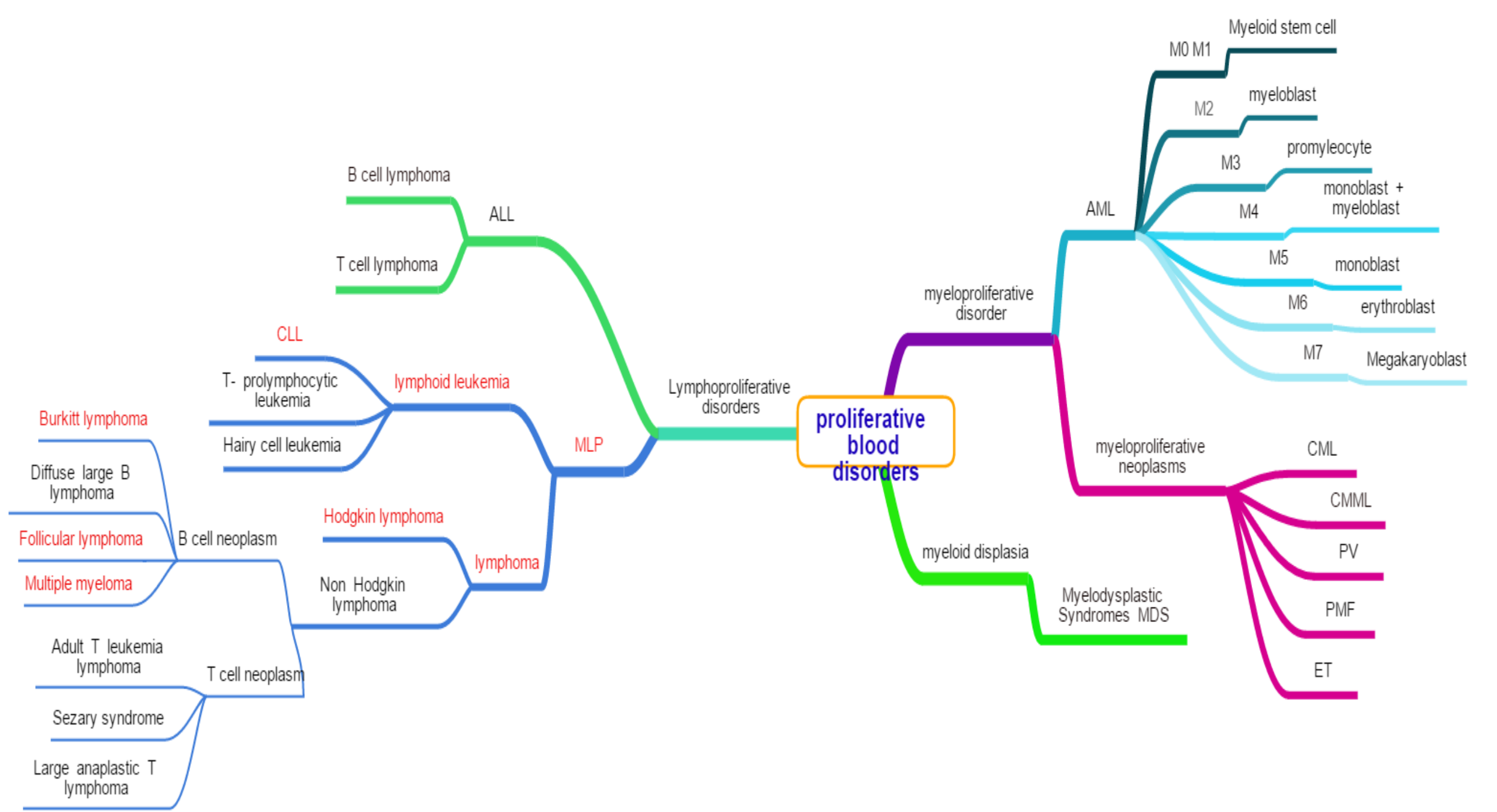
**Color coding**

- important
- Extra info
- Notes from lecturer

دعاء فبل المذاكرة :

(اللهم أني أسالك فهم النبين و حفظ الملرسلين و الملائكة المقربين اللهم اجعل السنتنا عامرة بذكرك و قلوبنا بخشيتك، أنك على كل شيئا قدير و حسبنا الله نعم الوكيل )

Please don't hesitate to contact us on:Haematology434@gmail.com


proliferative blood disorders
Lymphoproliferative disorders
MLP
lymphoid leukemia
CLL
T- prolymphocytic leukemia
Hairy cell leukemia
lymphoma
Hodgkin lymphoma
Non Hodgkin lymphoma
ALL
B cell lymphoma
T cell lymphoma
B cell neoplasm
Burkitt lymphoma
Diffuse large B lymphoma
Follicular lymphoma
Multiple myeloma
T cell neoplasm
Adult T leukemia lymphoma
Sezary syndrome
Large anaplastic T lymphoma
myeloproliferative disorder
AML
Myeloid stem cell
M0 M1
myeloblast
M2
promyleocyte
M3
monoblast + myeloblast
M4
M5
monoblast
M6
erythroblast
M7
Megakaryoblast
myeloproliferative neoplasms
CML
CMML
PV
PMF
ET
myeloid displasia
Myelodysplastic Syndromes MDS

# Definition

## ❖Lymphoproliferative disorders (LPDs):

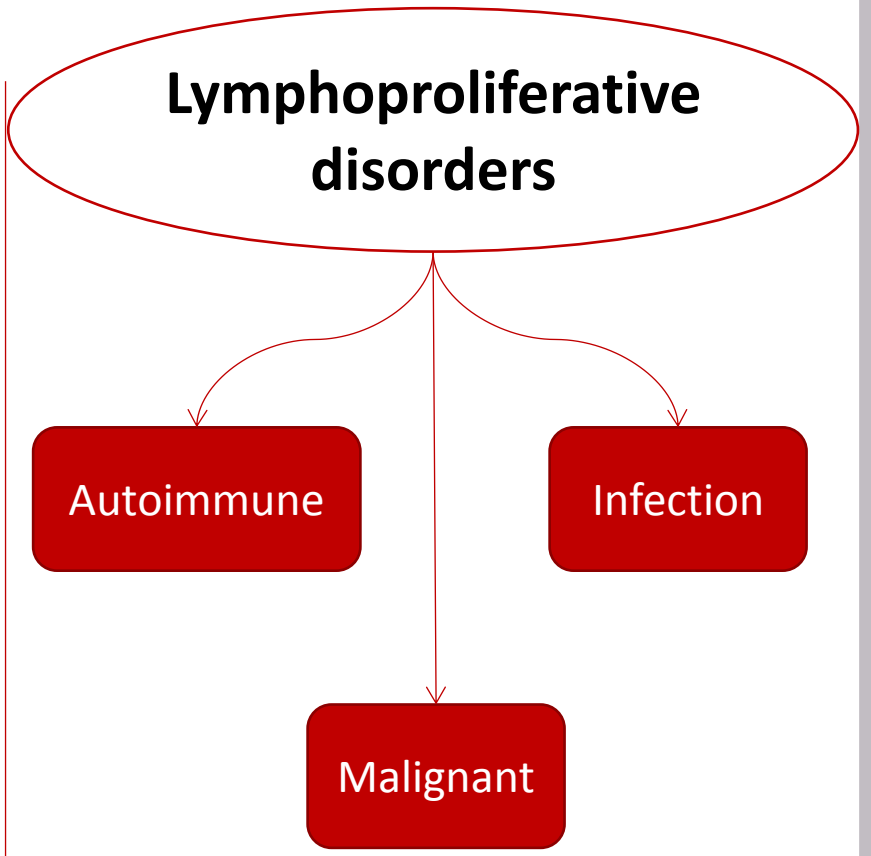
Several clinical conditions in which **lymphocytes are produced in excessive quantities** **(Lymphocytosis)**

## ❖Lymphoma:

**Malignant lymphoid mass** involving the **lymphoid tissues (lymph nodes and spleen)** with or without other tissues (skin ,GIT ,CNS …etc)

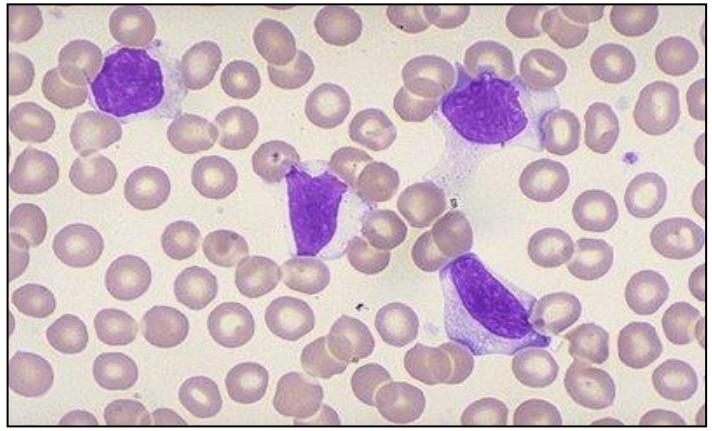
## ❖Lymphoid leukaemia:

**Malignant proliferation of lymphoid cells in Bone marrow and peripheral blood** with or without other tissues (lymph nods ,spleen , skin ,GIT ,CNS …etc)

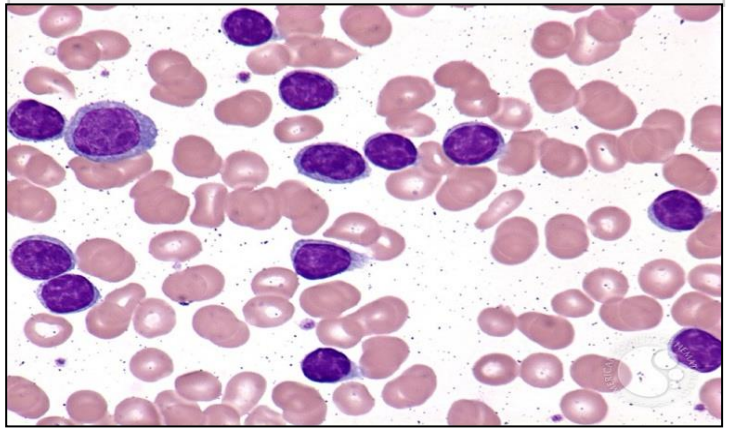


# Lymphocytosis

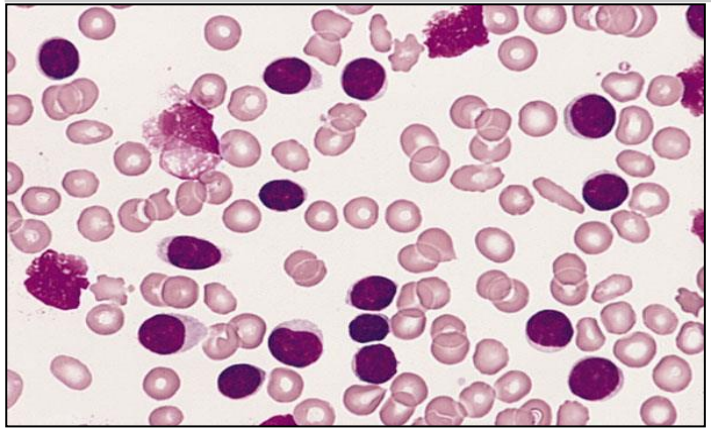
**1- viral infection**
**Infectious mononucleosis**
,cytomegalovirus ,rubella, hepatitis, adenoviruses, varicella



**2- Some bacterial infection:**
(Pertussis ,brucellosis …)
**3-Immune** : SLE , Allergic drug reactions
4- Other conditions: splenectomy, dermatitis ,hyperthyroidism metastatic carcinoma….)



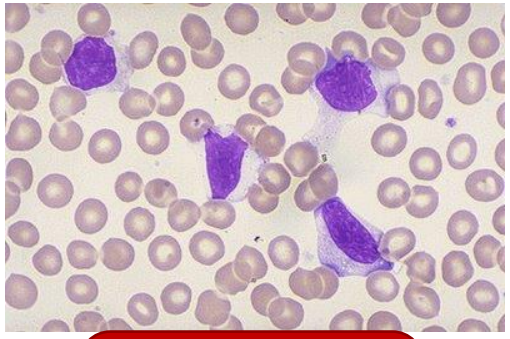
**5- Chronic lymphocytic leukemia (CLL)**
**6-Other lymphomas:**
**Mantle cell lymphoma ,Hodgkin lymphoma**



# Infectious mononucleosis

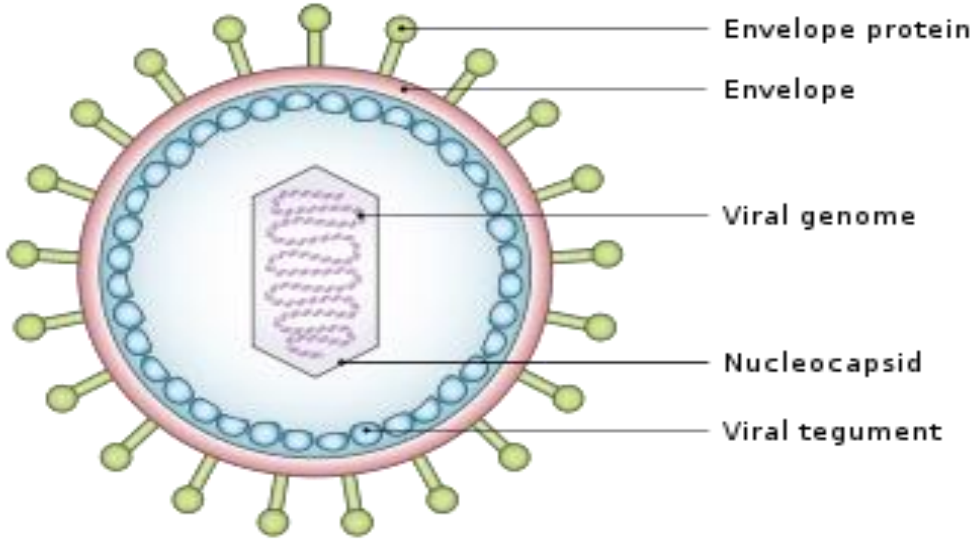
❖ An acute, infectious disease**, caused by Epstein-Barr virus and characterized by:**

- **Fever**
- **Swollen lymph nodes (painful)**
- **Sore throat,**
- **Atypical lymphocyte**
- **Affect young people ( usually)**



Lymphocyte larger than the normal

- **EBV is** herpes virus **transmitted through saliva** cause IM and implicated in the **development of Burkitt's lymphoma and Hodgkin's disease.**
- After the virus enters the body it can take up to a month before symptoms begin.



# Lab investigation & management

## Investigation

❖ **1-Virus specific antibodies :-**

IgM :Develops early and last for few month.

IgG :Develops later and persists for life.

❖ **2- Heterophile antibodies** (old tests)

Antibodies produced due to infection and react to antigen in animal RBCs.

❑ Paul-Bunnell test.

Sheep RBCs agglutinate in the presence of heterophile antibodies

❑ Monospot test:

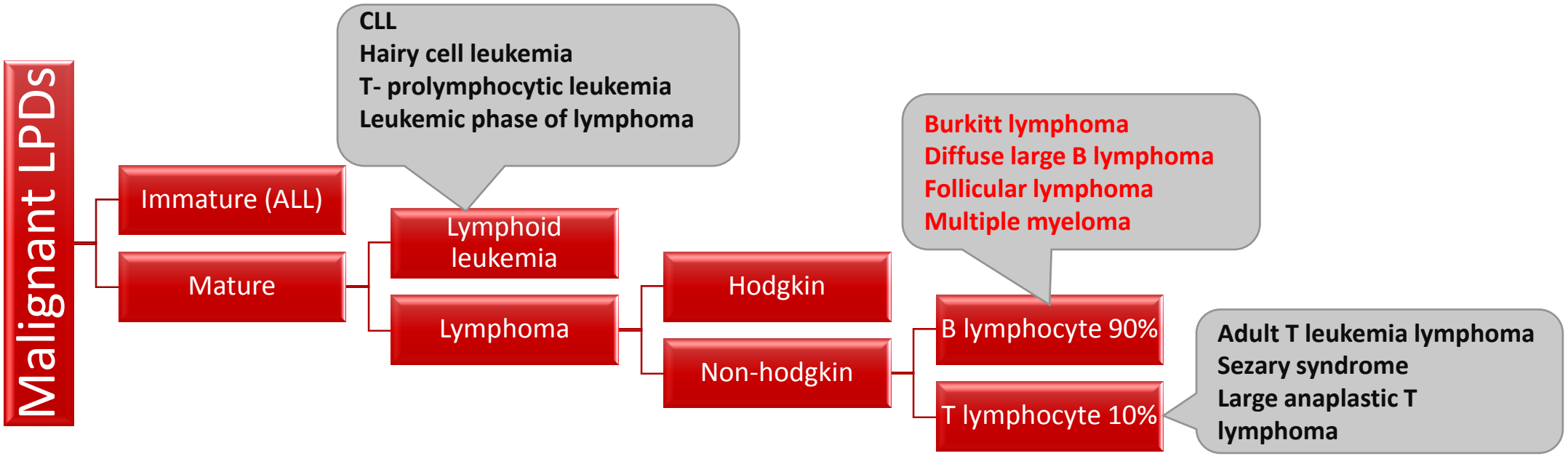
Relies on the agglutination of the horse RBCs by heterophile antibodies in patient's serum

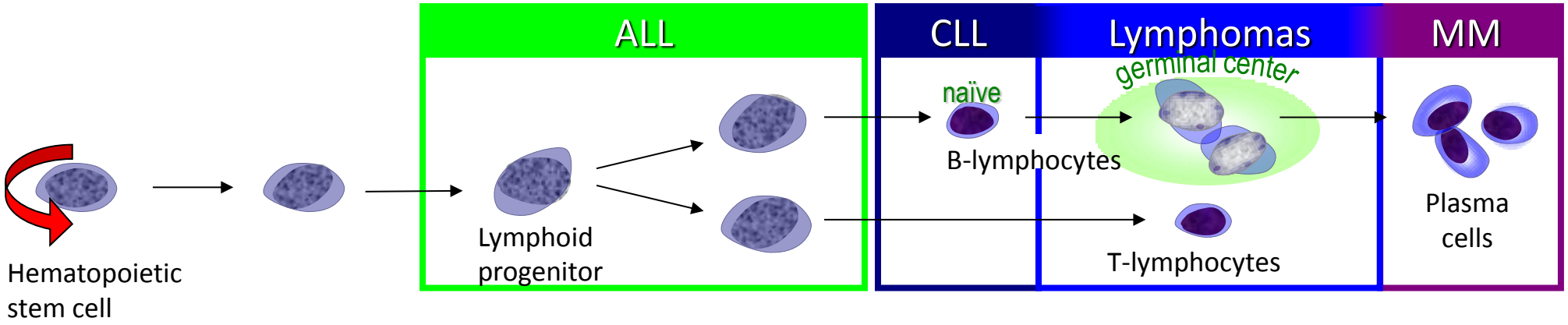
## Management

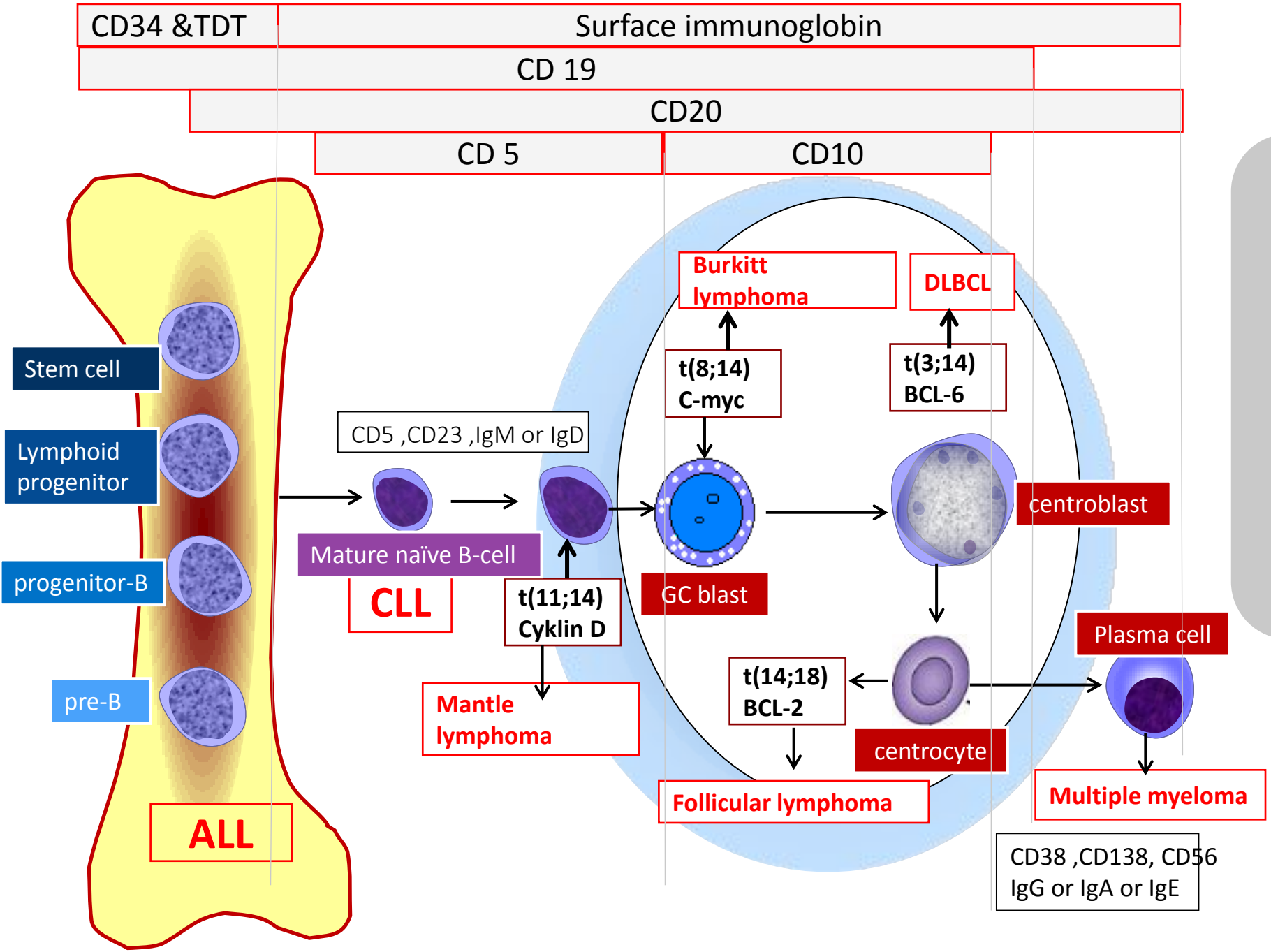
- Self limiting disease ( 4-6 weeks)
- Unusual complication such hepatitis ,encephalitis and splenic rupture may occur.
- **Treatment** :

1. Supportive
2. Rest
3. Analgesia
4. Steroid or Acyclovir in severe cases or at complication

# Malignant LPDs



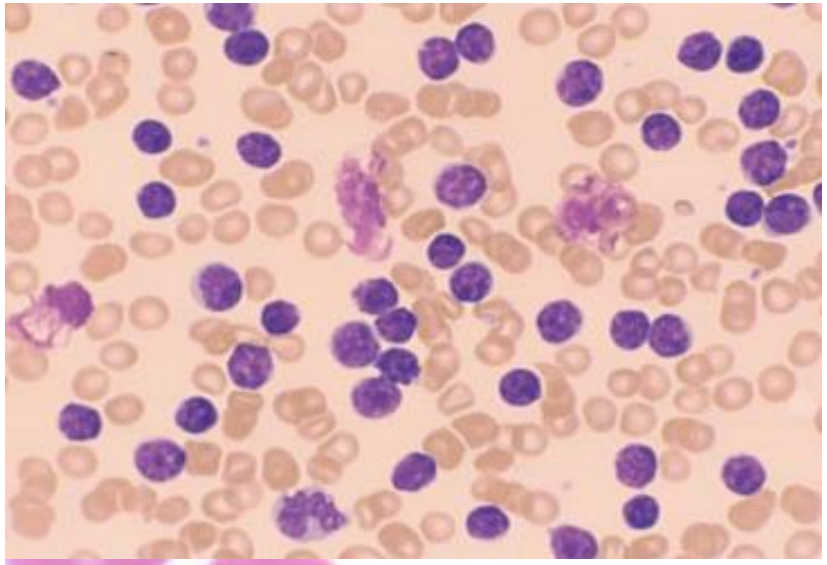



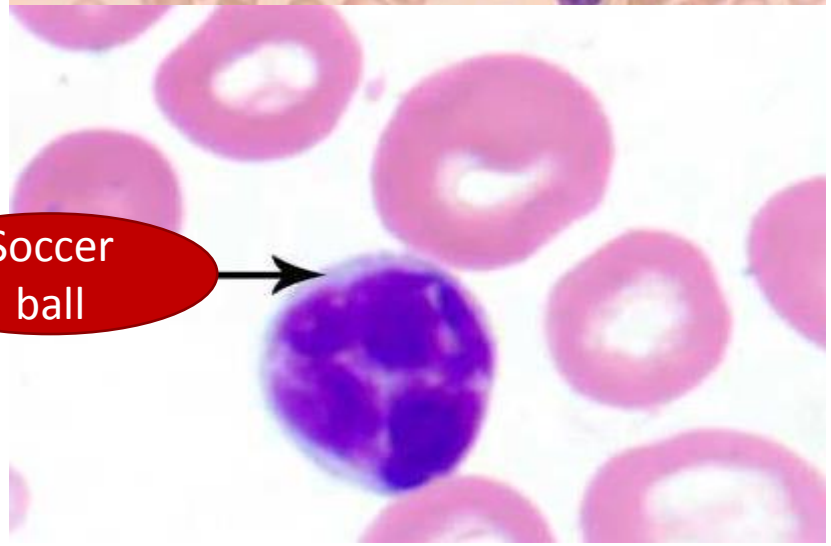



- Once the cell express it's surface immunoglobin it means it is mature
- CG blast, centroblast and cntrocyte are in the germinal cell
- BCL-2 (antiapoptotic)

# Chronic lymphocytic leukemia

- Malignant neoplasim characterized by an **increased number of small, mature lymphocytes in the blood** (>5,000 ) **and bone marrow** with or without (spleen and lymph node)
- **The most common adult leukemia (~25% of adult leukemias)**
- The median age is ~55 to 65 years ( rare < 40 years).
- 1.5 to 2 times more common in men than women.






## Features

- ❑ **40% of patients are asymptomatic at diagnosis.**
- ❑ **Moderate lymphadenopathy and splenomegaly**
- ❑ **Lymphocytosis (>5,000):**
  - **Small mature-appearing lymphocytes**
  - **Condensed ("soccer ball") nuclear chromatin**
  - **Numerous "smudge cells"**
- ❑ **Predisposition to infection**
- ❑ **Autoimmune phenomena (autoimmune hemolytic anemia)**
- ❑ **Transformation to large cell lymphoma (Richter's syndrome)**

# Burkitt's lymphoma

- High-grade non-Hodgkin's B-cell lymphoma which is **rapidly growing and highly aggressive with extremely short doubling time** (24 hrs)
- Types of Burkitt's lymphoma :-

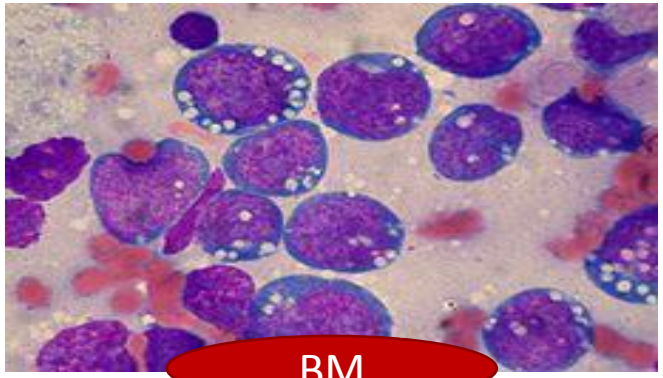
**1-Endemic**: associated with **chronic malaria and EBV** In equatorial Africa . **It particularly affects the jaw, other facial bone and breast**.

**2-Sporadic: occurs throughout the world and affects GIT**.

**3-Immunodeficiency-associated: associated with HIV infection** or the use of immunosuppressive drugs

**Morphology**

**Homogenous medium size cells with round nuclei and deeply basophilic and vacuolated cytoplasm**



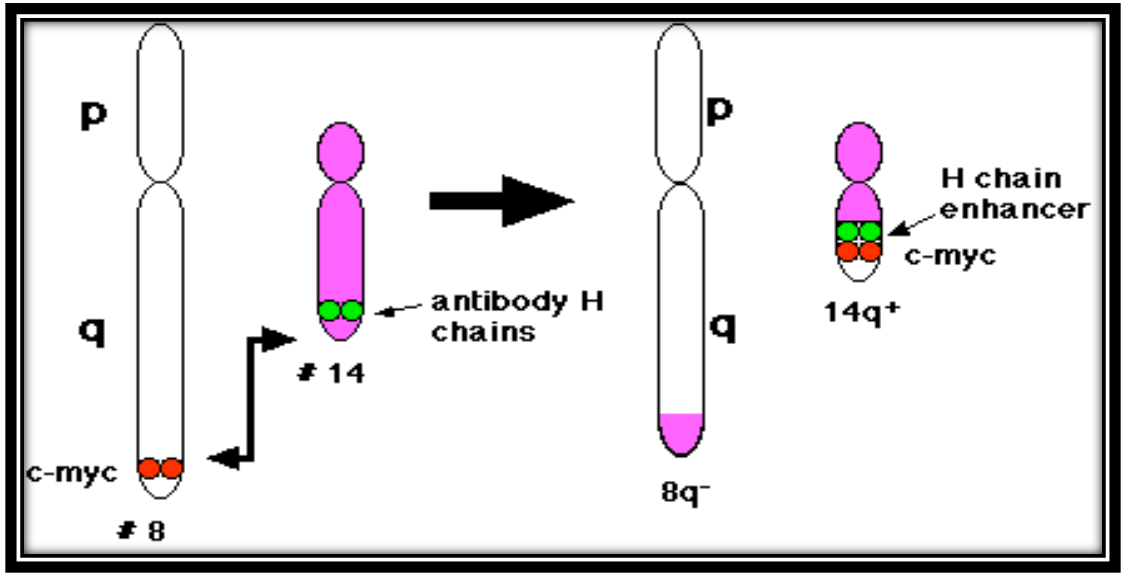
BM

**Diffuse infiltration with "starry sky" (Macrophages engulfing the apoptotic cells)**

Biobsy

# Genetics & clinical presentation

- q Highly associated with t(8;14) :
- Translocation of the **c-MYC proto-oncogene** at chromosome 8
- to immunoglobulin gene at chromosome 14
- qThe c-MYC is nuclear transcription factor .
- **q Burkitt's lymphoma is the fastest growing tumor in humans.**




- **Cure rate:**

**-90% at early phase**

**-70% at advance disease**

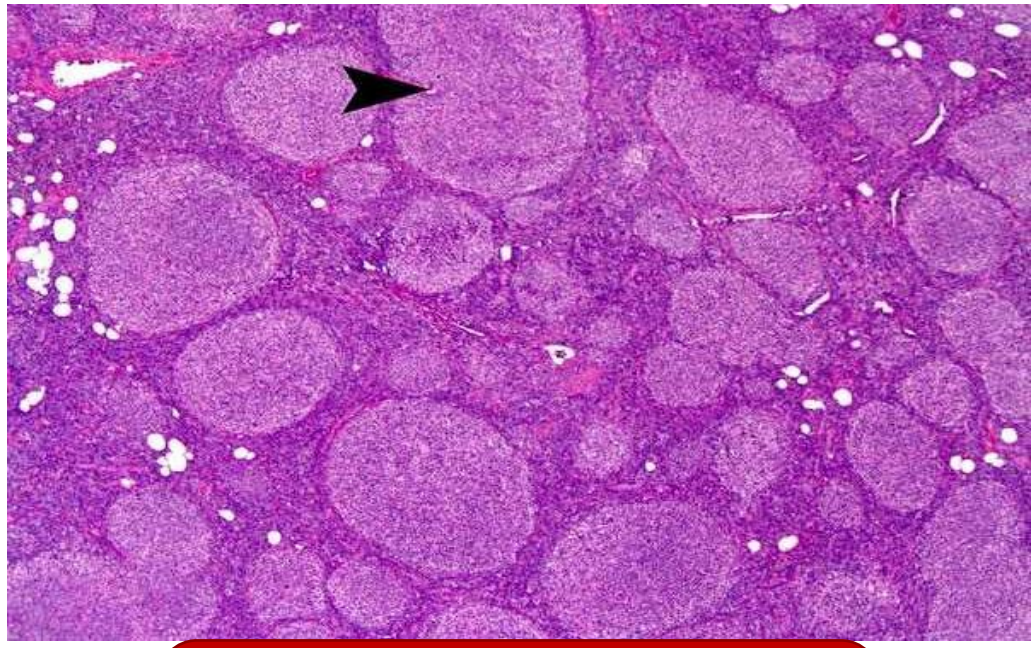
**After 25 days of intensive chemoth erapy**

# Follicular lymphoma

- FL is malignant **proliferation of germinal center B cells centrocyte** which has at least a partially follicular pattern.
- **Due to overexpression o f Bcl2** caused by t(14;18) .
- **Most common type of "indolent" lymphoma (25% ).**
- Presented as:

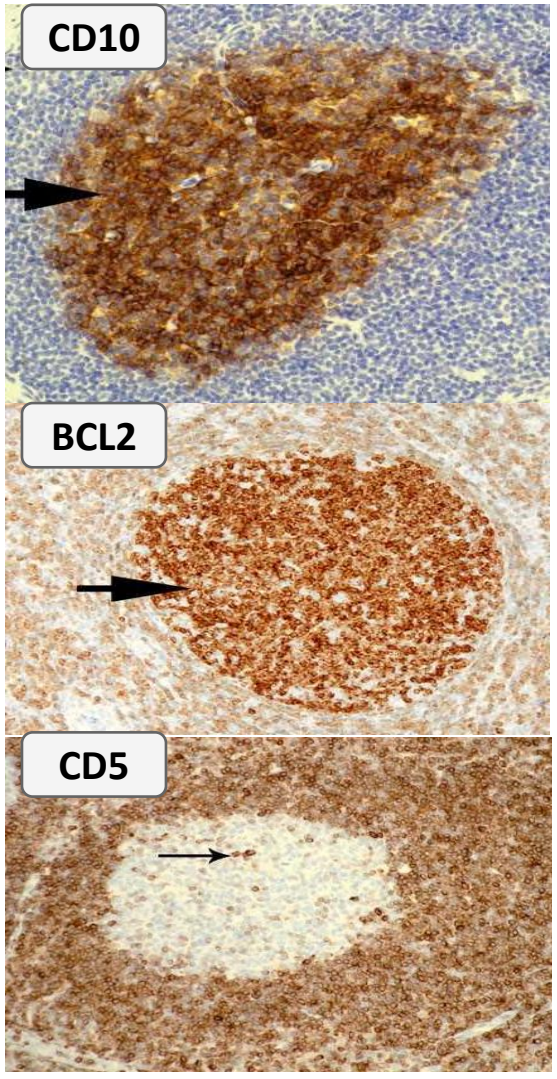
- Lymphadenopathy (100%)
- splenomegaly (80%)
- BM involvement (60%)
- blood involvement (40%).
- Indolent but incurable (some exceptions)

**Diagnosis**

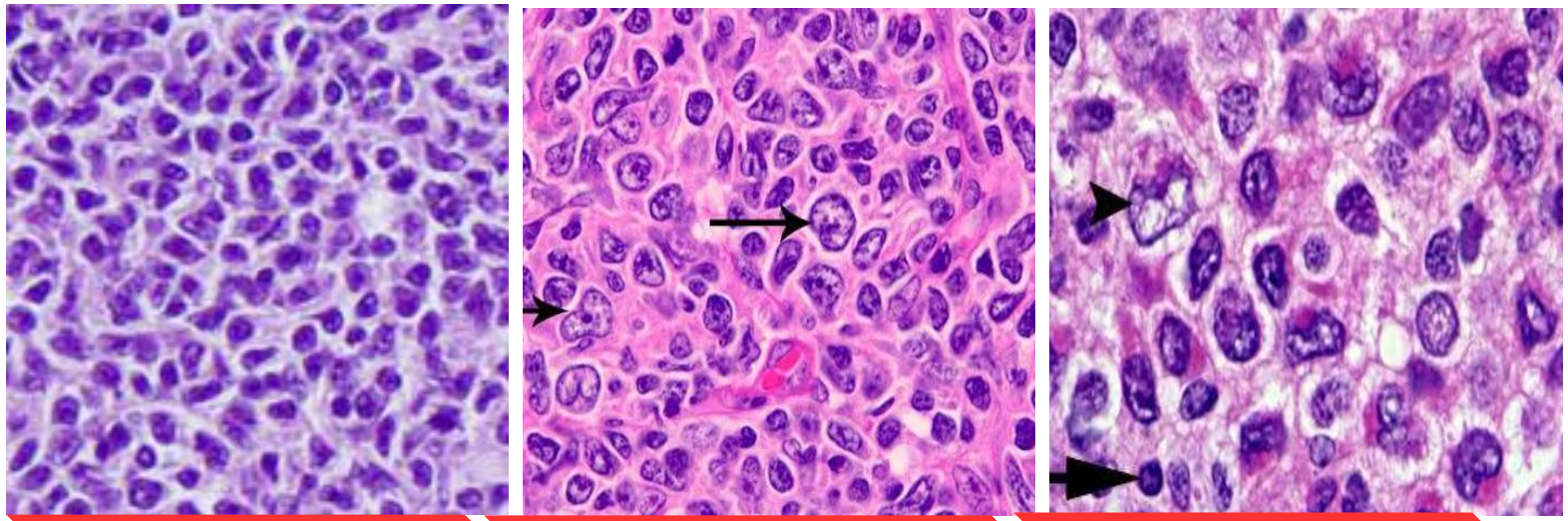


**Immunophenotyping:**
**Positive for CD10,CD20 and Bcl2**
**Negative for CD5 ( in most cases)**

# Management of FL




- Median survival is around 10 years.
- Transformation to aggressive lymphoma (DLBCL) can occur.



Low grade FL
Wach & wait

FL in transformation
chemotherapy

Aggressive
transformation
Aggressive
chemotherapy

We don't start therapy unless the small cells become aggressive

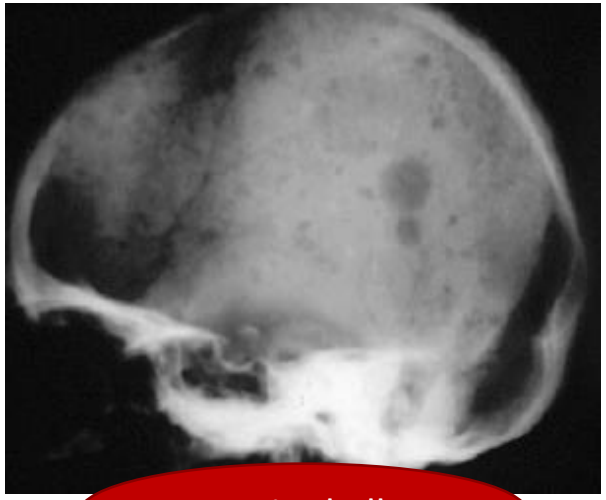
# Multiple myeloma

- Malignant B neoplasm characterized by a triad of abnormalities :-

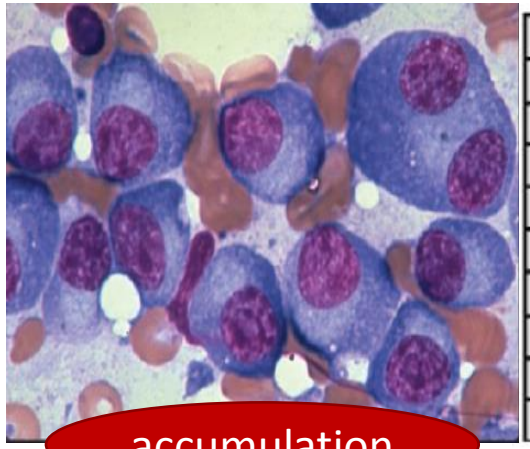
• Accumulation of plasma cells in the bone marrow

• Lytic Bone lesions

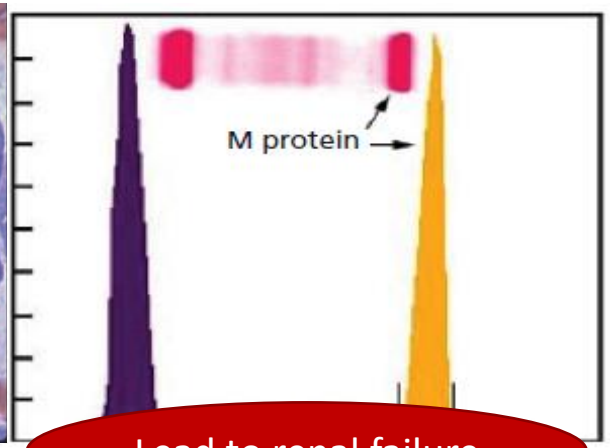
• Production of a monoclonal immunoglobulin (Ig) or Ig fragments



Lytic skull

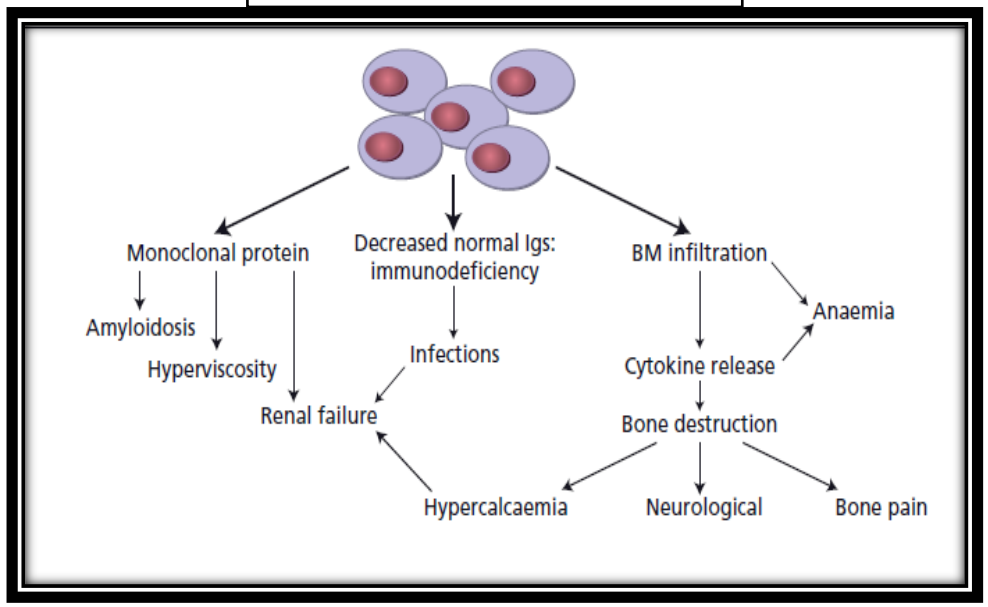


accumulation




Lead to renal failure

## Pathogenesis



# Hodgkin lymphoma

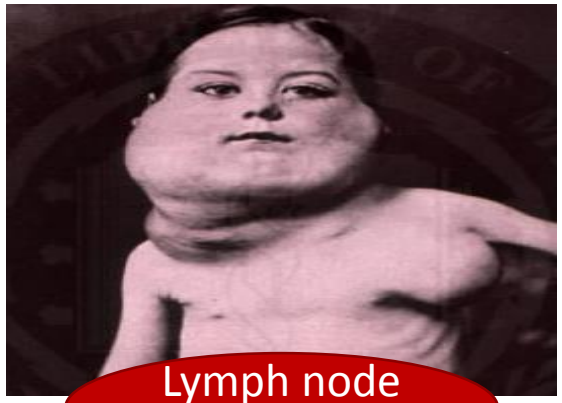
Thomas Hodgkin
(1798-1866)

**Classical HL**

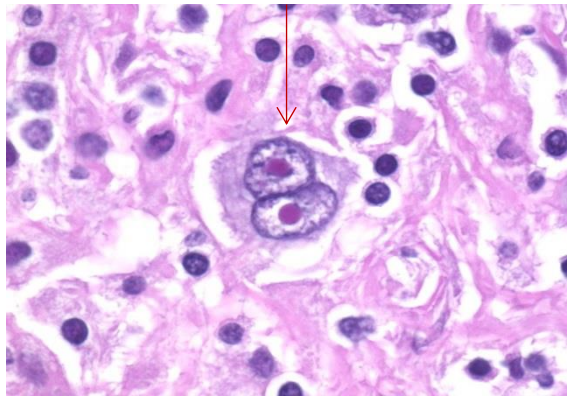
- Indolent malignant lymphoma characterized by :-

1- presence of **few large binucleated cells (Reed-Sternberg )** **malignant cells** surrounded by reactive cells (lymphocytes, plasma cells ,eosinophils)

2- **Involving cervical lymph nodes in young adults** (most often )

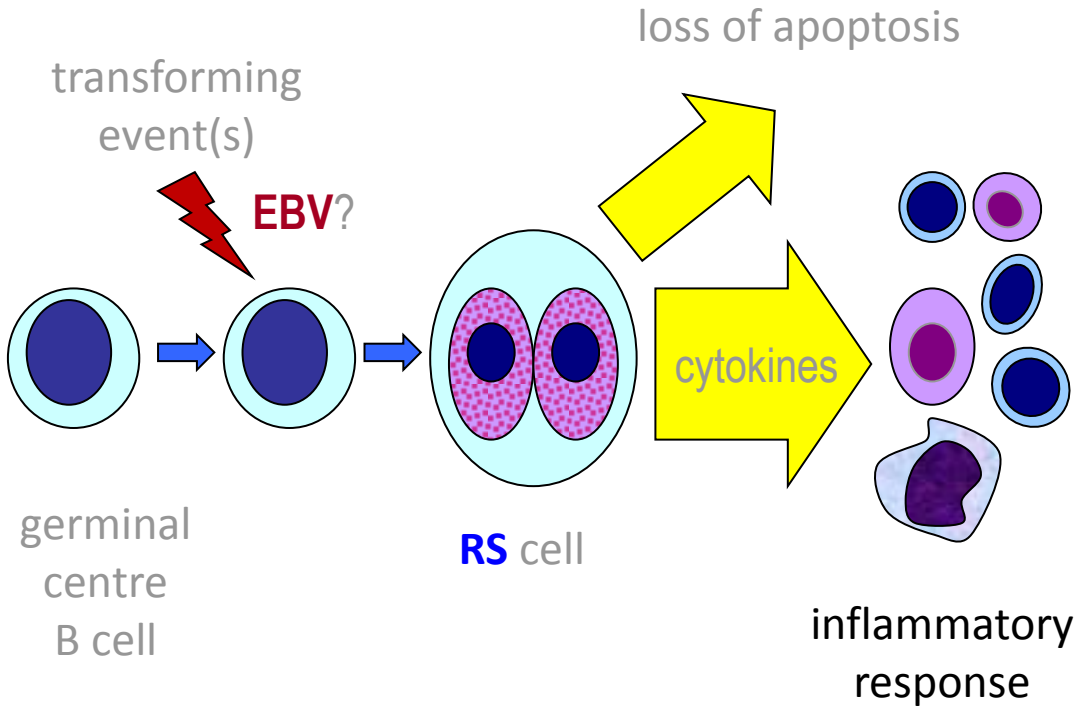


Lymph node involvement



# Hodgkin lymphoma

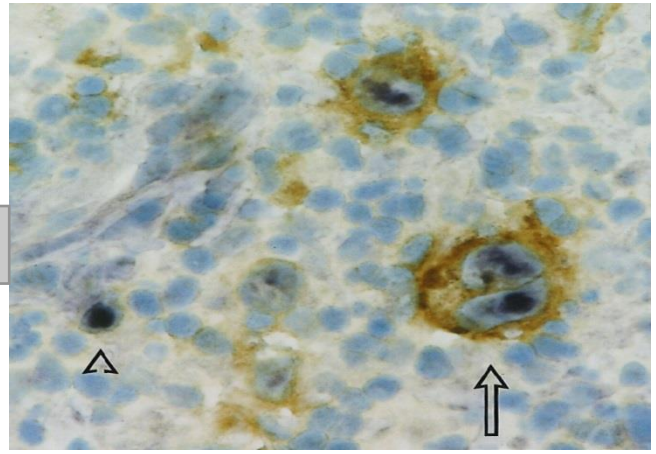
## Pathogenesis



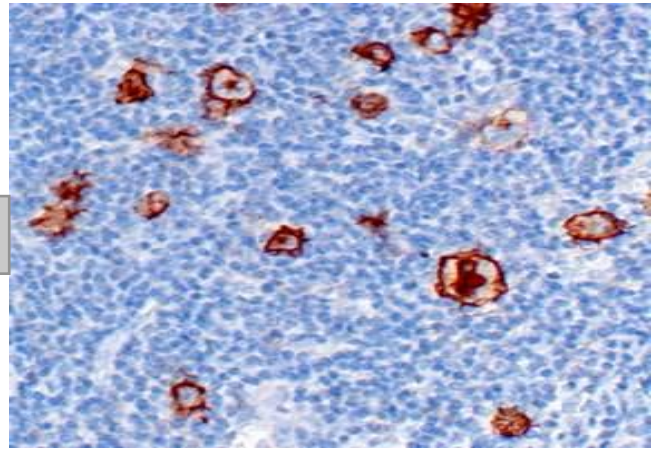

Germenal center B cell with EBV leads to dinucleate (RS cell) which in response lead to loss of apoptosis (accumulation) & recruit cytokines

## Diagnosis

CD50



CD30



# Practical way to think of lymphoma

| Category | | Survival of untreated patients | Curability | To treat or not to treat |
|---|---|---|---|---|
| Non-hodgkin lymphoma | Indolent | Years | Generally not crable | Generally defer Rx if asymptomatic |
| | Aggressive | Months | Curable in some | Treat |
| | Very aggressive | Weeks | Curable in some | Treat |
| Hodgkin lymphoma | All types | Variable months to years | Curable in some | Treat |

## 1-LPD could be

A. autoimmune
B. infectious
C. malignant
D. All of the above

## 2- which one is the specefic to define LPD:

A. Hig proliferation of lymphocyte (lymphocytosis)
B. Benign proliferation of lymphoid mass
C. High neutrophil proliferation
D. Non of the above

## 3- infectious mononucleosis is kind of:

A. Bacterial infection
B. Parasitic infection
C. Immune disorders
D. Viral infection

## 4- which one is characteristic of chronic lymphocytic leukaemia:

A. Binucleated malignant cell
B. Lytic bone
C. Starry sky histologically
D. Soccer ball shape cell

## 5-what is the fastest growing tumor in human:

A. adenocarcenoma
B. myeloma
C. Burkitt's lymphoma
D. none of them

## 6-in investigations IgM is specefic antibodies which:

A. Last few days
B. Last for few months
C. Last for years
D. Persists for life

1- D
2- A
3- D
4- D
5- C
6- B

- Q1define LPD, lymphoma & lymphoid leukaemia?
- Lymphoproliferative disorders (LPDs):Several clinical conditions in which lymphocytes are produced in excessive quantities (Lymphocytosis)
- Lymphoma:Malignant  lymphoid mass involving the lymphoid tissues
- Lymphoid leukaemia:Malignant  proliferation of lymphoid cells in Bone marrow and peripheral blood

Q2 what is the pathogenesis of hodgkin lymphoma?

- Germenal center B cell with EBV leads to dinucleate (RS cell) which in response lead to loss of apoptosis (accumulation) & recruit cytokines

# Thank you for checking our work

Now you can check a lecture out :D


Done by:

Khalil alhindas

Salih albnyan

Abdulrahman alnoaem

Mohammed albadrany

Reviewed by:

Hadeel B.Alsulami

Abdullah M.albasha


**If you donate money,**

**you give food!**

**But if you**

**donate blood,**

**you give Life!!**

دعاء بعد المذاكرة :

(اللهم اني أستودعتك ما قرأت وما حفظت وما تعلمت، فرده لي عند حاجتي اليه أنك على كل شيء قدير، وحسبنا الله ونعم الوكيل)