Blood pathology 2

Chronic Leukemia

LEC 4

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- **Chronic leukemias**

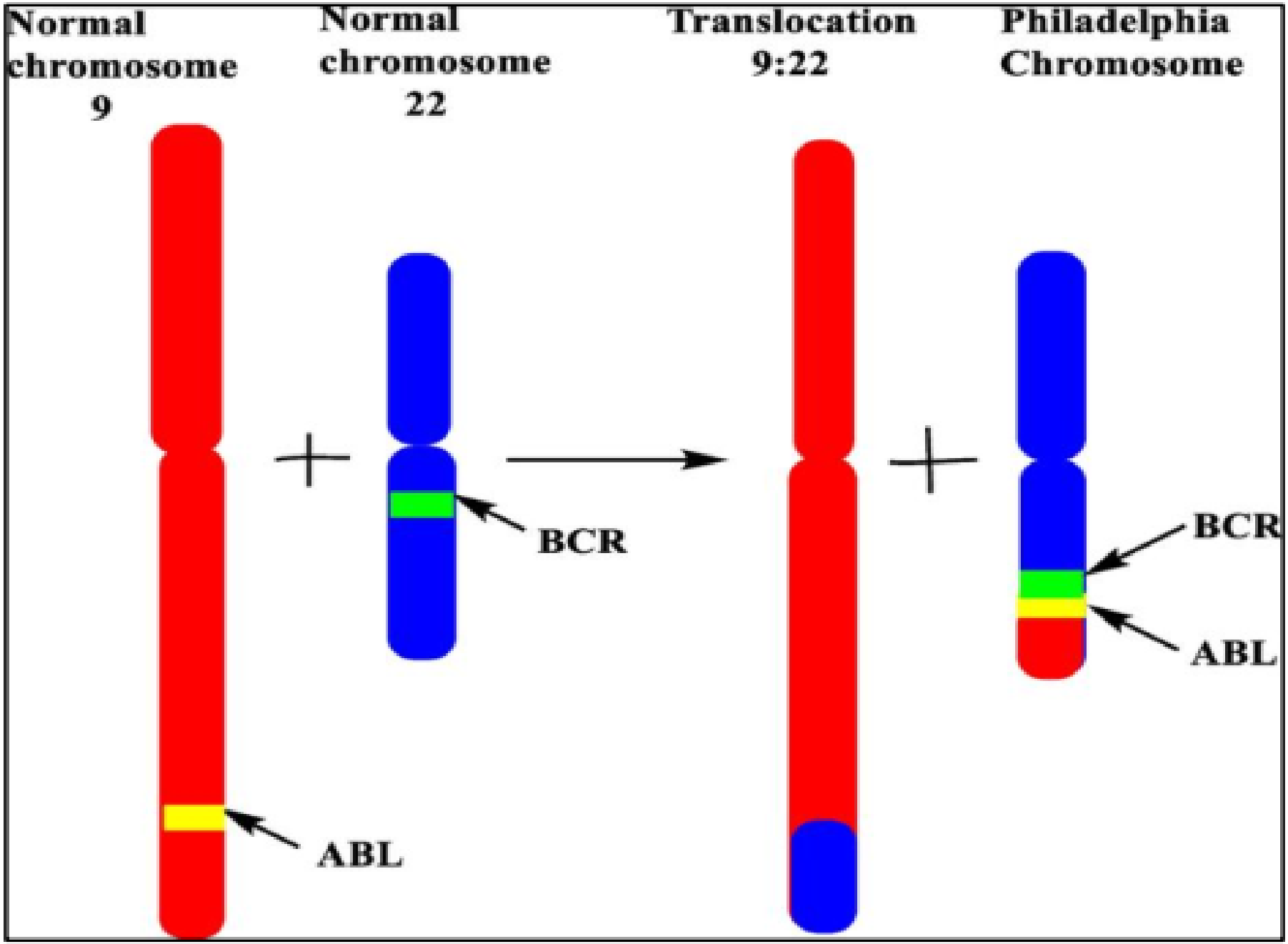
- The chronic leukemias comprise two main types, chronic myeloid leukemia (CML) and chronic lymphocytic leukemia (CLL). The chronic leukemias can be distinguished from acute leukemias by their slower progression and they are also more difficult to cure.

- **Chronic Myeloid Leukemia (CML)**

- Chronic myeloid leukemia (CML) **or** chronic granulocytic leukemia (CGL), about 15% of leukemias may occur at any age. The least common leukemia in children is **CML**. It is characterized by an increased growth of myeloid cells in the bone marrow and the accumulation of these cells in the blood. The diagnosis of CML by the characteristic presence of the **Philadelphia (Ph) chromosome**

- **Pathogenesis:**

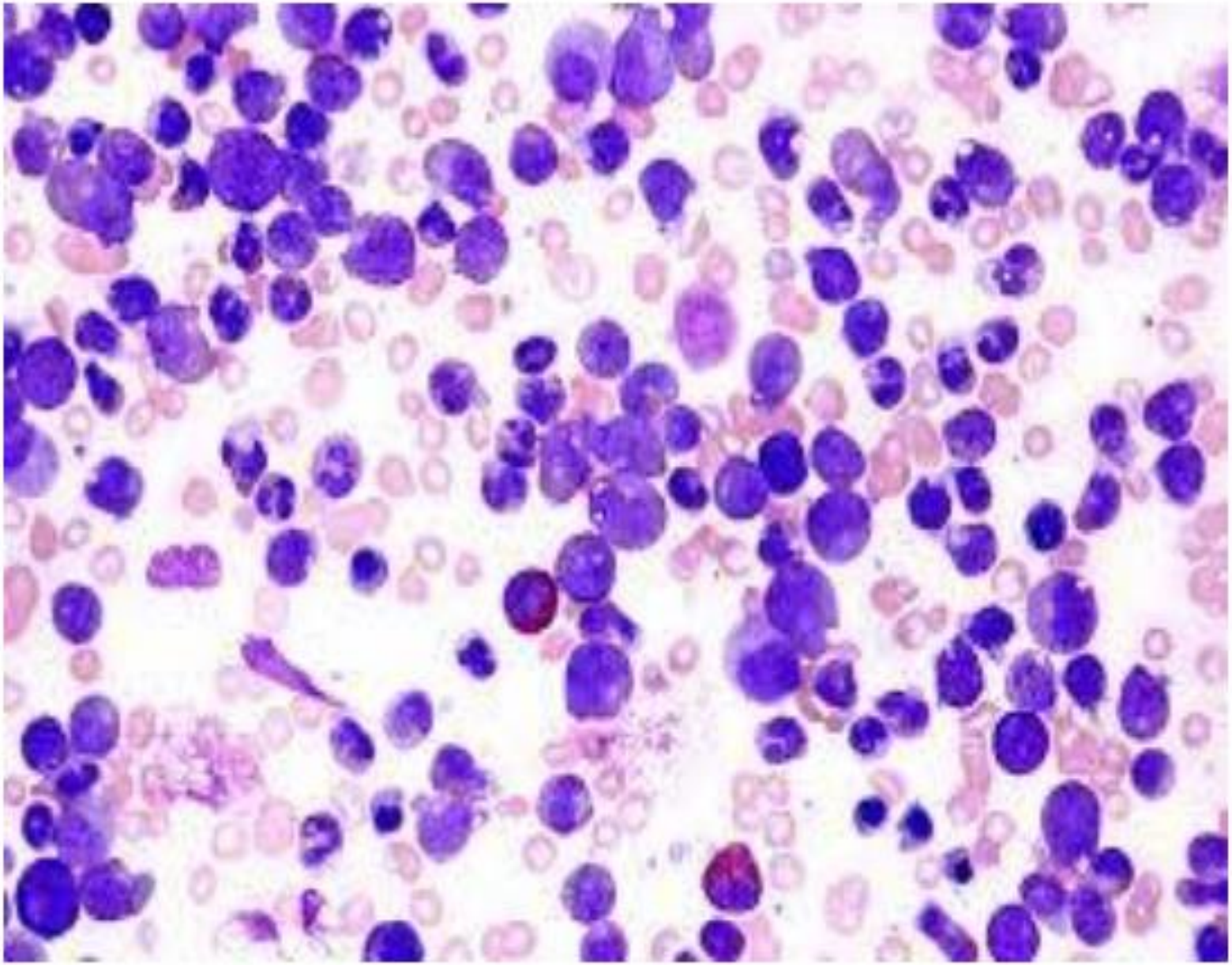
- CML is characterize by presence of the Philadelphia (Ph) chromosome, associated with a **Chromosomal translocation** between the long arms (q) of chromosomes 9 and 22 (9,22) as a result of which part of the ABL gene is moved to the BCR gene on chromosome 22 and part of chromosome 22 moves to chromosome 9. The resulting BCR-ABL gene codes for a fusion protein of size 210 kDa. This has tyrosine kinase activity in **excess** of the normal gene.


Normal chromosome 9
Normal chromosome 22
Translocation 9:22
Philadelphia Chromosome
BCR
ABL
BCR
ABL

- **Signs and symptoms of CML**
- The disease may be diagnosed incidentally on routine blood testing. A **great increase** in total granulocyte**.**
- 1- Features of anemia pallor
- 2- Bruising due to thrombocytopenia
- 3- weight loss , anorexia , and night sweats.
- 4- Splenomegaly is common with pain .
- 5- fever and gout.
- CML tends to move to an acute stage (increase of blast cells in the marrow to 50% or more) and patients **die** of hemorrhage or infections , as in acute leukemias**.**

- **Laboratory findings**

- 1- Leucocytosis is usually >50 x 10^9/L and sometimes >500 x 10^9/L. A complete spectrum of **myeloid cells** is seen in the peripheral blood.
- 2- Increased circulating basophils.
- 3- Normochromic, normocytic anemia is usual.
- 4- Platelet count may be increased.
- 5- Bone marrow examination shows hypercellular , granulocytic proliferation.
- 6- More than 95% of **CML** patients have abnormal Philadelphia chromosome , which can be detected by cytogenetic or PCR techniques.
- Best treatment of CML is bone marrow transplant



- **Chronic lymphocytic leukemia**

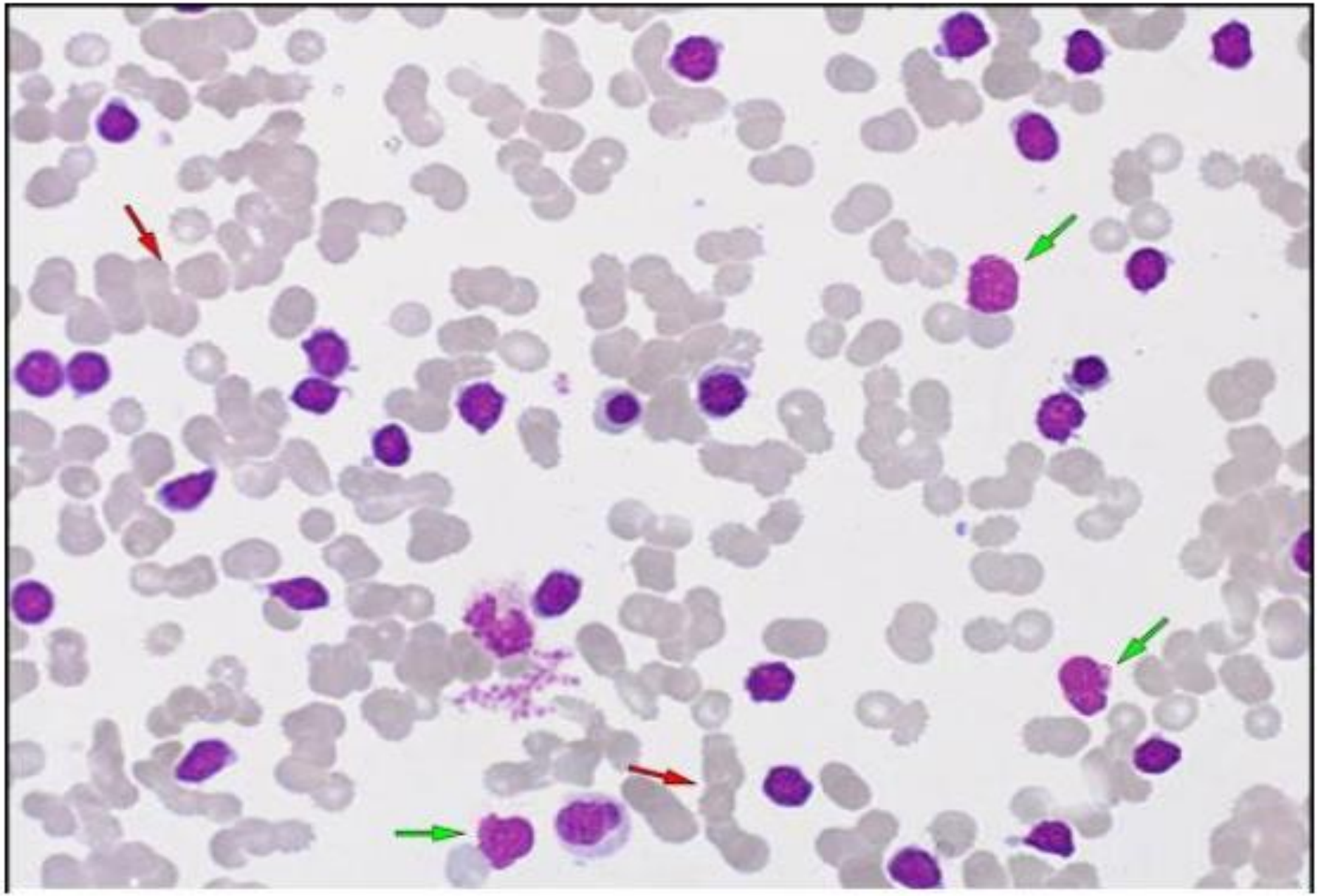
- CLL peak incidence between 60-80 years of age. The aetiology is unknown but there are geographical variations in incidence. It is the most common of the leukaemias in the Western world but rare in the Far East. In contrast to other forms of leukemia there is no higher incidence after previous chemotherapy or radiotherapy.

- There is a sevenfold increased risk of **CLL** in the close relatives of patients. Tumor cell appears to be a **relatively mature B cell**. The cells accumulate in the blood, bone marrow, liver, spleen and lymph nodes as a result of a prolonged life span with impaired apoptosis.

- **Clinical features of CLL**

- 1. The disease occurs in older subjects. The male to female ratio is 2:1.
- 2. Most cases are diagnosed when a routine blood test is performed.
- 3. Enlargement of cervical, axillary lymph nodes is the most frequent clinical sign.
- 4. Features of anemia and thrombocytopenia (bruising or bleeding) may be seen..
- 5. Splenomegaly and, less commonly, hepatomegaly is common in later stages.
- Immunosupression due to cellular immune dysfunction results in bacterial , fungal and viral infections. **Infections** is the most common cause of death in CLL. Autoimmune hemolytic anemia is seen in CLL

- **Diagnosis of CLL**
- 1- Blood films show **lymphocytosis** (70-90%) of white blood cells appear as small lymphocytes.
- 2- Total leukocyte count ranges between 30.000-300.000 / c.mm.
- 3- Anemia and thrombocytopenia may be also seen.
- 4- The immunophenotyping of the lymphocytes shows them to be **B cells** , which express surface markers CD5+ and CD23+.
- 5- Autoimmune haemolysis may also occur.
- 6- Bone marrow aspiration shows lymphocytic replacement of normal marrow elements. Lymphocytes comprise about 25-95% of all the cells.



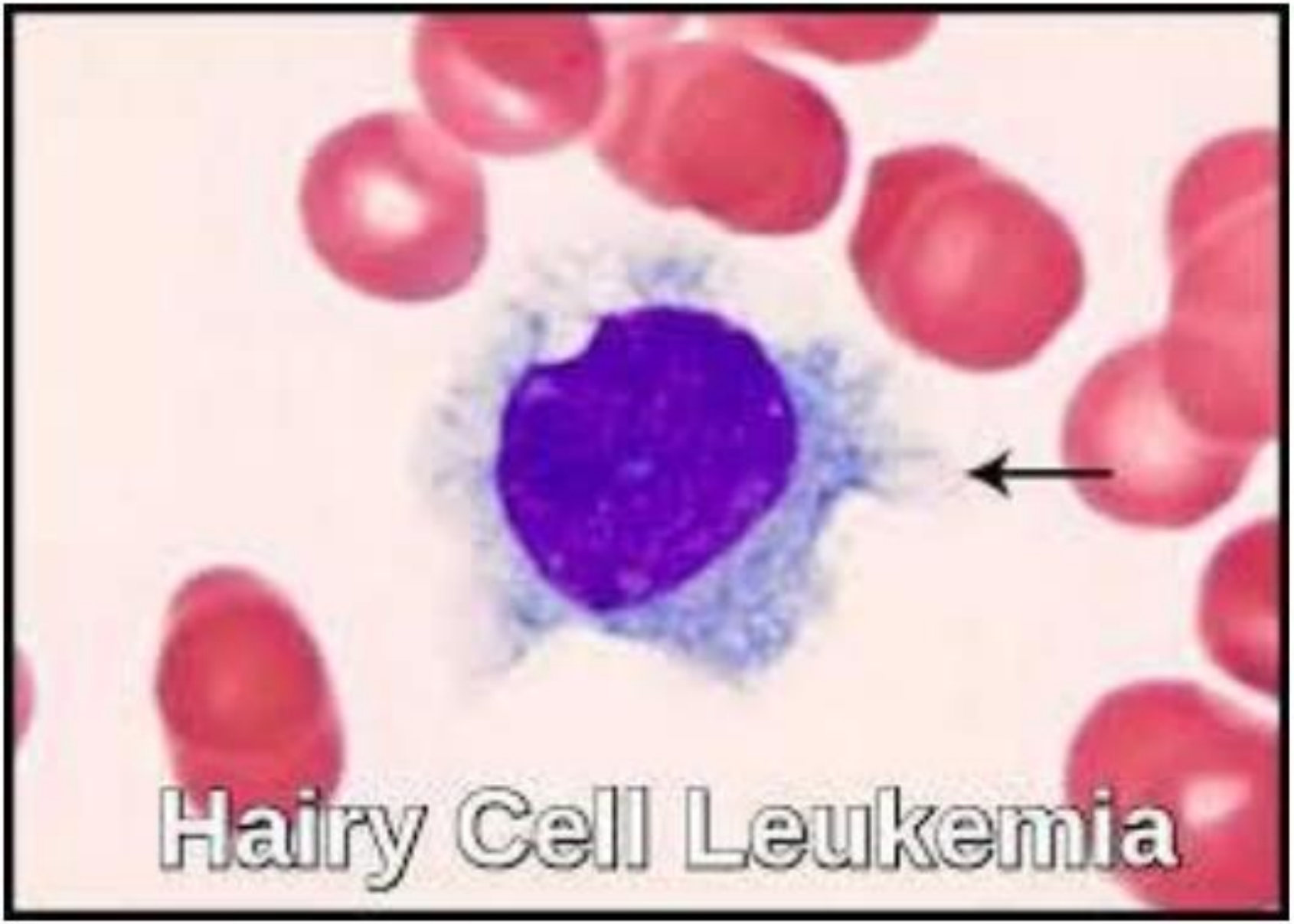
- **Hairy cell leukemia**

- Hairy cell leukemia (HCL) , also known as leukemic reticuloendotheliosis , is a **slow growing leukemia**. It is most common in older white males. This an unusual disease of peak age 40-60 years and men are affected more than women. **It is a type of chronic lymphoid leukemia.**

- This disorder is characterized clinically by features due to Pancytopenia. The spleen may be moderately enlarged.

- The number of hairy cells in the peripheral blood is variable: they may be rare.

- The bone marrow shows a characteristic appearance of mild fibrosis . A serum paraprotein may be present and the patients may have arthritis and vasculitis


Hairy Cell Leukemia

Thank You For Listening