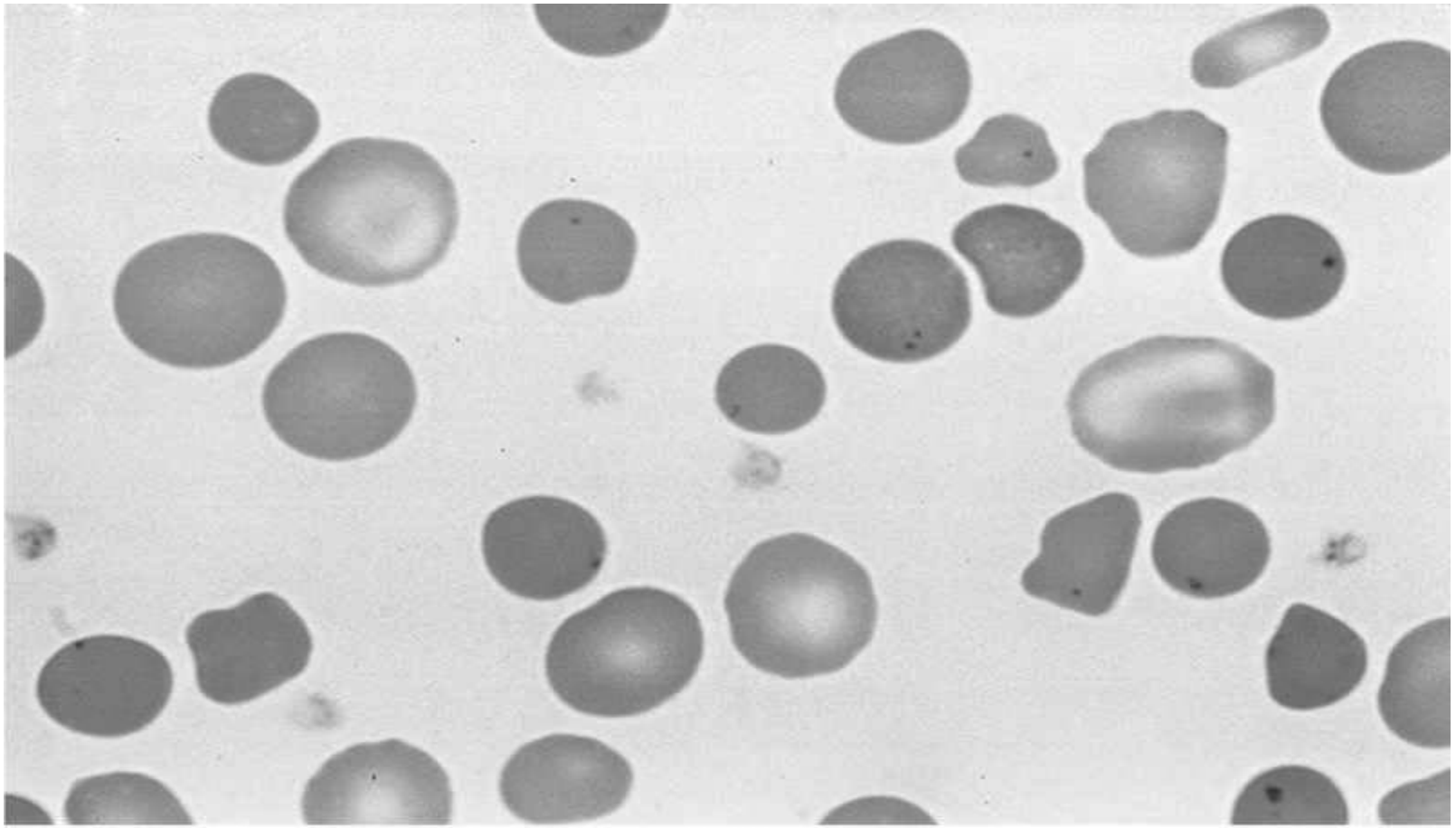
Hematopathology Lab

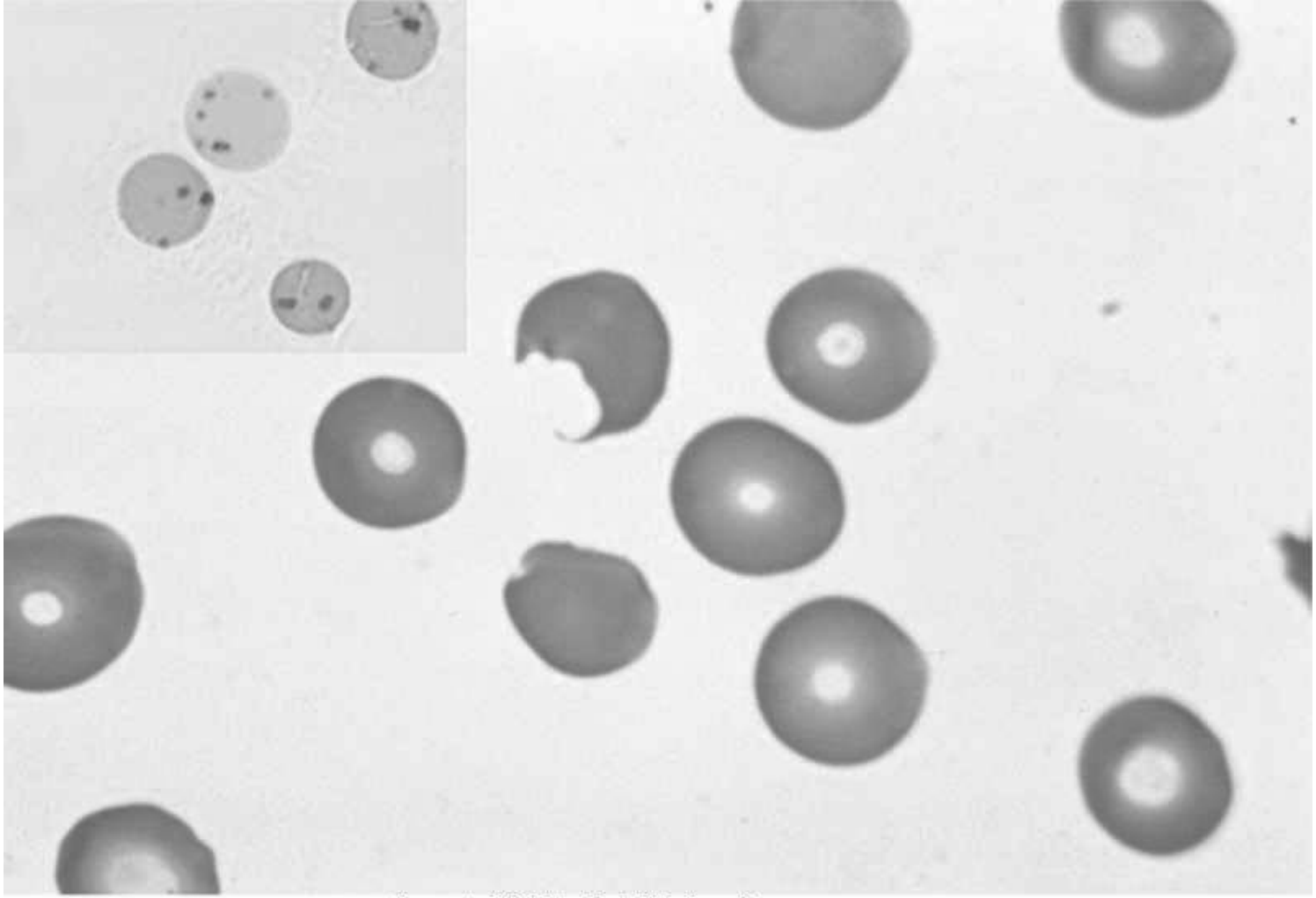
Third year medical students

Objectives

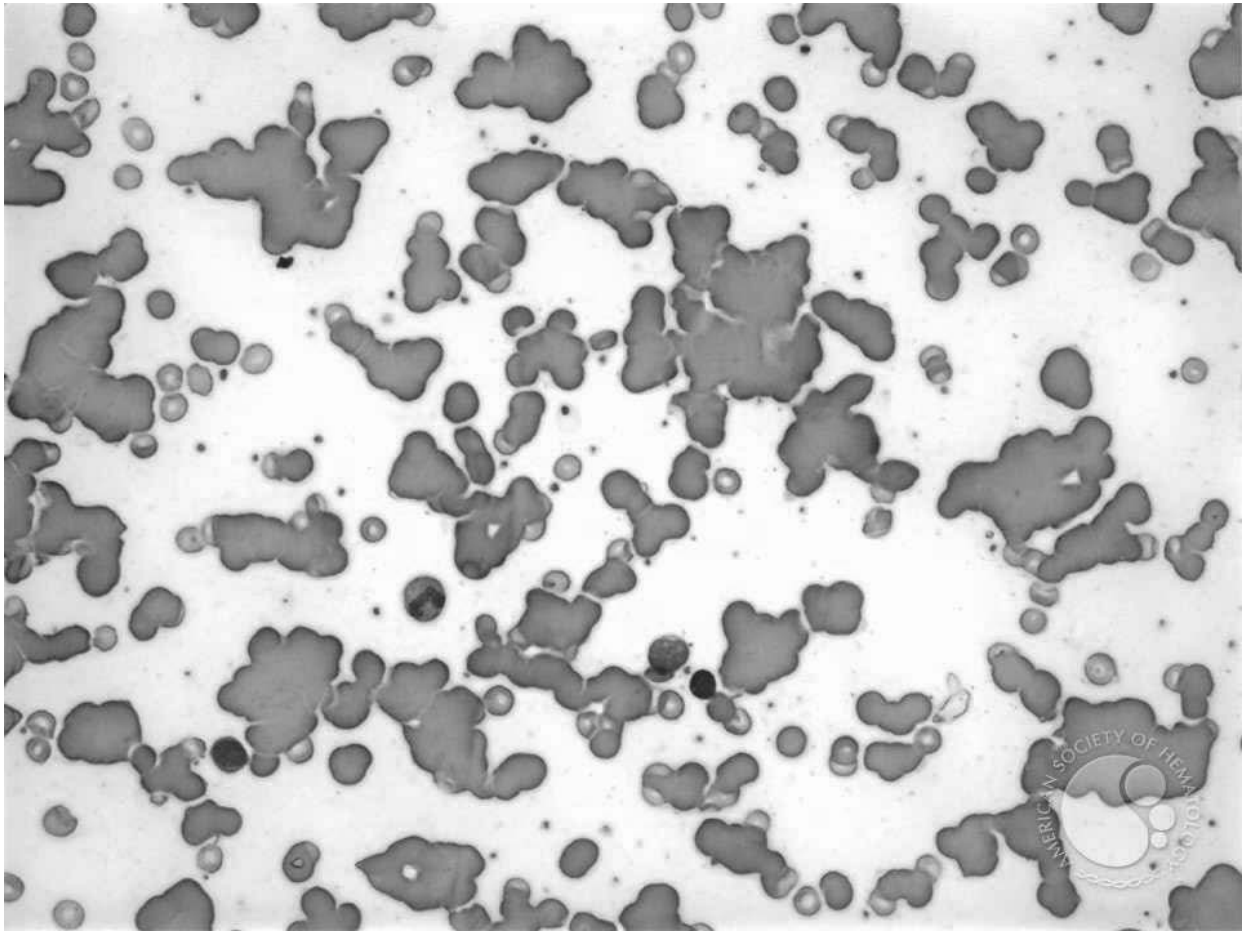
- Identify the lesion
- Know the specific name of the lesion
- Know associated disease
- Know relevant pathologic background



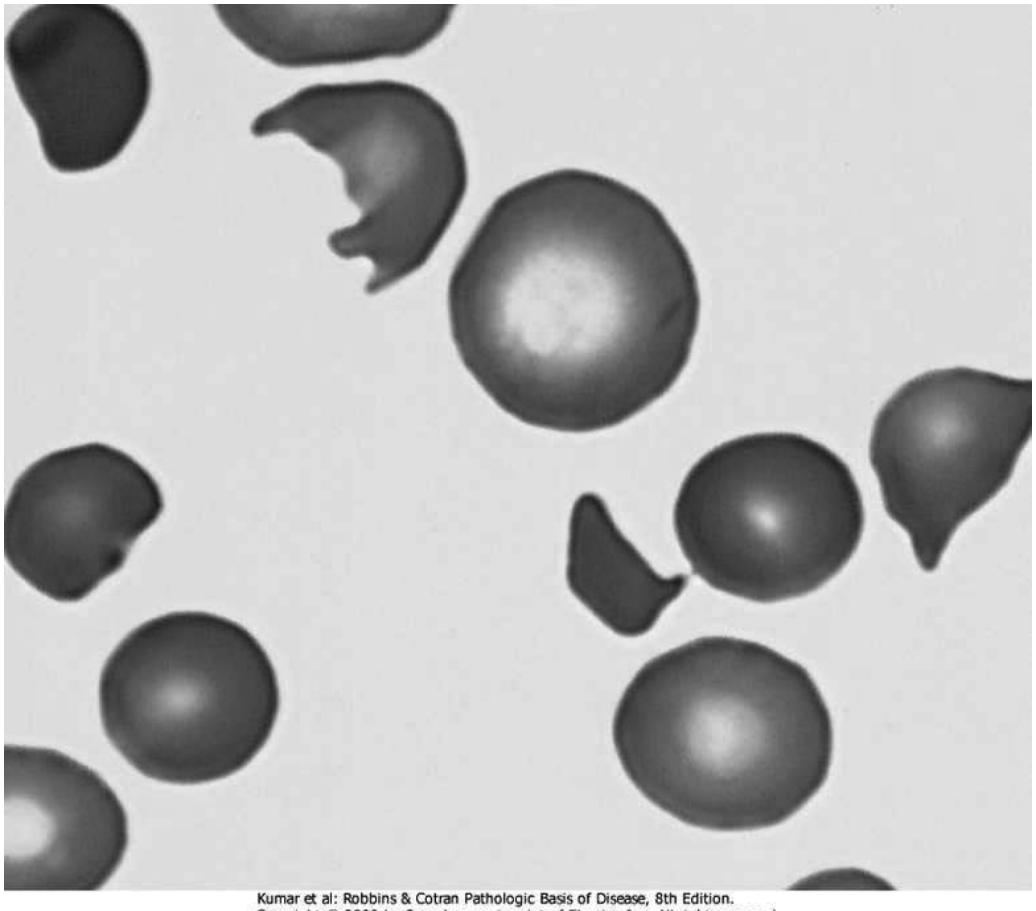
- Spherocytes: appear small, round hyperchromatic RBCs (no central pallor). Occur in HS and autoimmune hemolytic anemia
- Howel Jolly bodies: appear as few small dark eccentric dots. Remnants of DNA. Post splenectomy



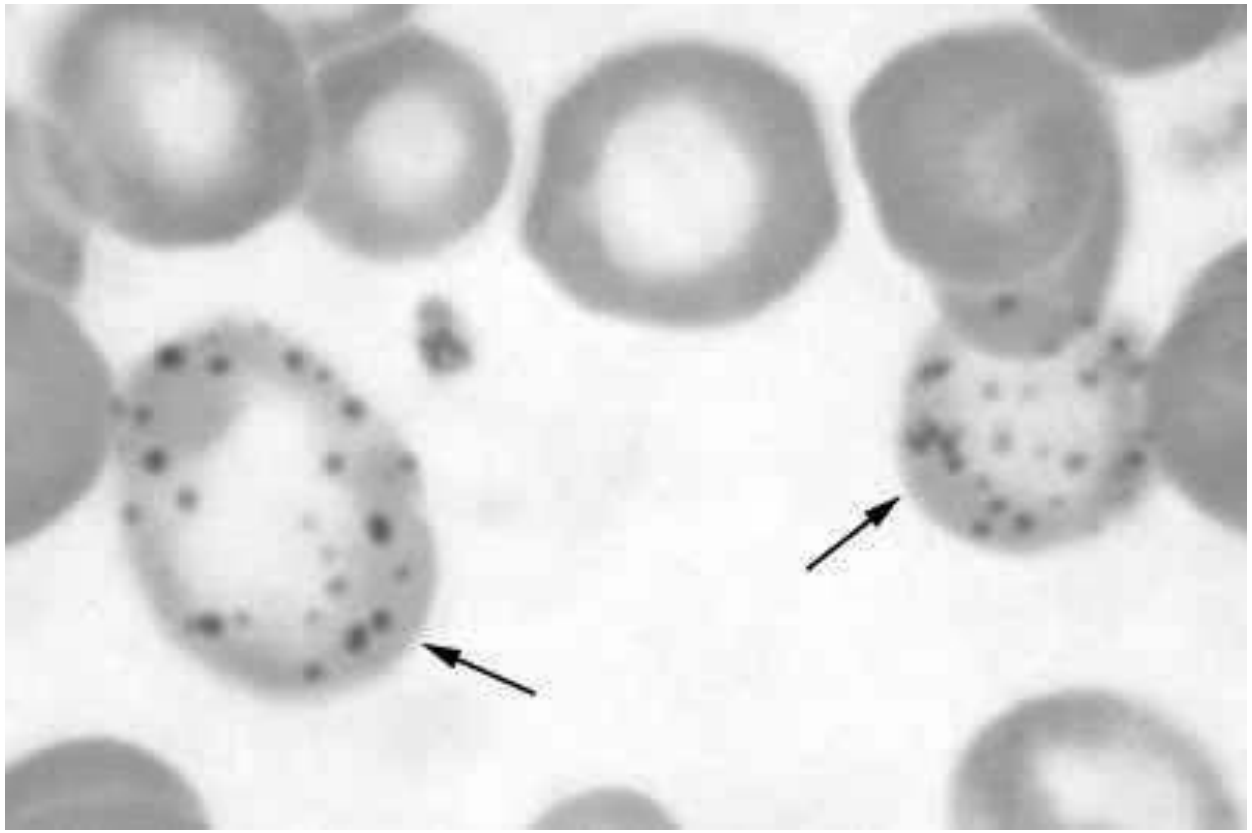
- Bite cell: part of RBC is indented. G6PD deficiency
- Crystal violet stain: detects Heinz bodies; clumped hemoglobin molecules secondary to G6PD deficiency



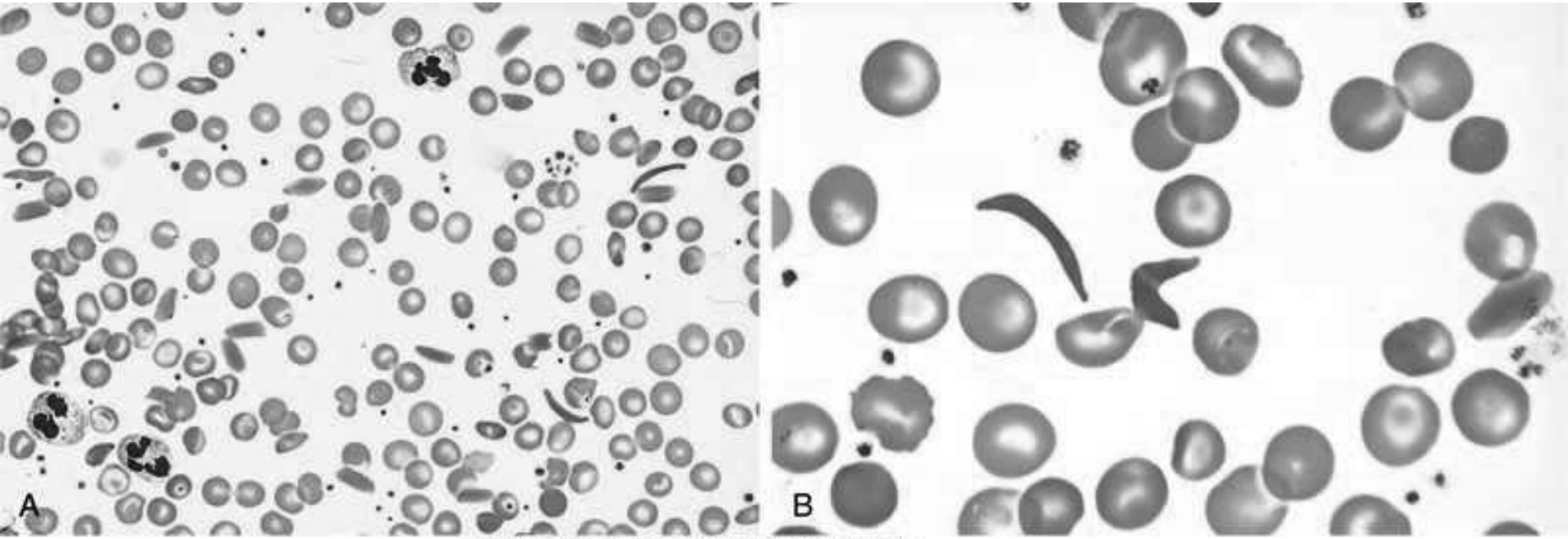
- RBC agglutination: irregular clumps of RBCs. Autoimmune hemolytic anemia.



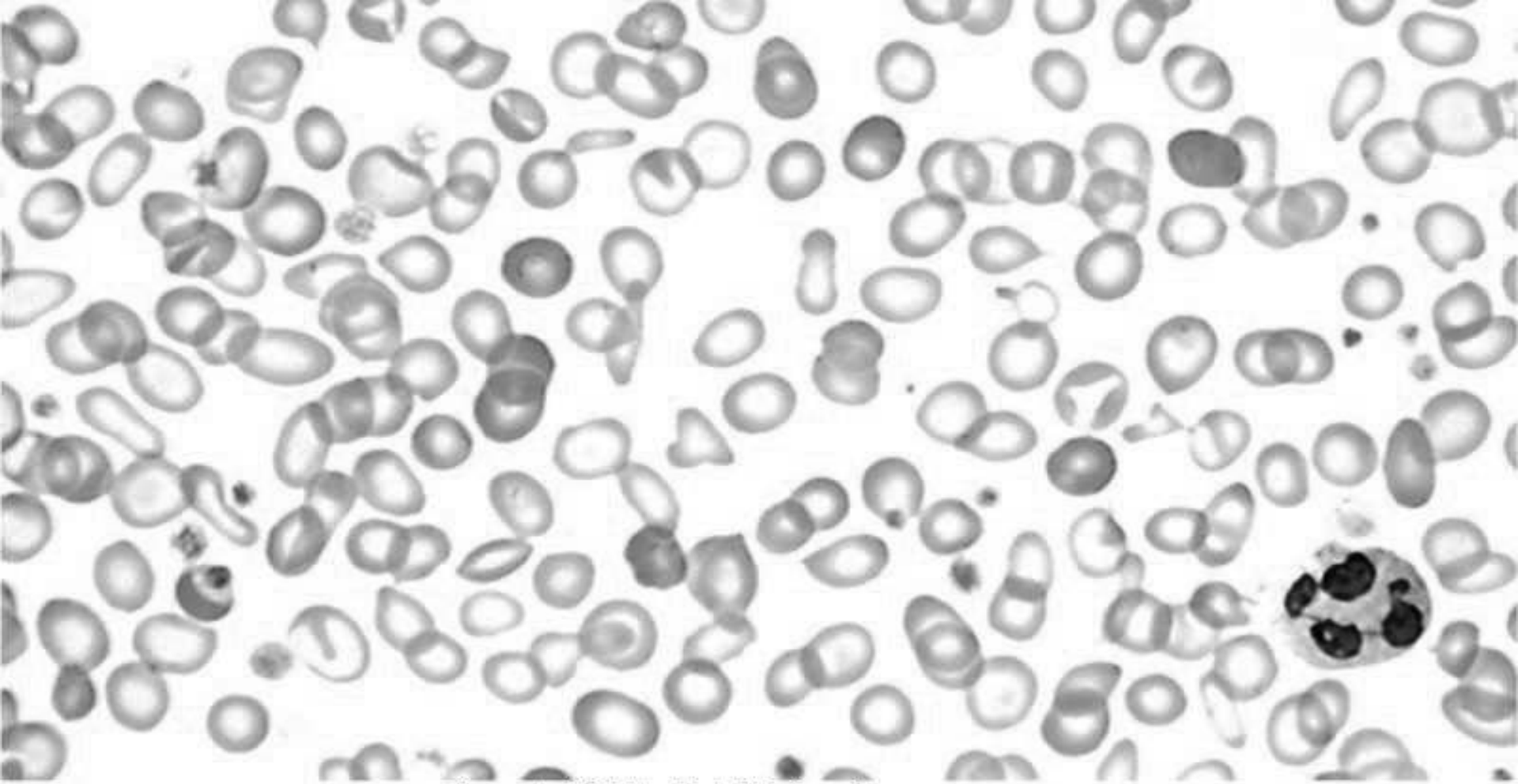
- Schistocytes: fragmented RBCs, appear as torn, irregular & different shapes. Occu in microangiopathic hemolytic anemias, physical trauma to RBCs (cardiac valves, repetitive mechanical trauma)



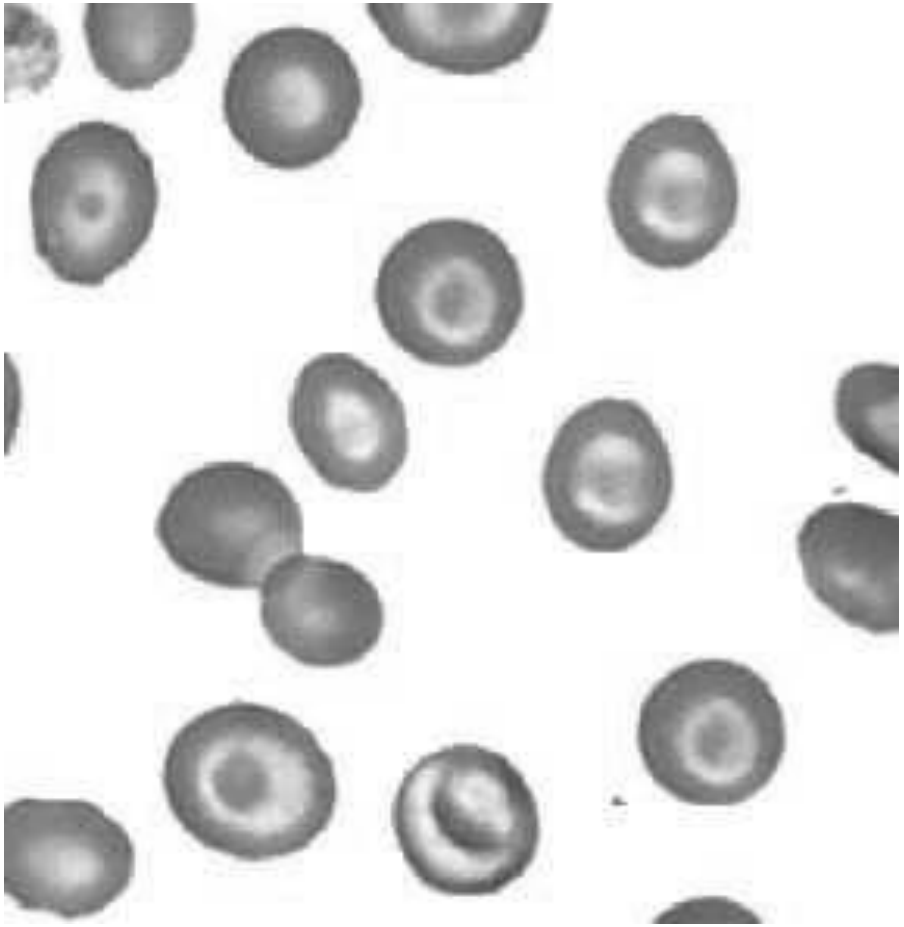
- Basophilic stippling: punctate bluish dots, ribomosomal structures, appear in thalassemia



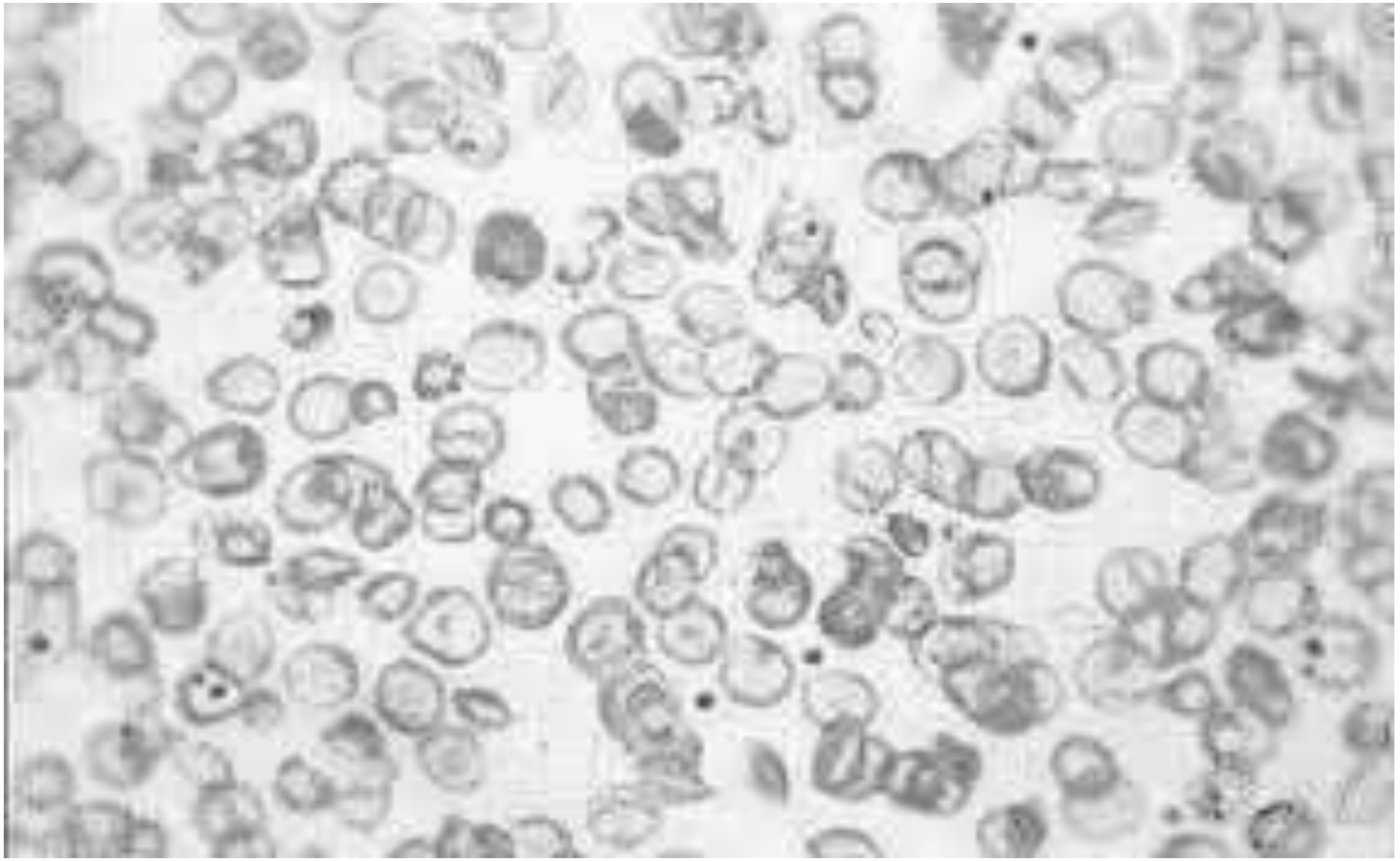
- Sickle cells appear as curved cylinders, represent irreversibly sickled RBCs. Appear in sickle cell anemia



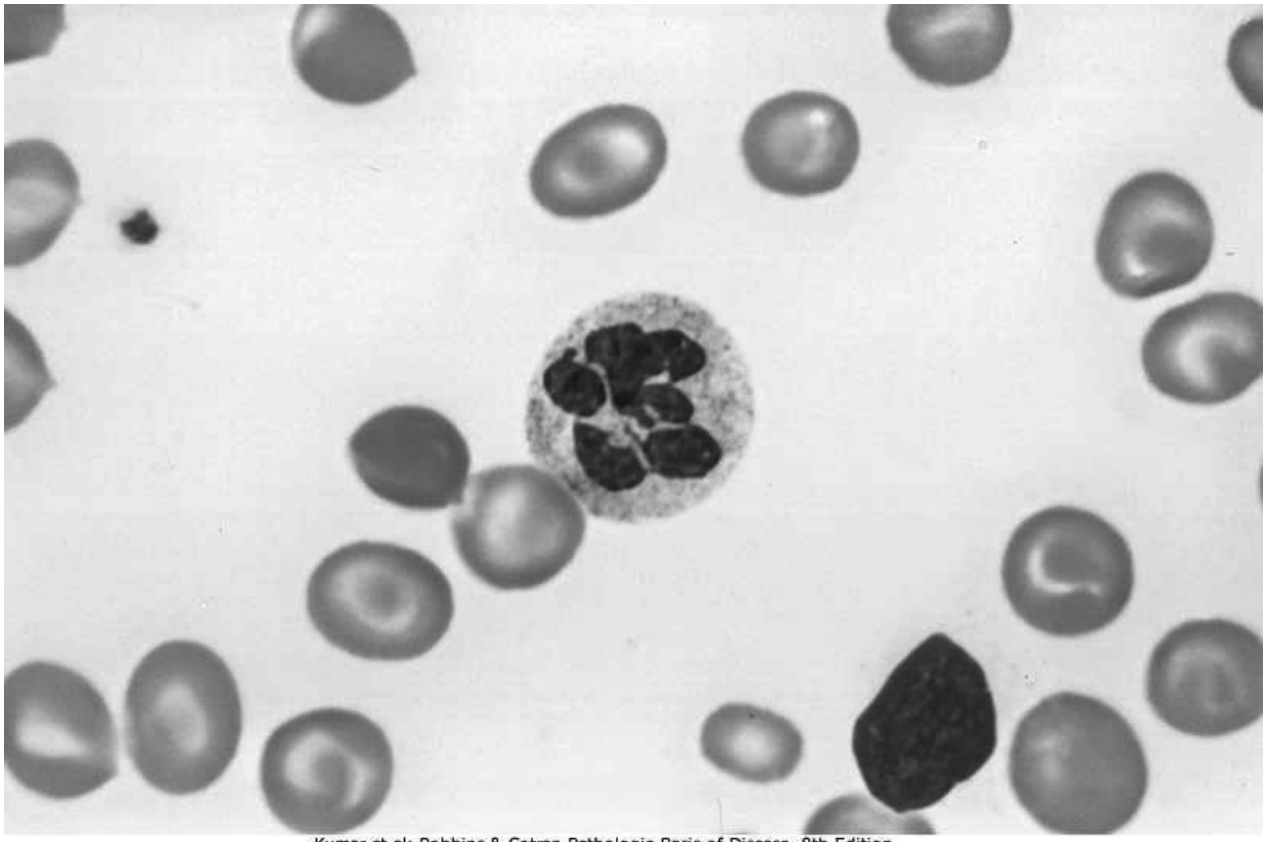
- Hypochromic microcytic anemia: RBCs appear small & pale (central pallor >1/3), occur in thalassemia and iron deficiency anemias (IDA)
- In IDA: other abnoraml shapes appear (poikelocytosis), causing high RDW



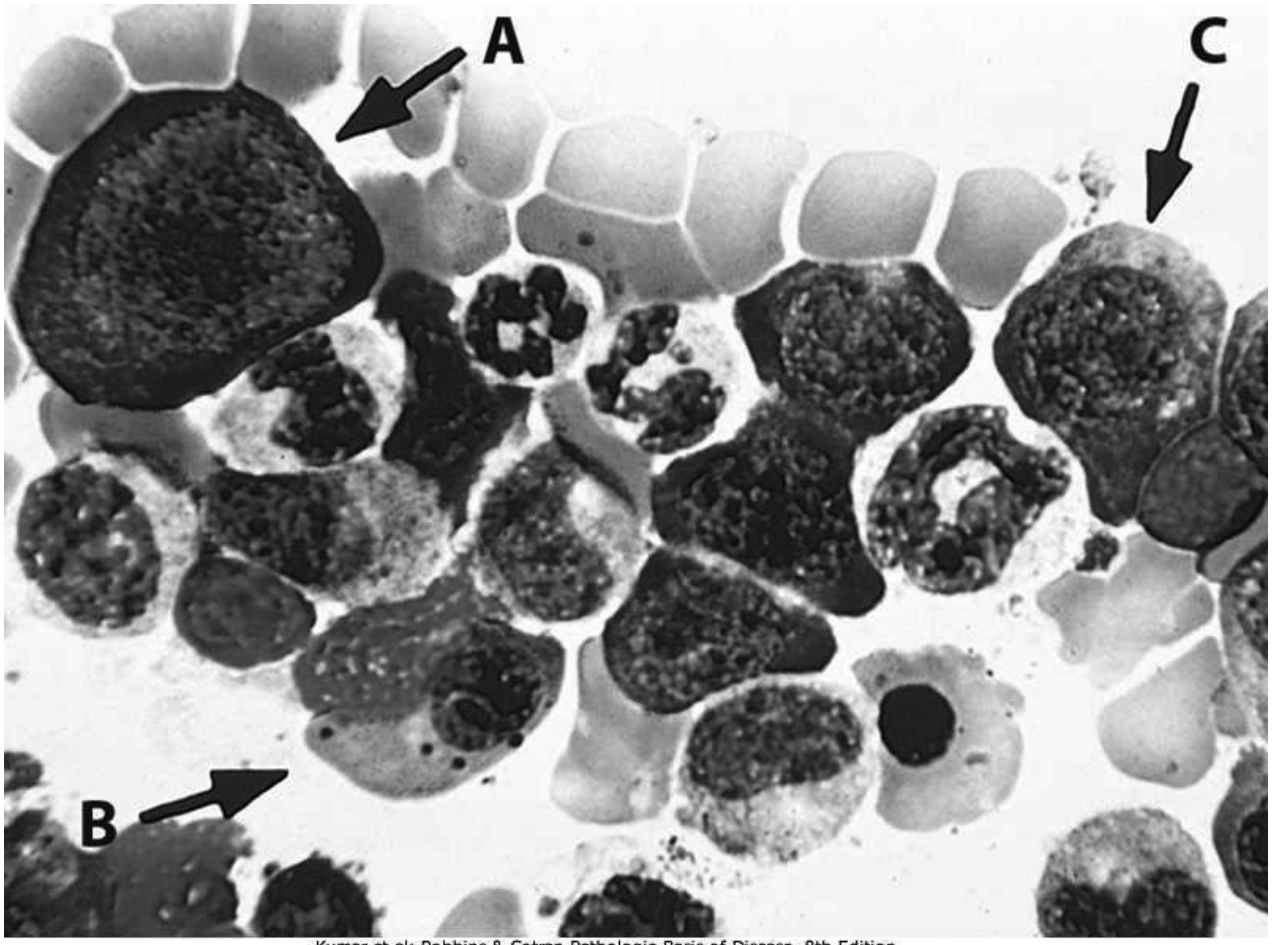
- Target cells: the central pallor show a red dot. Non-specific finding, appear in IDA, thalassemia and sickle cell anemia



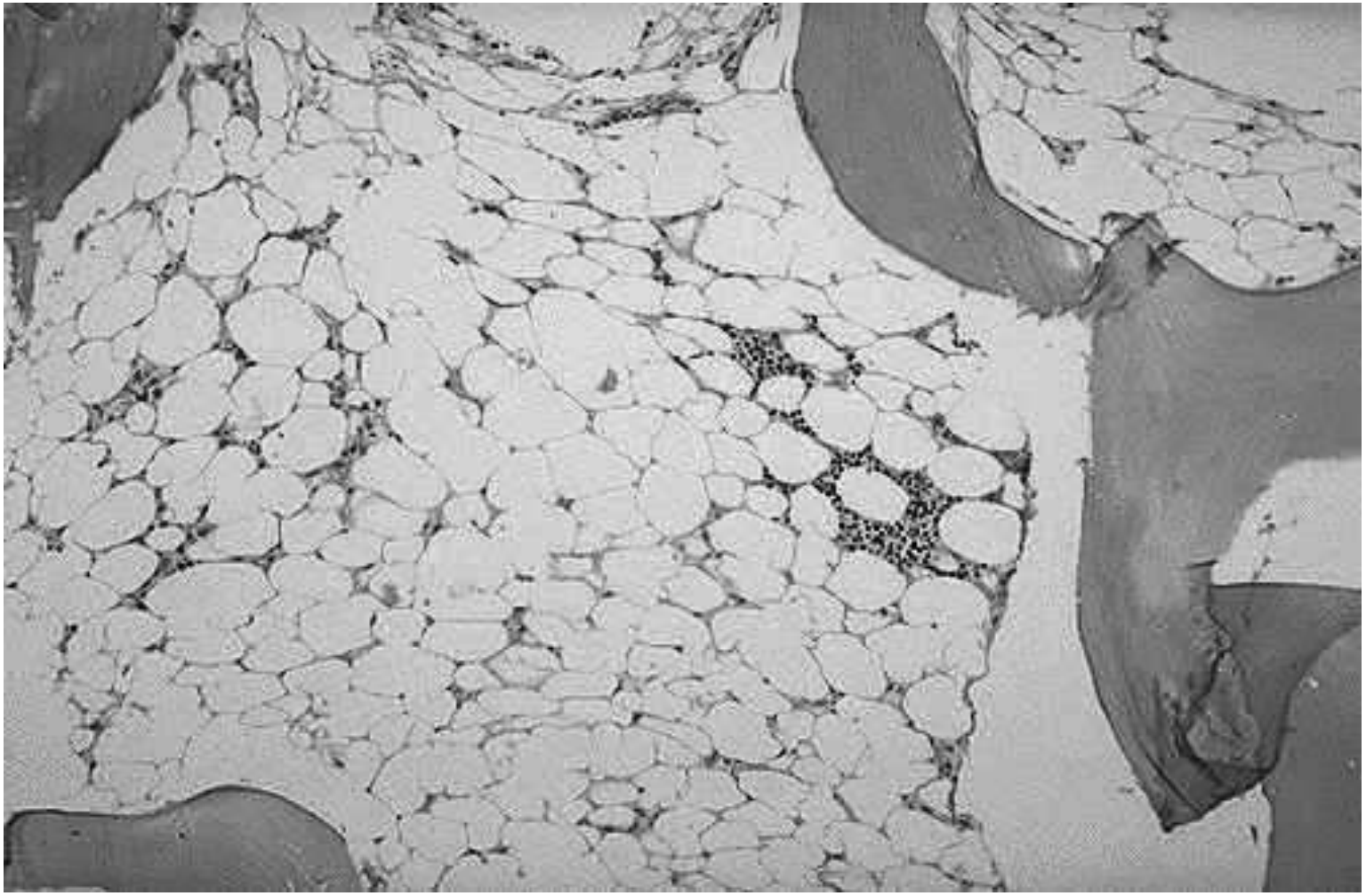
- Hypochromic microcytic anemia with few target cells: the RBCs are generally monomorphic, signifying thalassemia



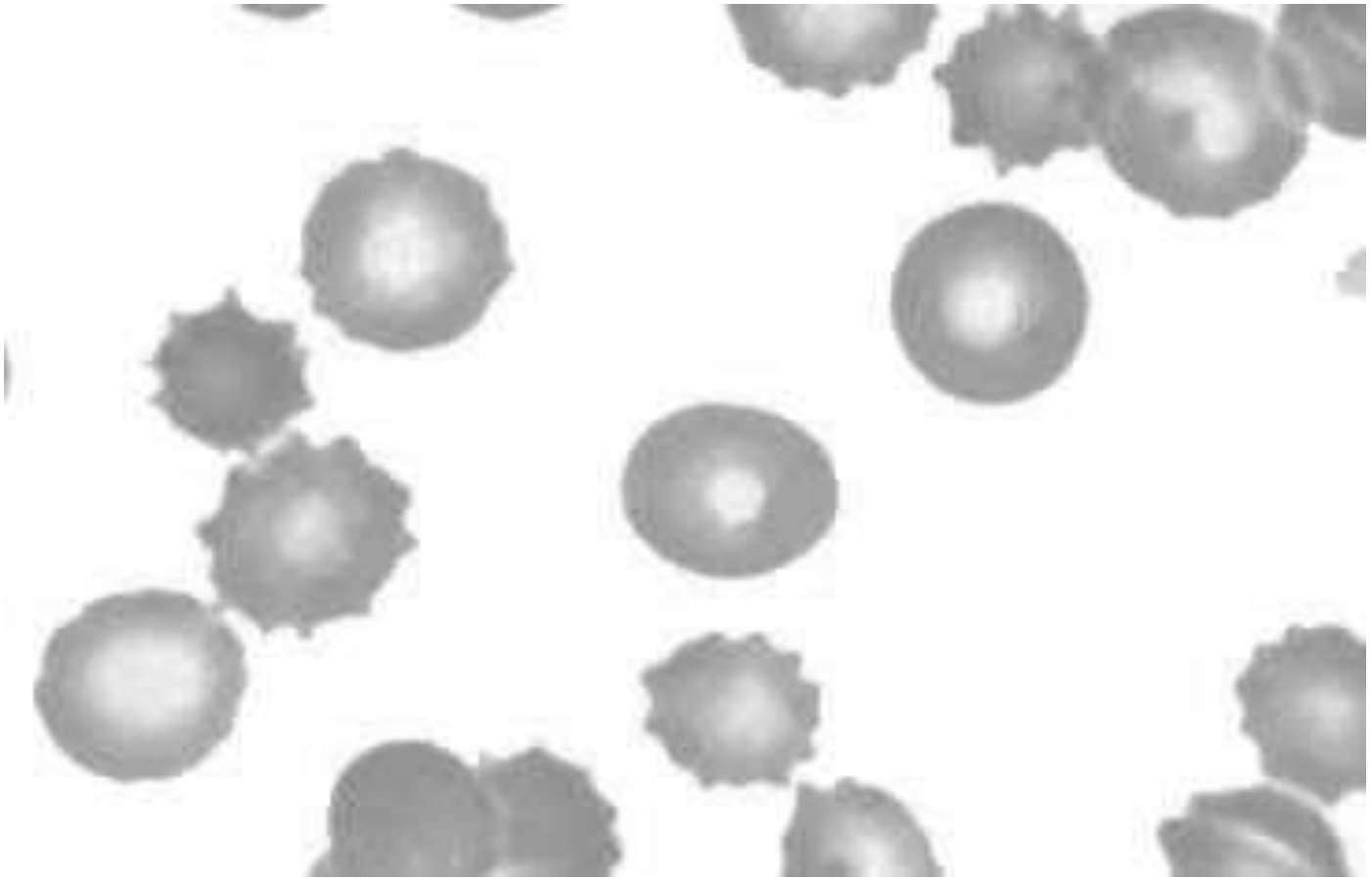
- Hypersegmented neutrophil: number of nuclear lobes > 4, appear in megaloblastic anemia



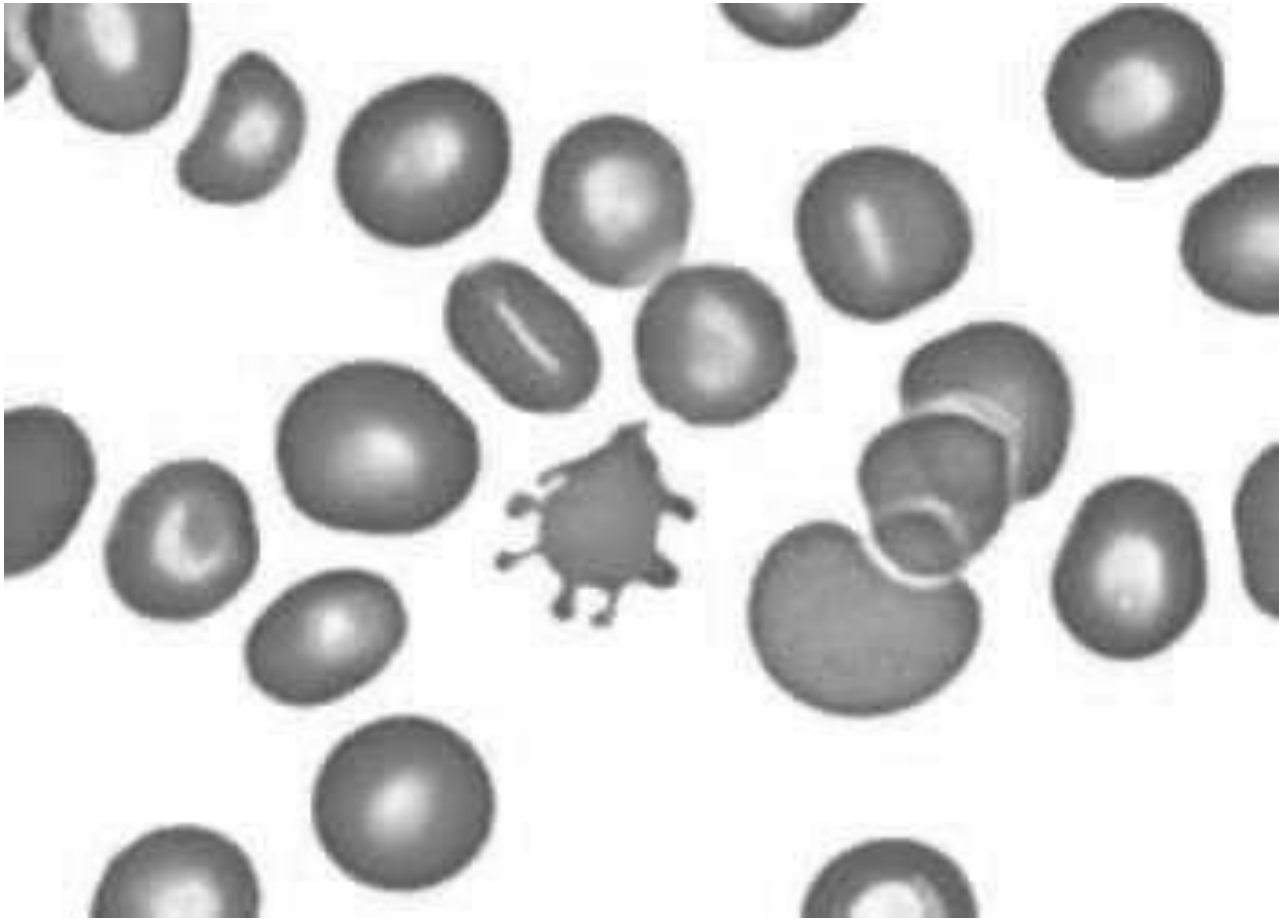
- Megaloblastic change in erythroid precursors: appear larger with a pale nucleus, megaloblastic anemia



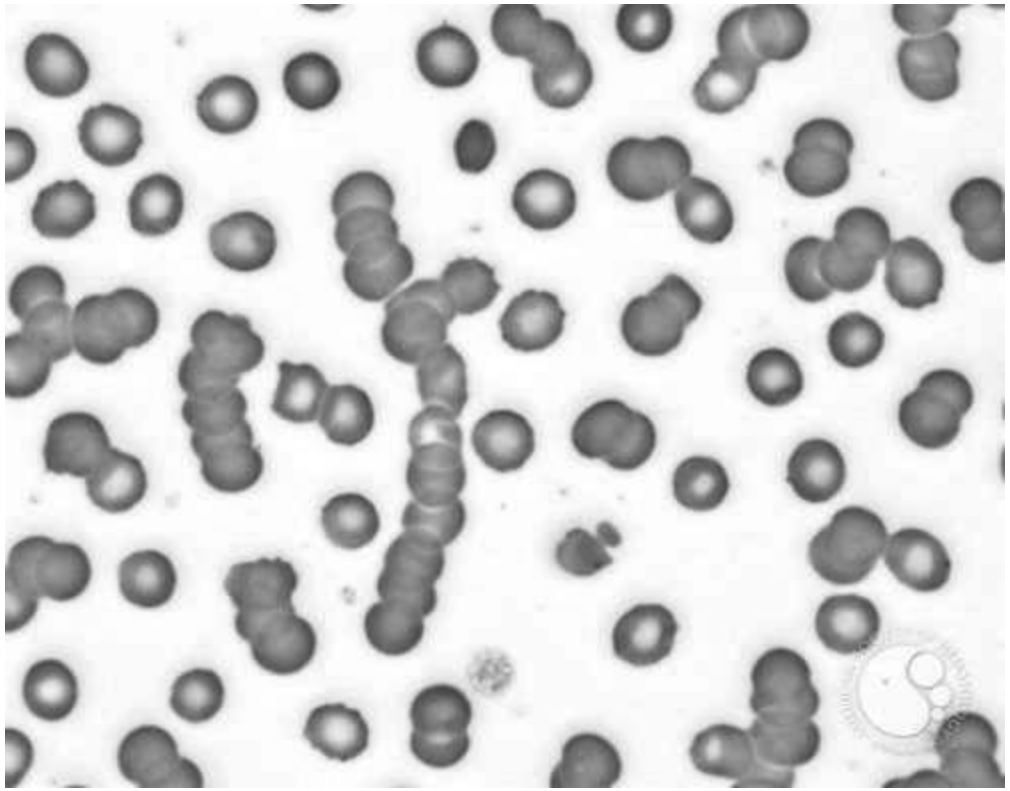
- Aplastic anemia: Bone marrow spaces are mostly occupied by fat. Hematopoietic cells are markedly decreased



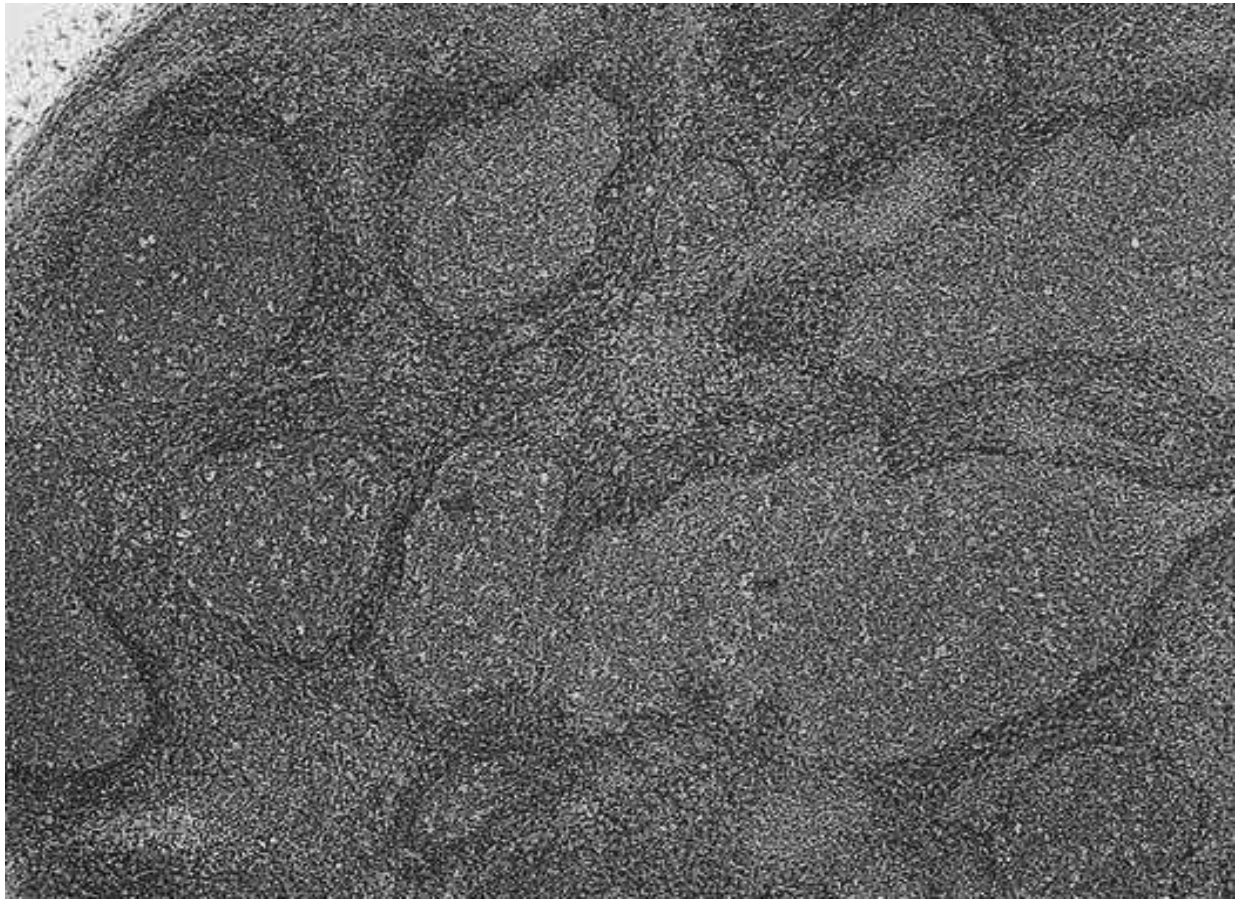
- Echinocytes (Burr cells): circumferential small monomorphic projections that are evenly spaced . Appear in chronic renal failure



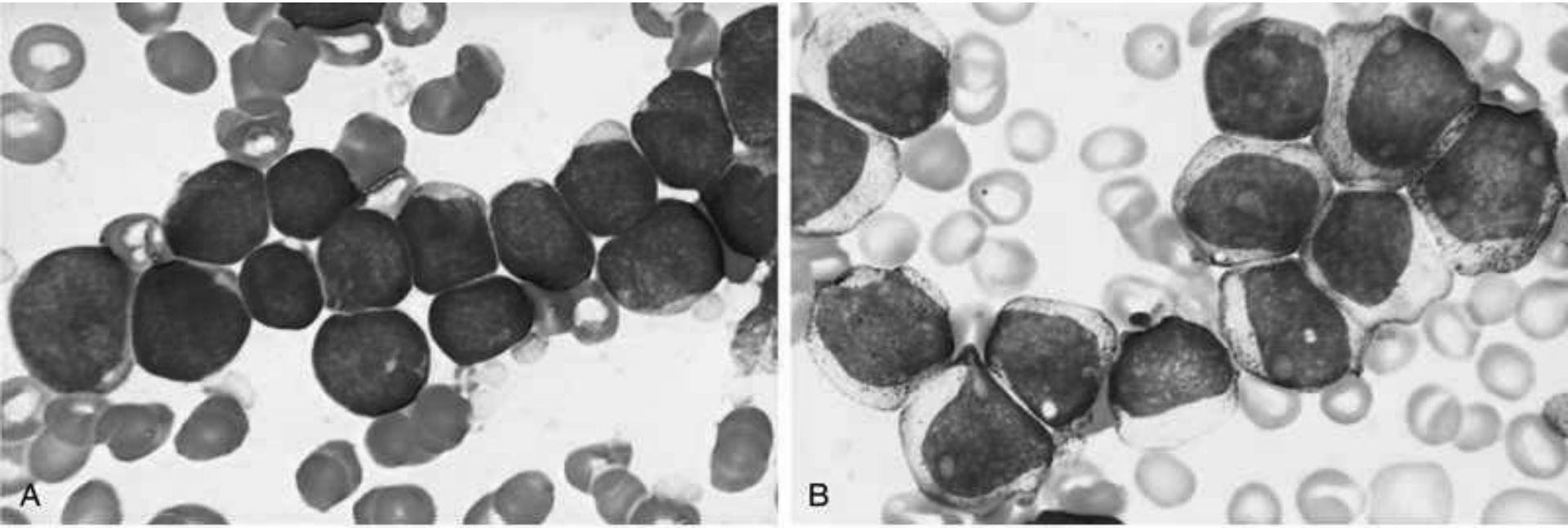
- Acanthocyte (Spur cell): long membrane projections that are dissimilar and unevenly distributed. Seen in hypercholesterolemia disorders, notably chronic liver diseases



- Rouleaux formation: RBCs are stacked in a linear pattern secondary to M-protein in the blood. Occurs in plasma cell myeloma



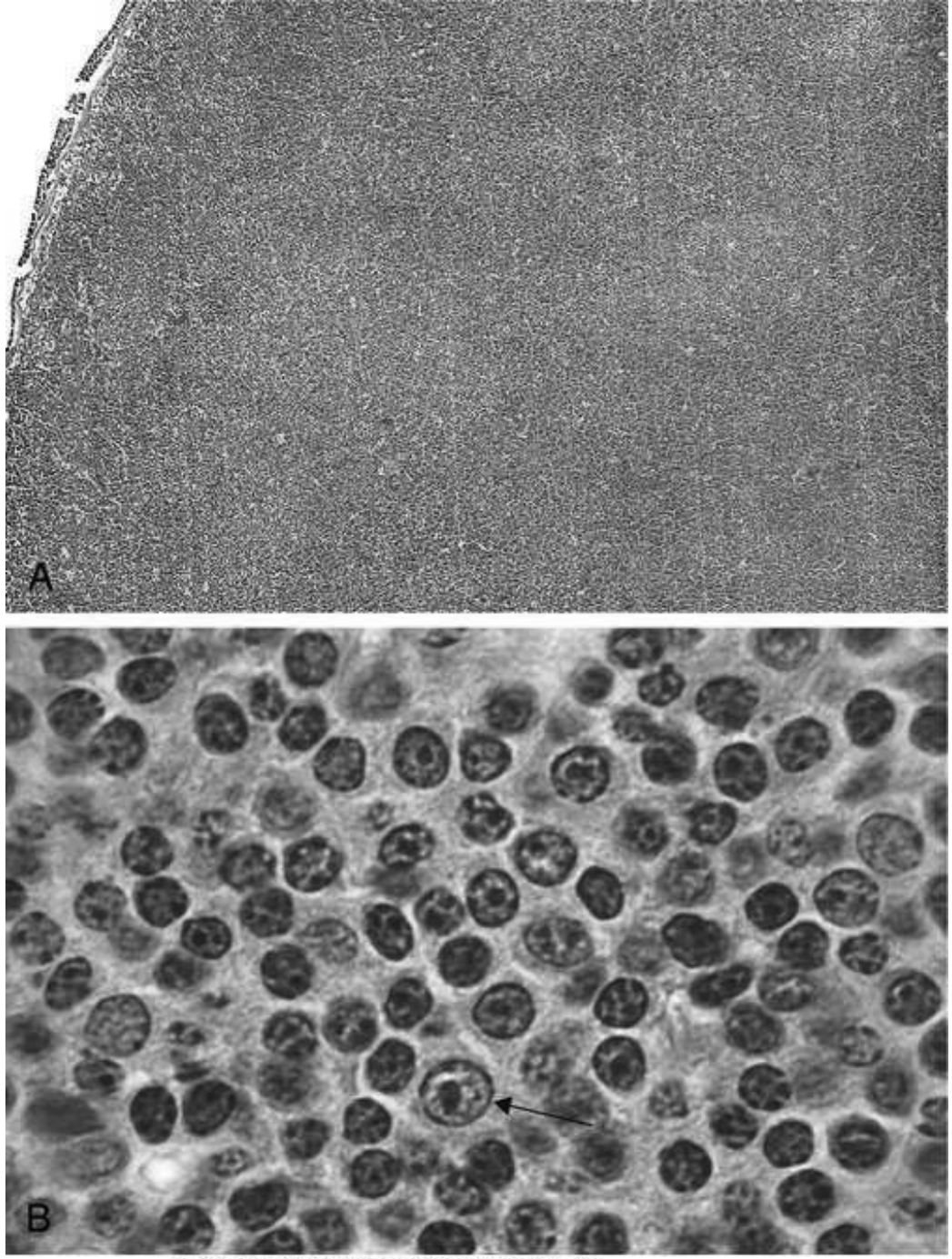
- Reactive follicular hyperplasia: note the enlarged follicles, variable sizes and shapes. The lymph node is enlarged. Seen in rheumatologic diseases, HIV and toxoplasmosis



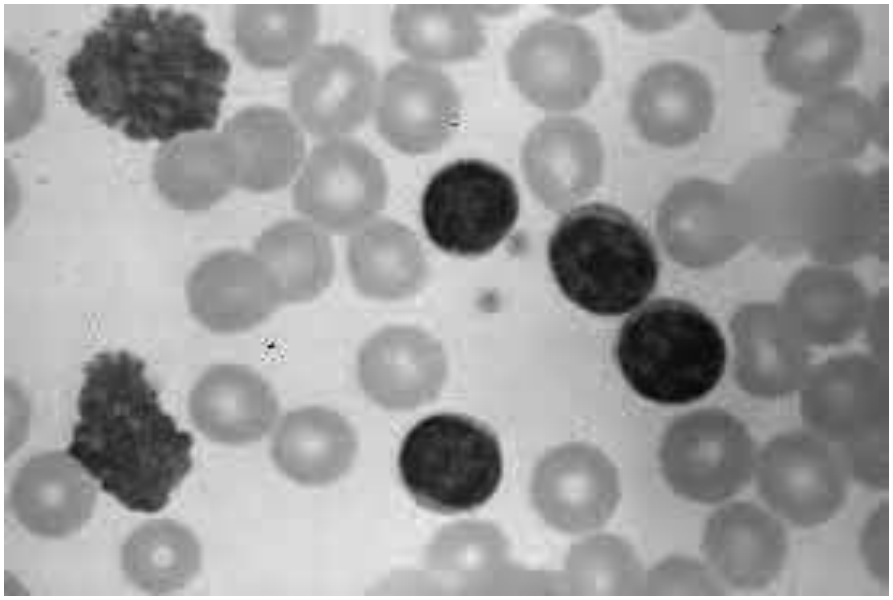
- Morphology: lymphoblasts (left) have fine chromatin, minimal agranular cytoplasm compared to myeloblasts (right) which have more abundant cytoplasm, some cytoplasmic granularity and prominent nucleoli

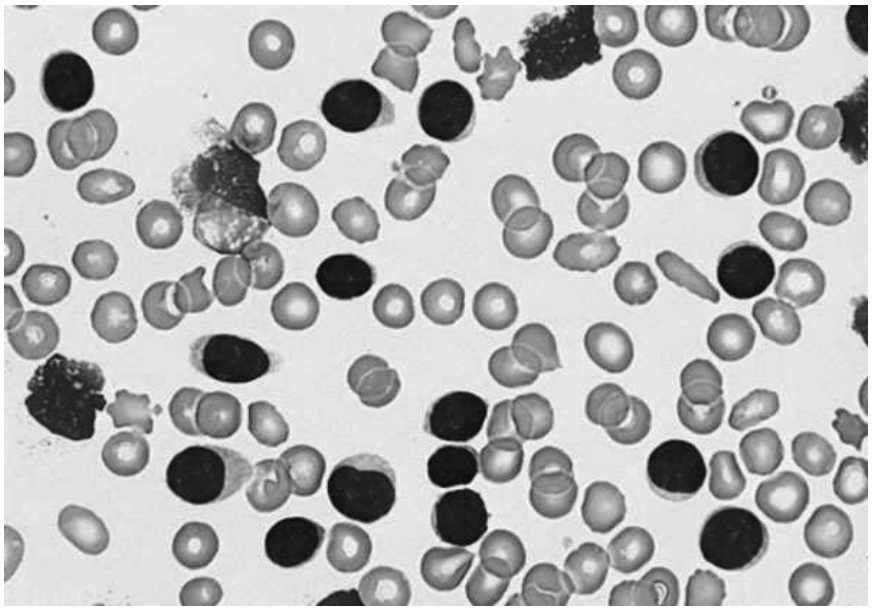
Small lymphocytic lymphoma:

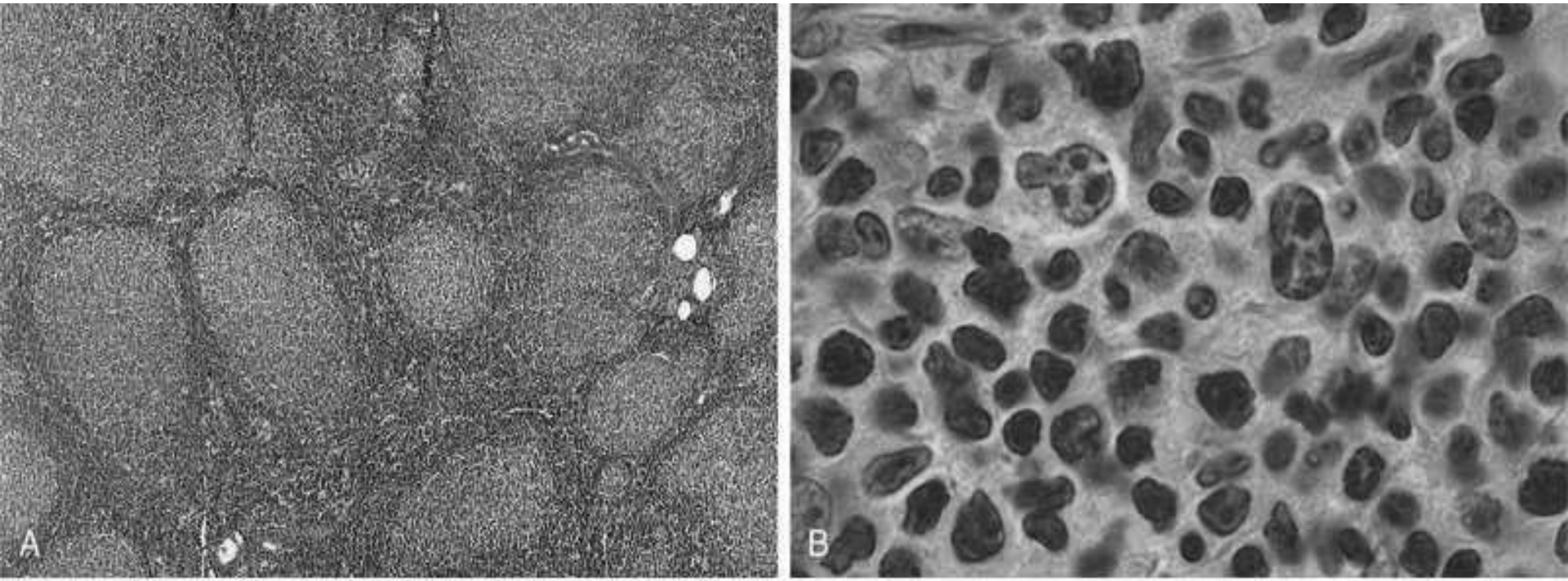
- A: Low-power view shows diffuse effacement of nodal architecture.
- B, At high power, a majority of the tumor cells have the appearance of small, round lymphocytes. A "prolymphocyte," a larger cell with a centrally placed nucleolus



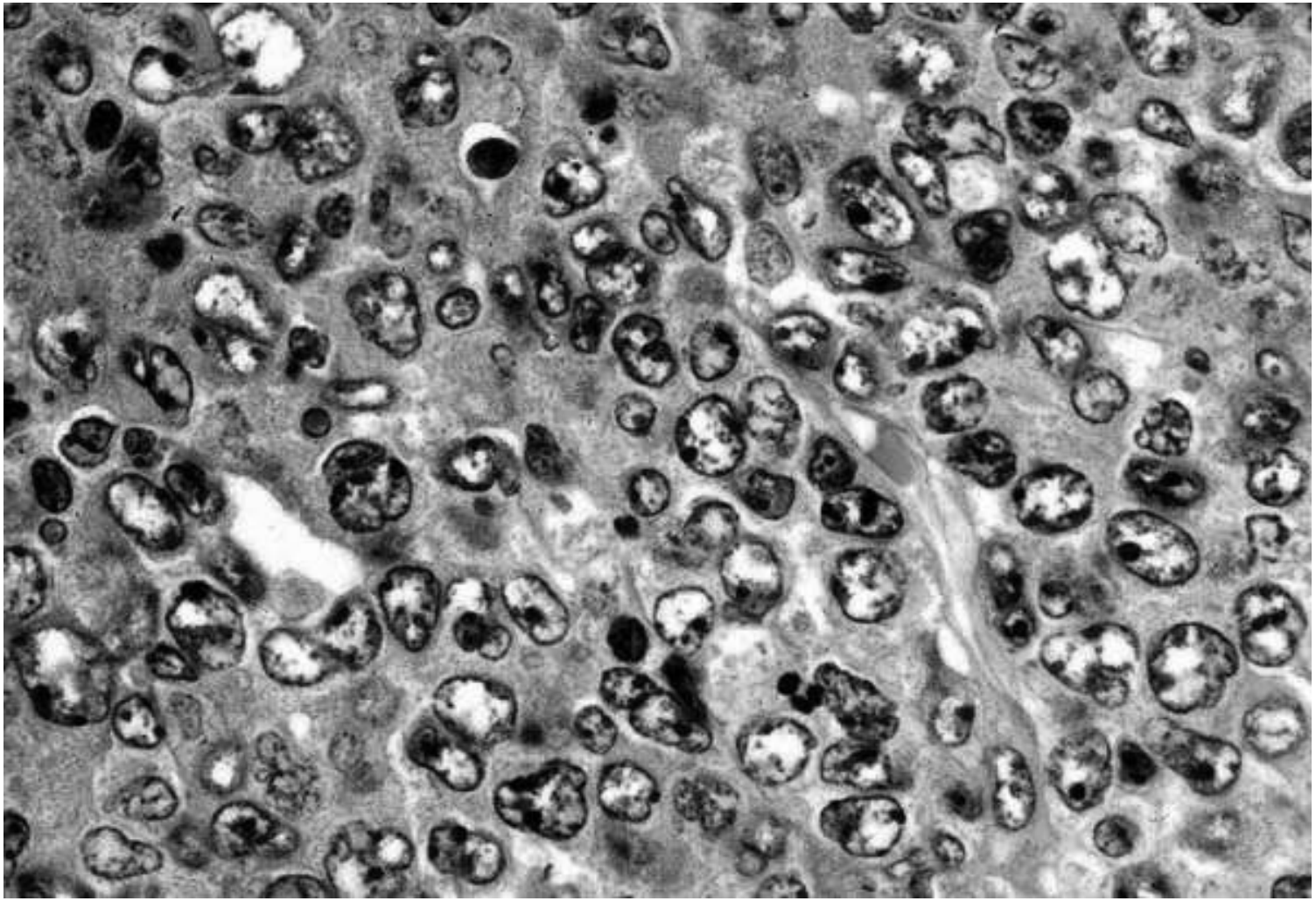
- CLL: Peripheral blood shows increased lymphocytes, appear small and mature similar to normal lymphocytes. Burst “smudge” cells are commonly seen



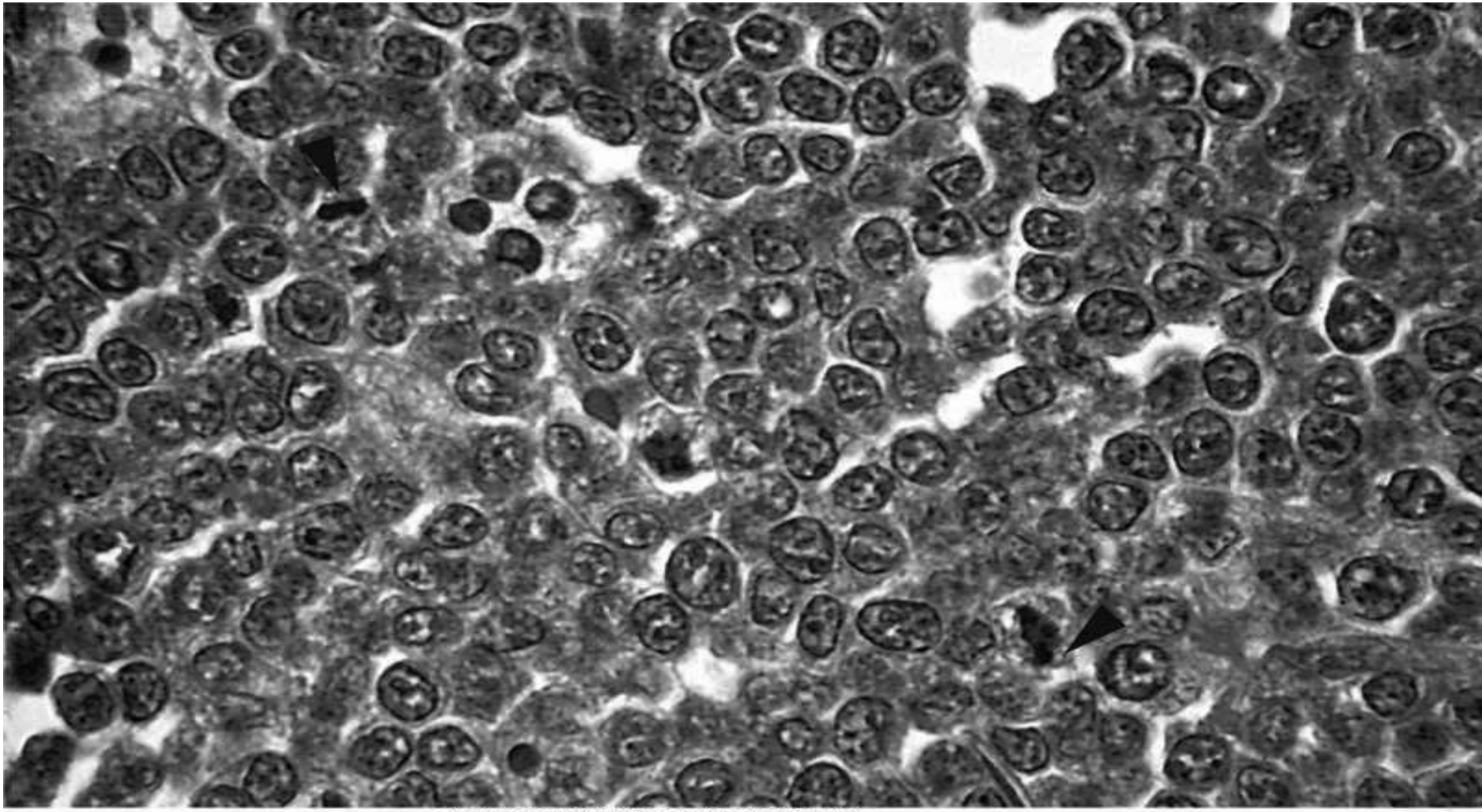




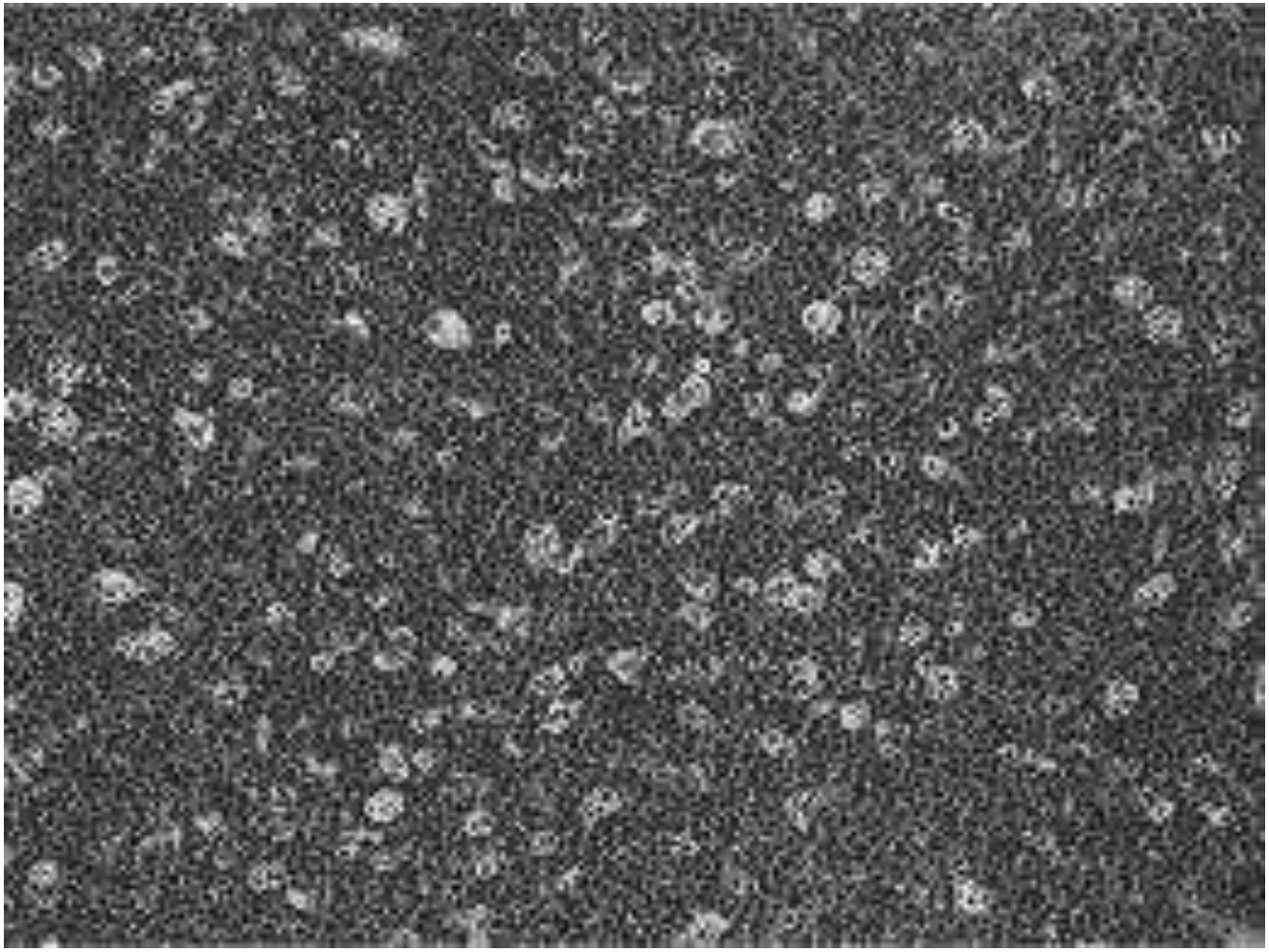
- Follicular lymphoma: **A,** Nodular aggregates of lymphoma cells are present throughout **B,** At high magnification, small lymphoid cells with condensed chromatin and irregular or cleaved nuclear outlines (centrocytes) are mixed with a population of larger cells with nucleoli (centroblasts)



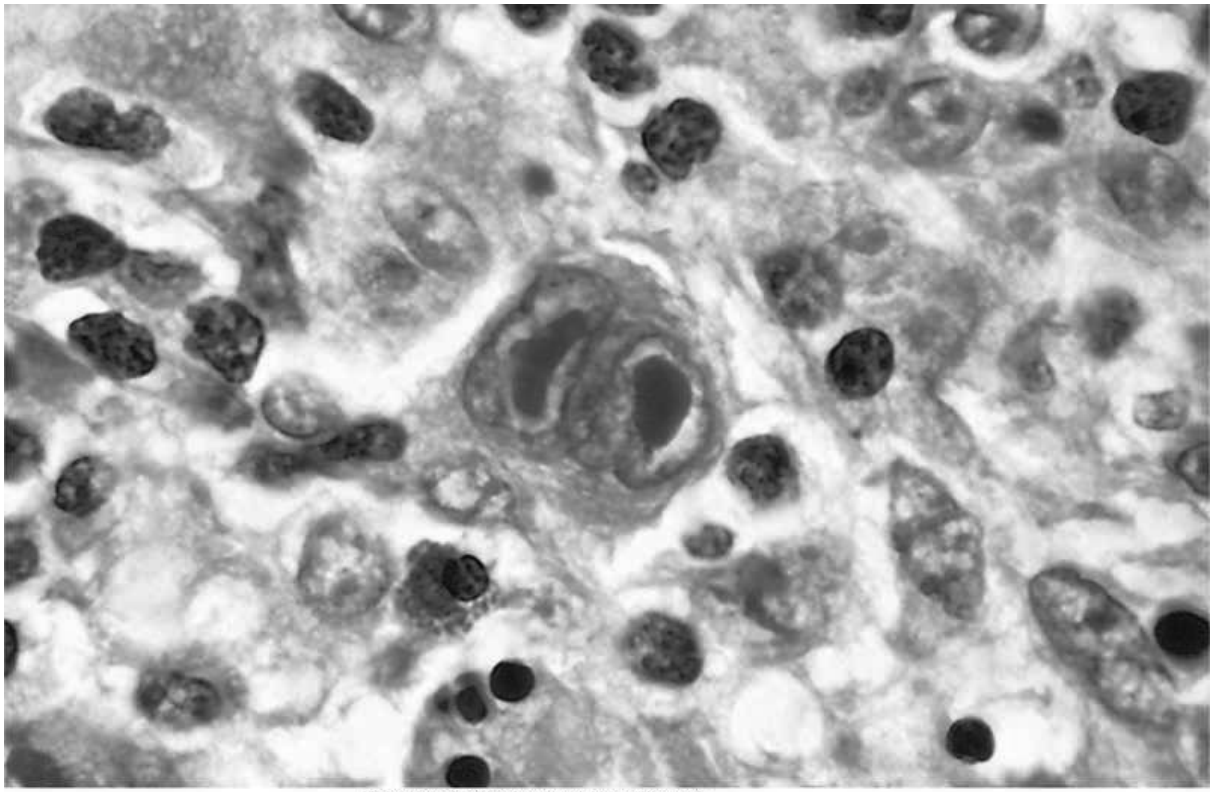
- DLBCL: lymphoma cells have large nuclei (>2x normal lymphocyte size) with open chromatin and prominent nucleoli



Burkitt lymphoma (High power view): The tumor cells and their nuclei are fairly uniform and intermediate in size, giving a monotonous appearance high level of mitotic activity (*arrowheads*) and prominent nucleoli

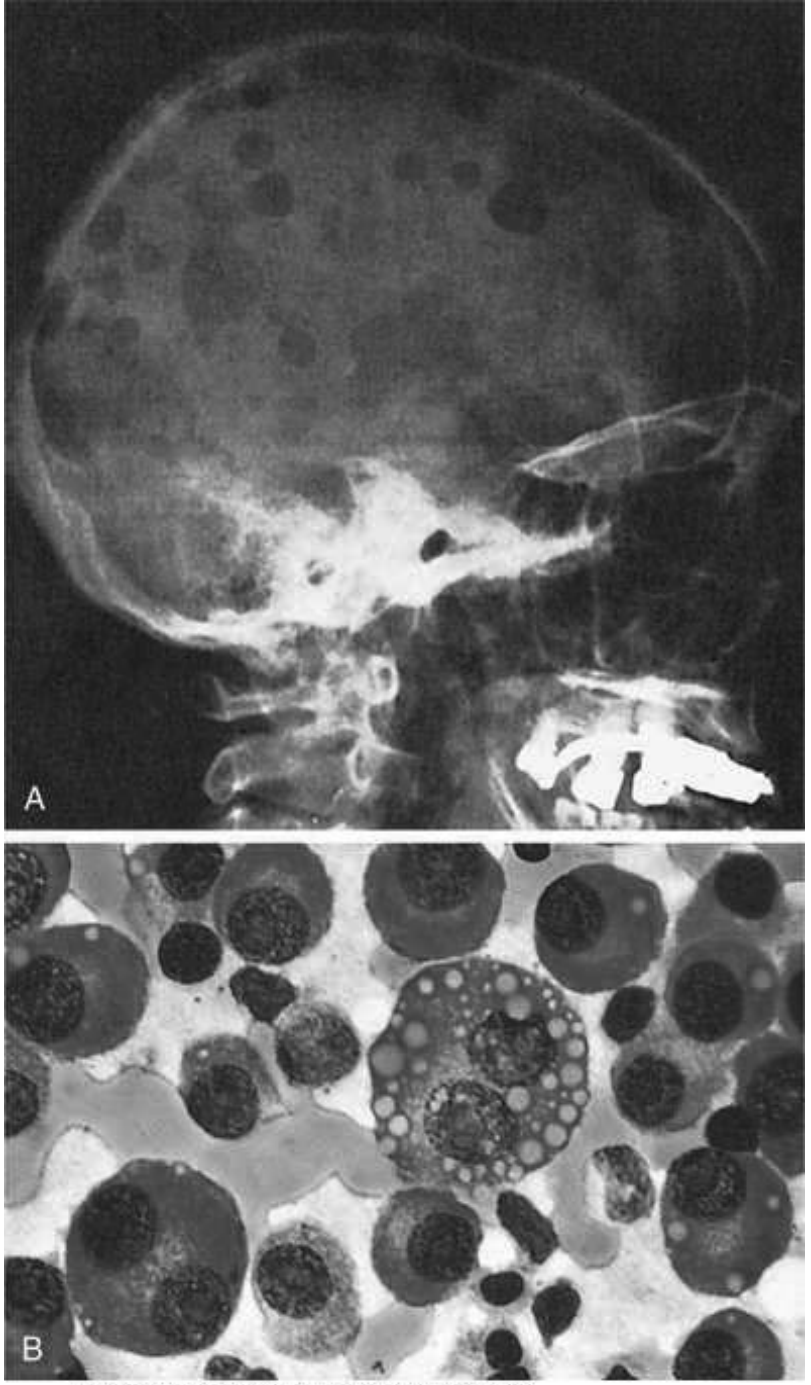


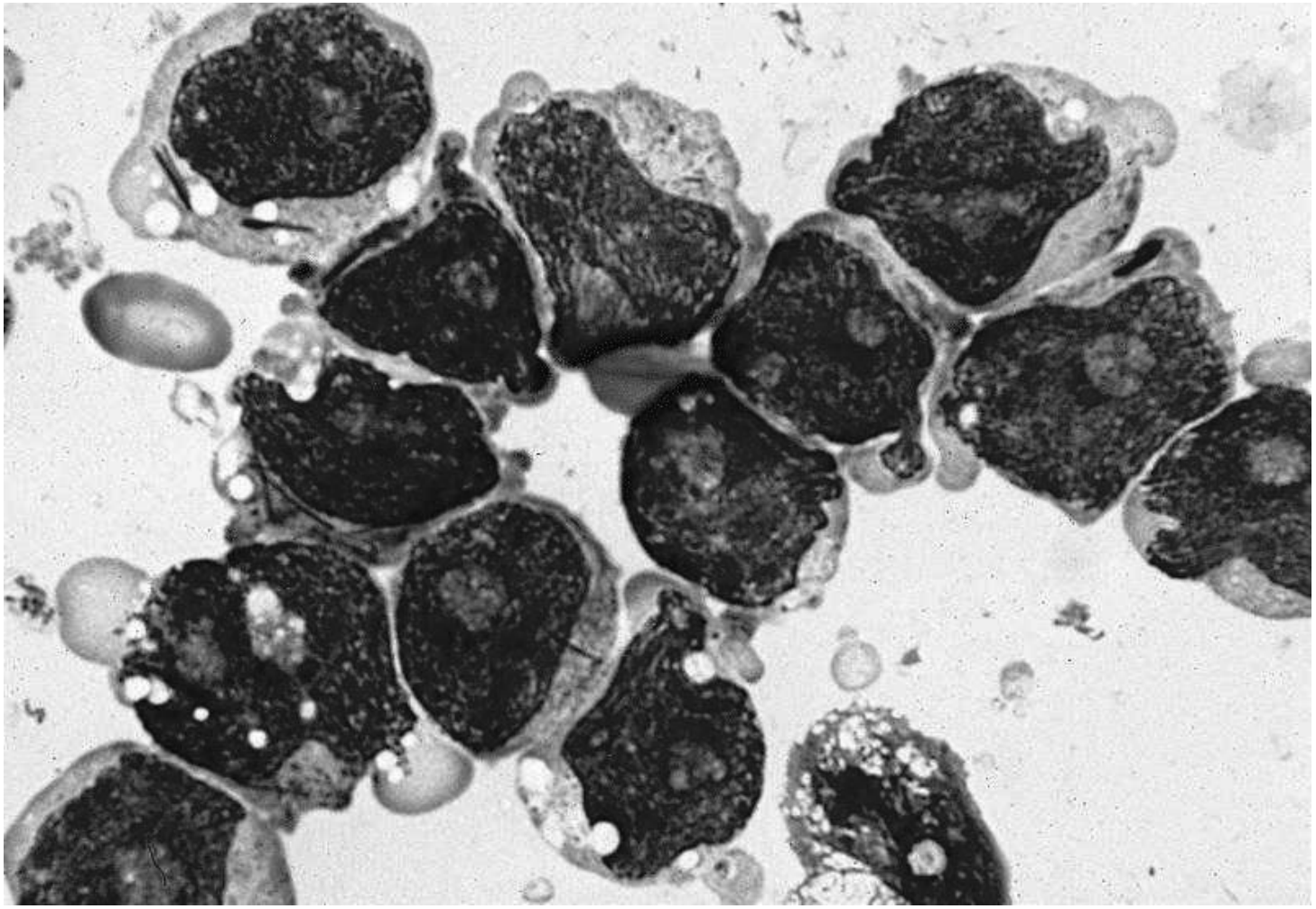
- The "starry sky" appearance is characteristic of Burkitt lymphoma on low power view. The white cells are macrophages that engluf apoptotic cells which are markedly increased



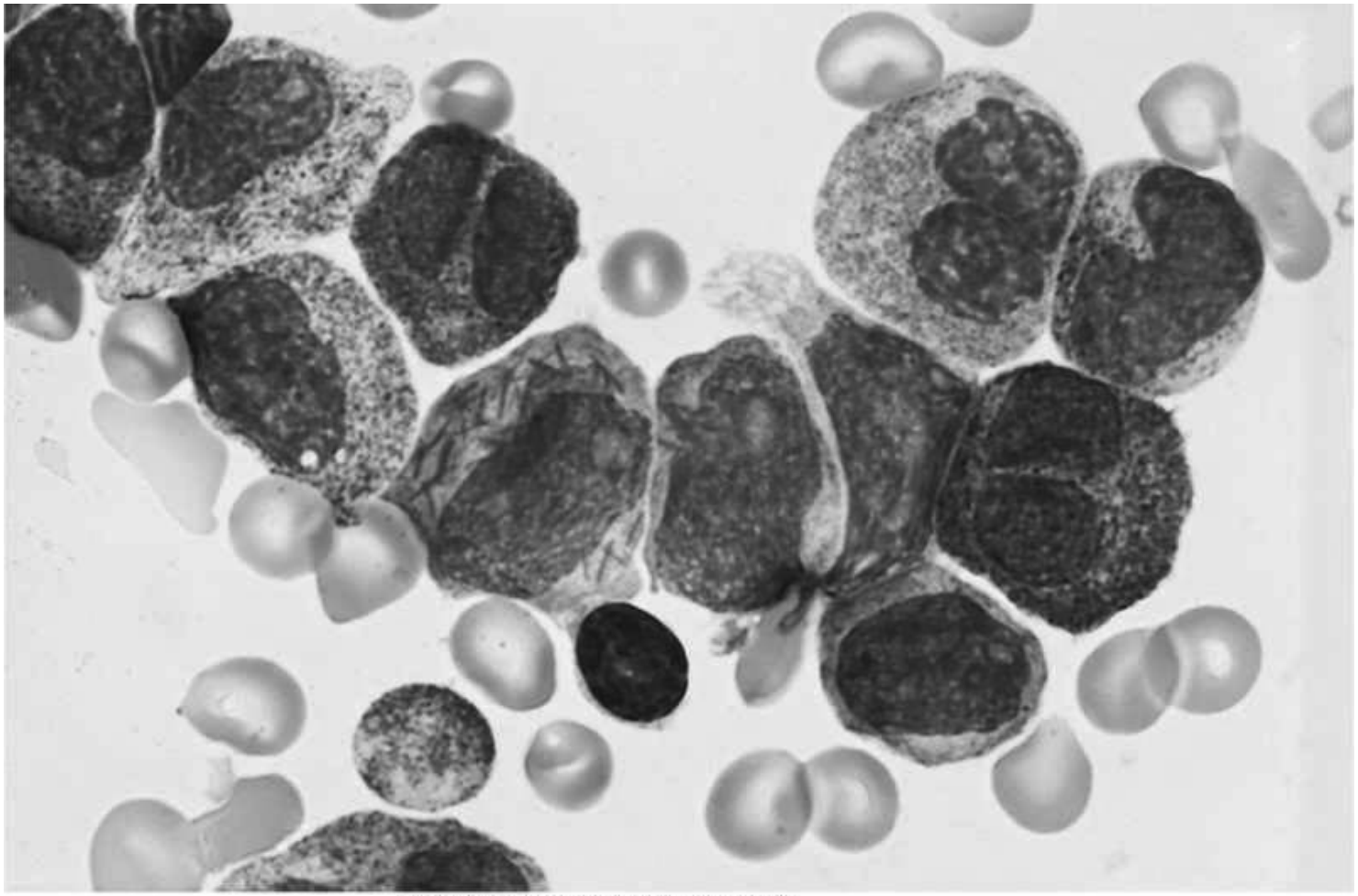
- Reed-Sternberg cell, A giant cell with two nuclear lobes, large eosinophilic e nucleoli, and abundant cytoplasm, surrounded by reactive lymphocytes, macrophages, and eosinophils. RS cell appear only in Hodgkin lymphoma. Although it originates from a post-germinal center B-cell, it is genetically distorted and lack the normal B and T cell markers (CD20 and CD3, respectively), unlike other non-Hodgkin lymphomas

- Plasma cell myeloma:
- A) X-ray shows numerous bone lytic lestion in the skull and other bones
- B) Normal marrow cells are largely replaced by plasma cells, including forms with multiple nuclei, prominent nucleoli, and cytoplasmic droplets containing immunoglobulins

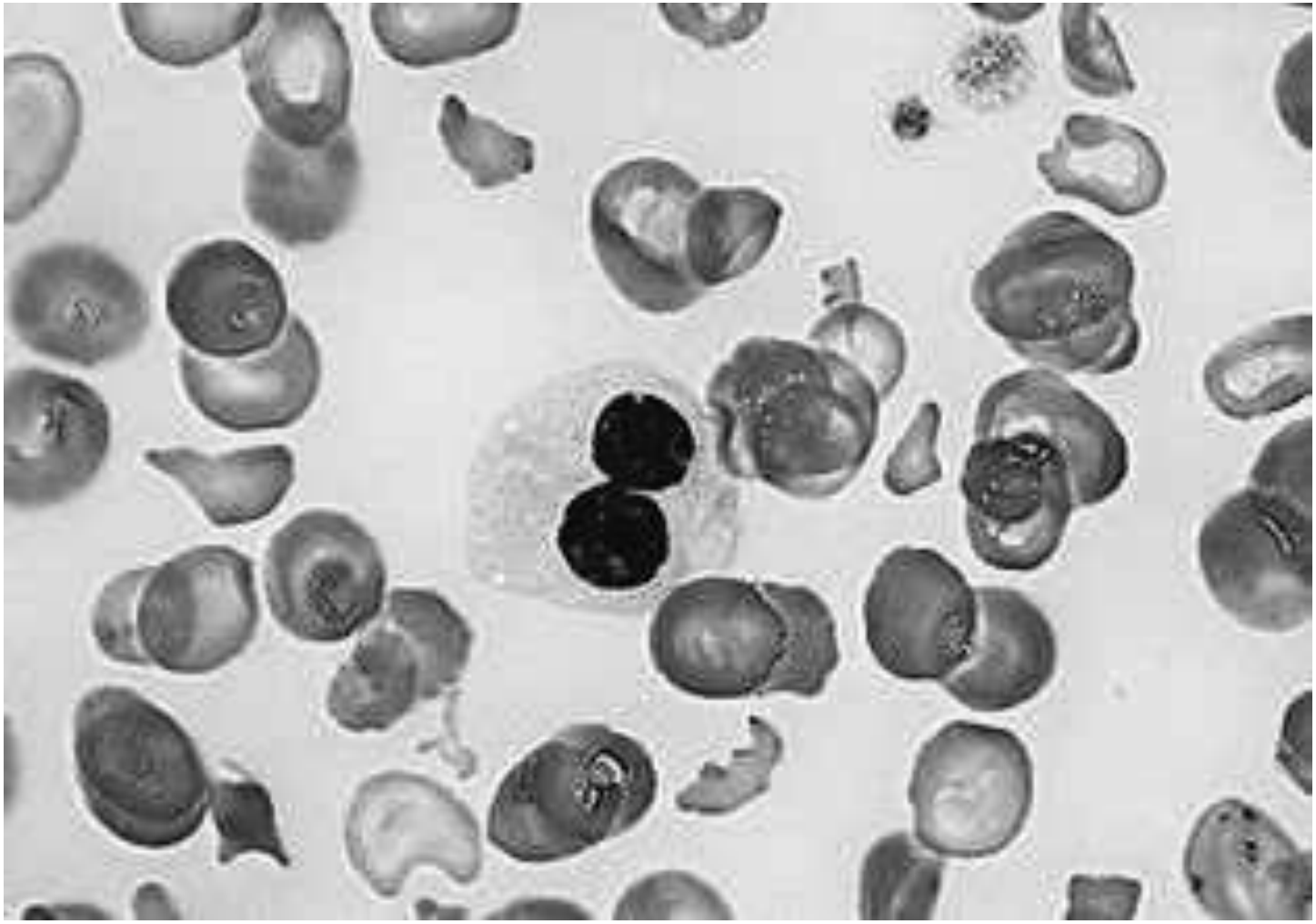




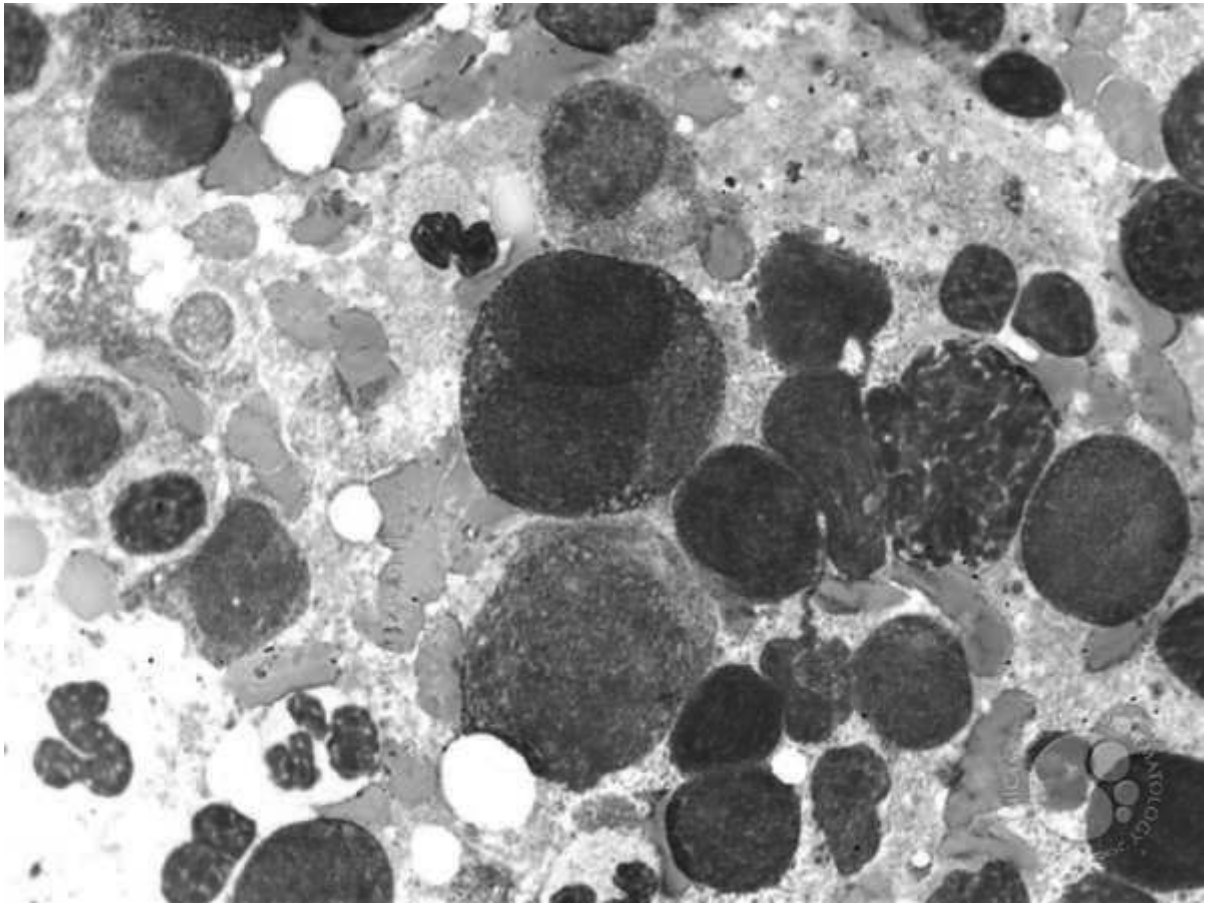
- AML: myeloblasts show increased N/C ratio but a relatively abundant cytoplasm. The cytoplasm is focally granular. Auer rods are also seen. The nuclei show pale chromatin and nucleoliS



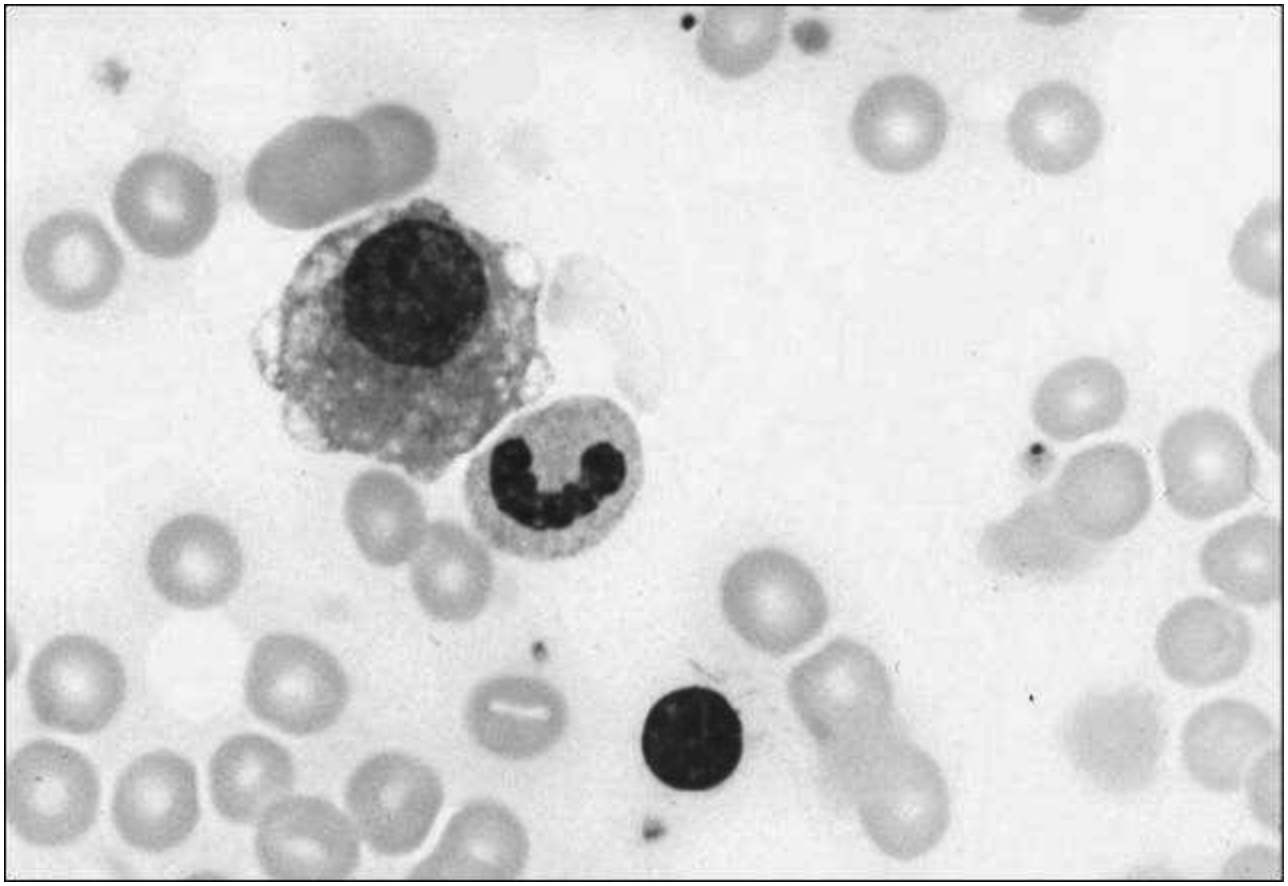
- Acute promyelocytic leukemia: The neoplastic promyelocytes have abnormally coarse and **numerous** azurophilic granules. Other characteristic findings include the presence of several cells with **bilobed nuclei** and a cell in the center of the field that contains **multiple** needle-like Auer rods



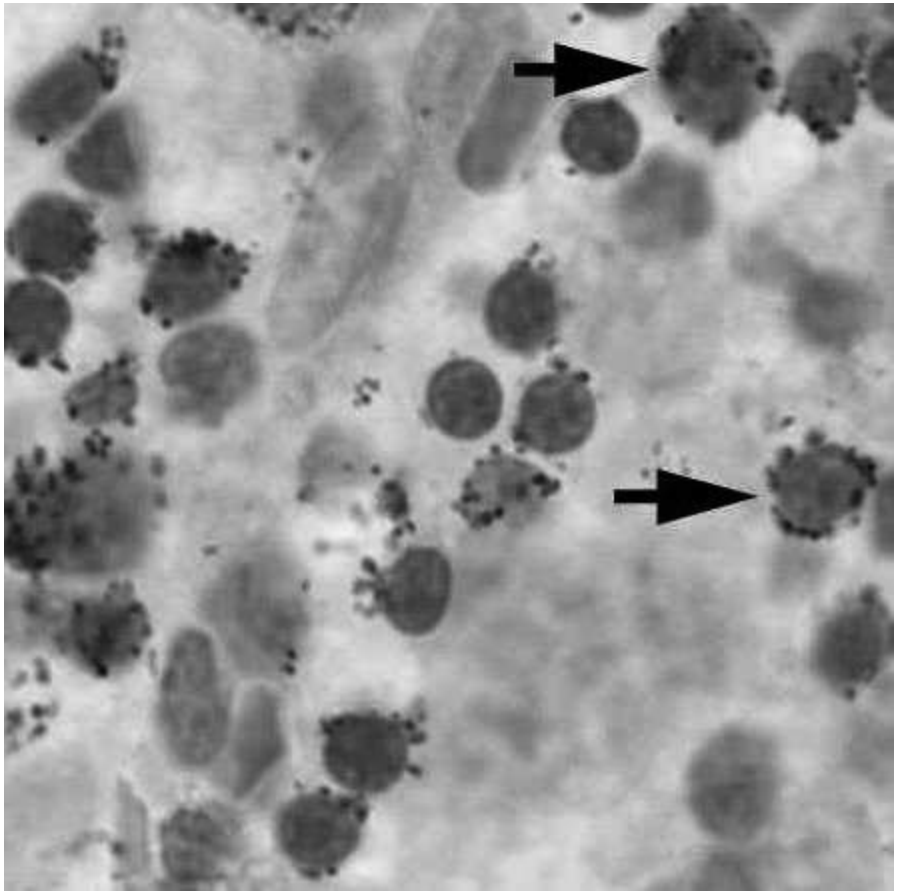
- Myelodysplastic syndrome, Granulocytic dysplasia: neutrophils show hypolobated nucleus and hypogranular cytoplasm



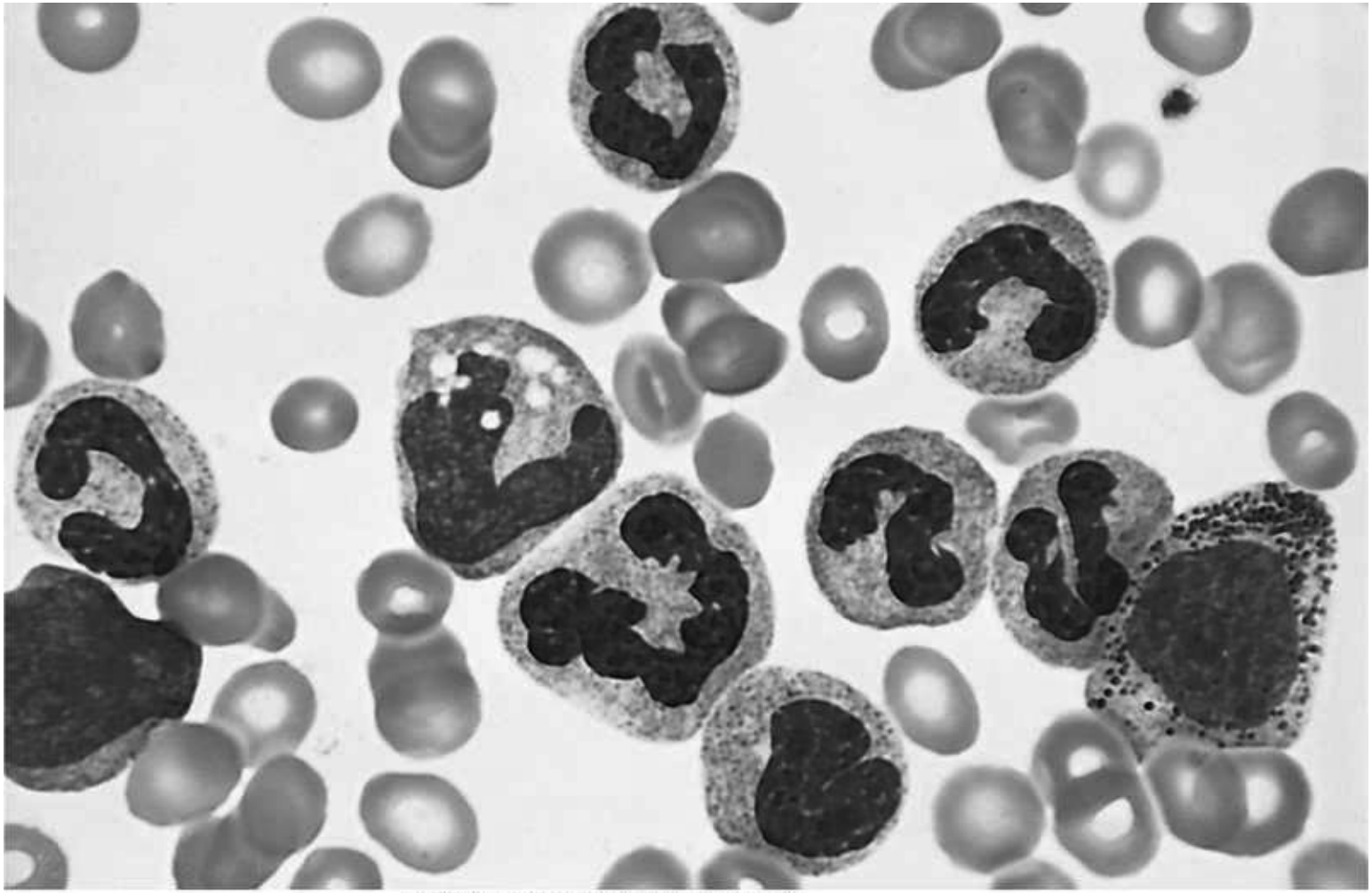
- Myelodysplastic syndrome, erythroid dysplasia: multinucleation, large megaloblastoid erytroid precursor (similar to megaloblastic anemia)



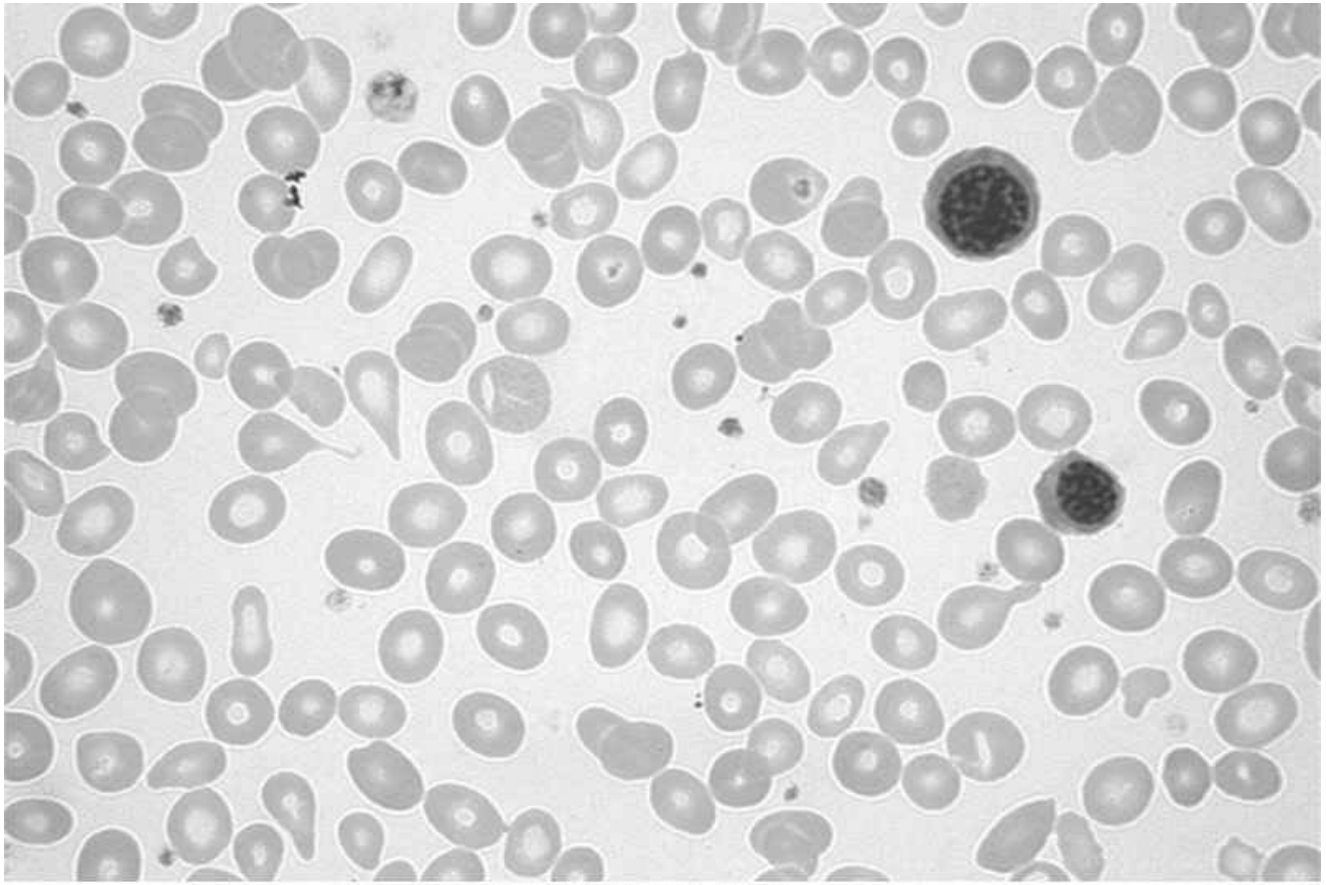
- Myelodysplastic syndrome, megakaryocytic dysplasia: megakaryocytes become small in size, with a monolobated nucleus



- Myelodysplastic syndrome, refractory anemia with ring sideroblasts: Iron stain shows a ring of iron around the nucleus of erythroid precursors. It represents abnormal accumulation of iron in the mitochondria. This type of MDS manifests as a refractory anemia solely



- Chronic myeloid leukemia, peripheral blood smear: Granulocytic forms at various stages of differentiation are present including basophils



- Primary myelofibrosis: nucleated erythroid precursors and several teardrop-shaped red cells appear in the blood secondary to extramedullary hematopoiesis, as the marrow spaces become fibrotic