

Acute Myeloblastic Leukaemias (AML)

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Introduction

- *The acute leukemias are characterized by uncontrolled proliferation of hematopoietic precursor cells, with loss of maturation and differentiation.*
- **The malignant cells (blasts or minimally differentiated precursors) accumulate in the bone marrow and suppress normal hematopoiesis.**

- **Distinction** of ALL from AML is the first critical step in the evaluation of acute leukemia since treatment and prognosis are very different.

ACUTE MYELOID LEUKEMIA (AML)

- *AML is highly heterogeneous.*
- **It can show differentiation along any of the lineages derived from the CFU-GEMM.**

FAB classification of AML

- This defines **eight subtypes** (M0 – M7).
- A basic criterion for the diagnosis of AML in the FAB system is that *at least 30% of cells in the bone marrow or blood must be myeloblasts.*

M0:	Minimally differentiated AML
M1	AML without maturation
M2	AML with maturation
M3	Acute promyelocytic leukemia

M4:

Acute myelomonocytic leukaemia

M5:

Acute monocytic leukemia

M5 A: >80% of marrow cells are monoblasts

M5 B: Predominance of promonocytes

M6:

Acute erythroleukemia

M7:

Acute megakaryocytic leukaemia

Epidemiology of AML

- **Acute myeloid leukemia occurs at all ages but is predominantly a disease of older adults.**
- **Approximately 85% of acute leukemias in adults are AML, compared to 15% of acute leukemias in children.**
- **There appears to be a familial predisposition to AML.**
- **First-degree relatives of AML patients have about a three-fold increase in risk, and there is increased concordance for AML in identical twins.**

- **Groups at risk:**
- **1- People who work in the leather and rubber industries.**
- **2- Truck drivers.**
- **3- Gas station attendants, and..**
- **people who work in the petroleum industry, who are all exposed to benzene and other hydrocarbons.**

Lab. Δ of AML

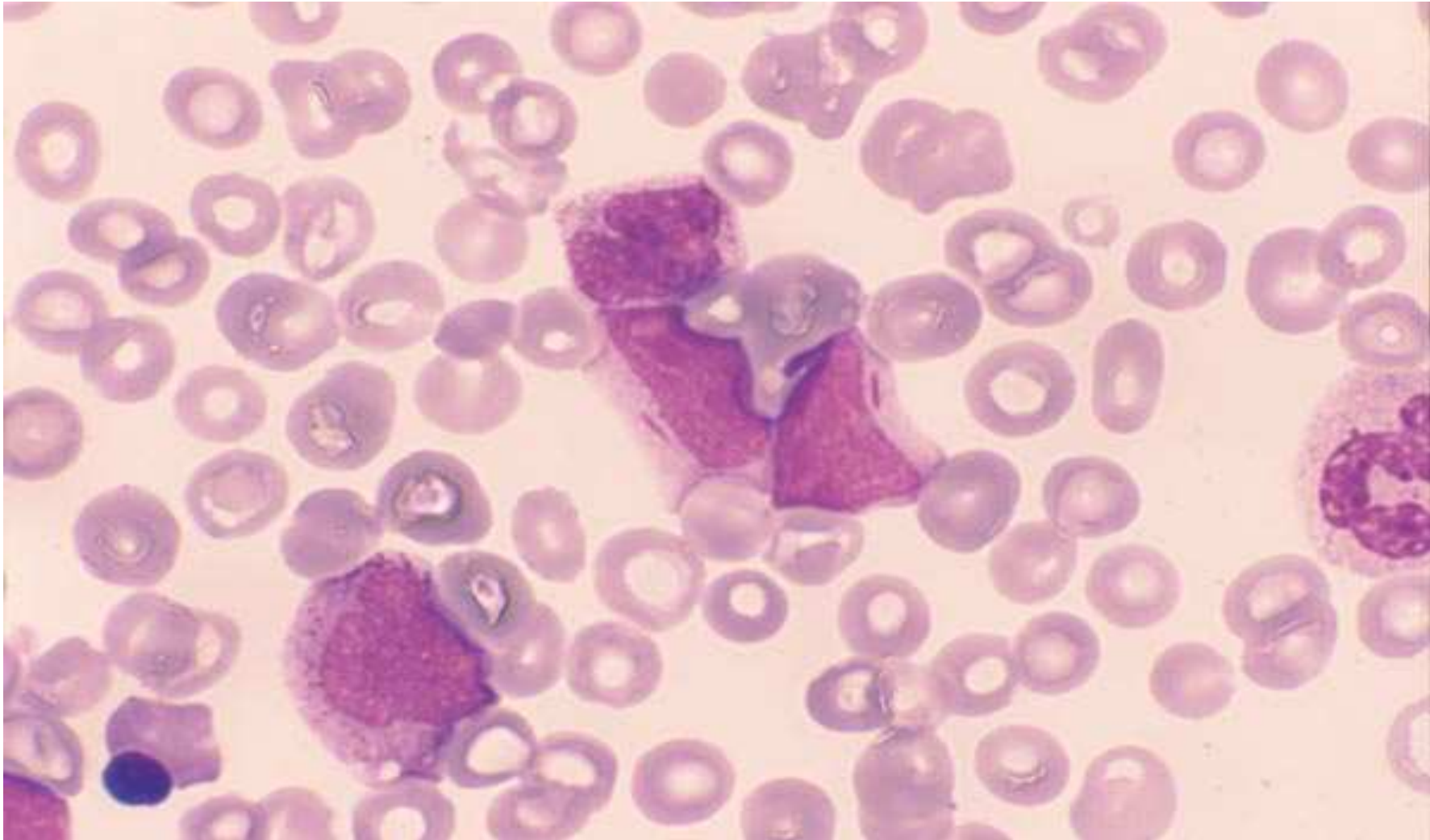
- **1- CBC:**
- - Anemia
- - Thrombocytopenia (platelet count given by automated hematology analyzers may be increased due to fragments of the leukemic blasts, which are counted as platelets).

- - **TWB count** is variable; it is **elevated** in more than half of patients and may exceed 100,000/ μL , but may also be **decreased**.
- - **Blasts** are usually present on blood smear but occasionally may be absent.
- *The only morphologic feature that absolutely confirms myeloid lineage is the presence of Auer rods.*

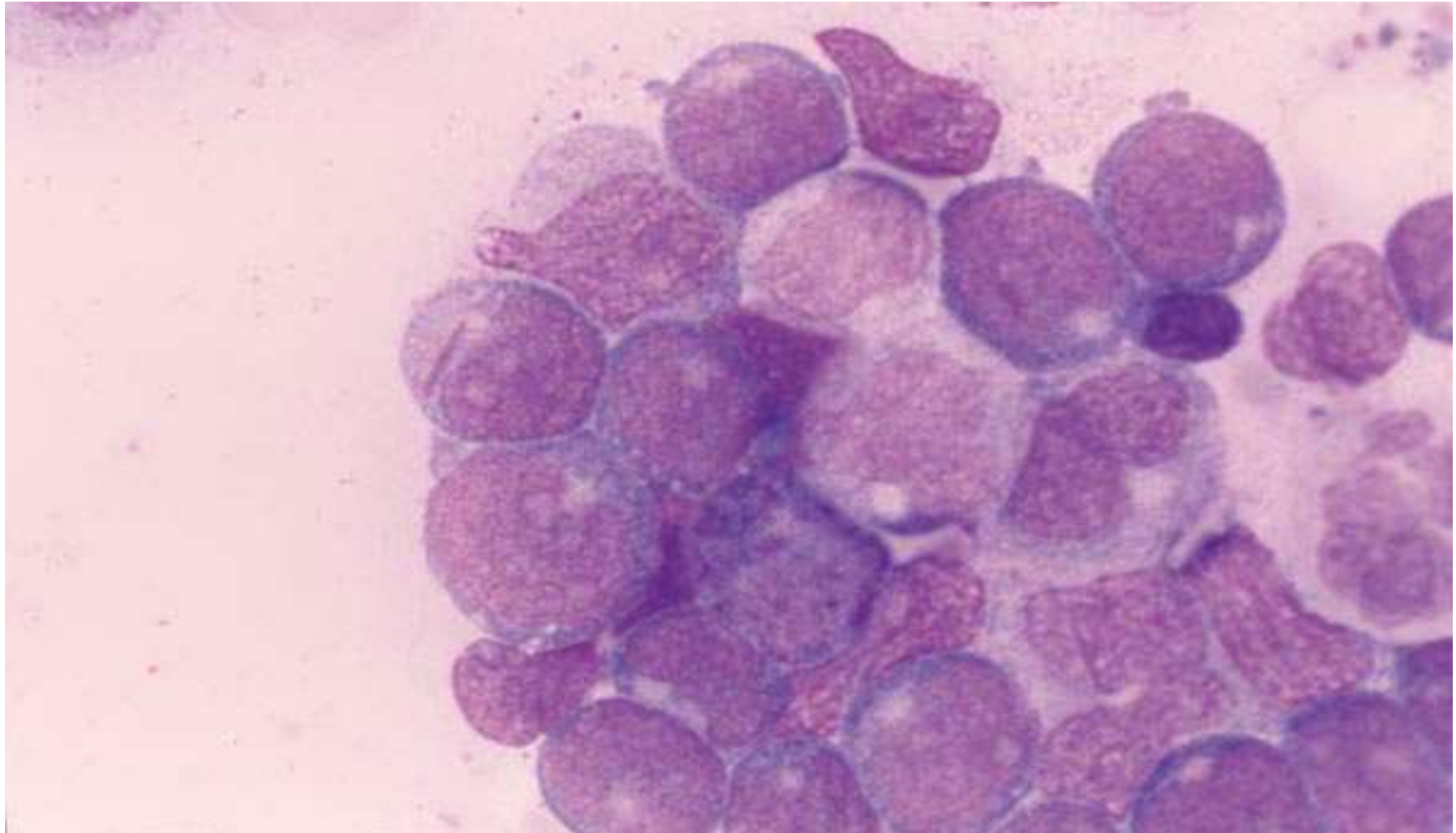
- **2- Bone Marrow:**

- The bone marrow is typically **hypercellular**, with a predominance of blasts or other immature cells.
- Normal hematopoietic precursors are decreased.

Acute myelogenous leukemia (AML) blood smear. The two cells in the center contain Auer rods



Acute myelogenous leukemia (AML) bone marrow aspirate. Note the prominent Auer rod in the cell on the edge of the cluster.



- **3- Cytochemistry:**
- - **Myeloperoxidase and/or Sudan black B: positive, except for the M0 subtype.**
- - **Naphthol ASD chloroacetate (“specific”) esterase: It is positive in AML with granulocytic differentiation.**
- - **Naphthyl butyrate (“nonspecific”) esterase: It may be positive in AML with monocytic differentiation.**

- **4-Immunophenotyping:**
- It is most useful in identifying myeloid lineage and distinguishing between AML and ALL (based on cell markers).
- **5- Cytogenetics:**
- It is critical in the **diagnosis** and **treatment** of **AML**.
- Chromosomal abnormalities can be divided into reciprocal translocations and alterations in chromosome number.

THANK YOU

