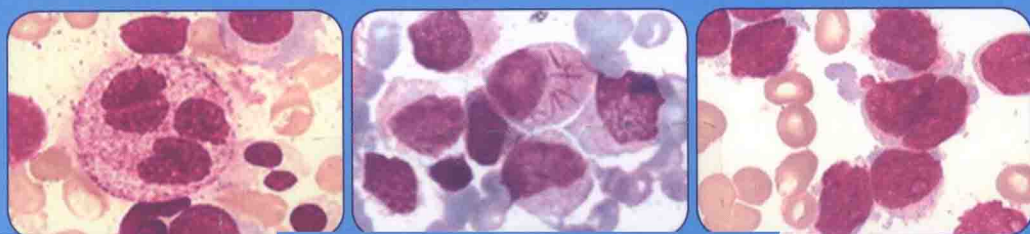


·第2版·

Practical Atlas of Hematology

实用 血液学图谱

主 编 李顺义 卢兴国 李伟皓



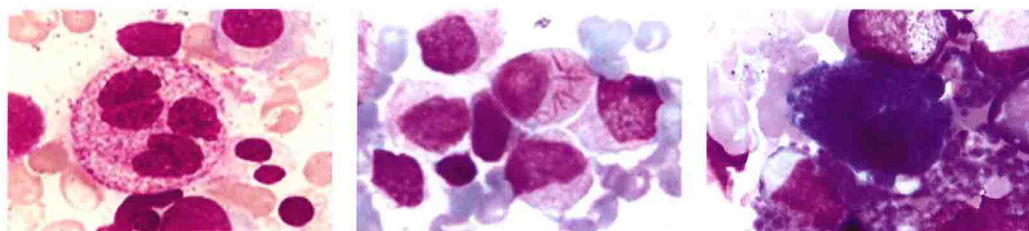
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本书主要选取河北医科大学第二医院血液实验室和浙江大学医学院附属第二医院血液实验室拍摄的血液和骨髓涂片编辑而成。全书共分为四部分：正常血细胞形态学、异常血细胞形态学、骨髓检查、血液系统疾病。书中共展示全真图 531 幅，并配有少量细胞化学、免疫细胞化学、病理切片图像。本书内容简洁翔实、图文并茂、价钱低廉，制作精良，适合临床医师、血液学实验室工作人员、检验医学专业院校本科和专科师生在医疗、教学、科学研究中使用。

The figures of this book were mainly collected from the medical laboratory of Second Hospital, Hebei Medical University and hematology laboratory of Second Affiliated Hospital, Zhejiang University. Four parts are included: morphology of normal blood cell, morphology of abnormal blood cell, bone marrow examination and hematological diseases. There are 531 figures and a number of figures of cytochemistry, immunocytochemistry and pathological image. This atlas can be used as a reference book for clinicians, laboratory technicians, scientific researchers and medical students.

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血细胞形态学是血象和骨髓象检查的基础,也是血液系统疾病诊断、鉴别诊断及疗效观察最重要的手段之一。自从全国形态学专家座谈会在北京召开以来,迅速引起国内各实验室对形态学诊断的重视,各高等医药院校尤其是招收检验医学专业院校的师生普遍重视了形态学教学质量的提高。国内虽出版多部血细胞图谱,由于图谱价格较高,尚难满足临床医师、血液学实验室工作人员、检验医学专业院校本科和专科师生在医疗、教学、科学研究中使用。我们考虑到临床与教学对图谱的需求量较大,计划出版一部简明、实用的小型图册,以供内科血液专业的医师、从事形态学诊断的检验人员、硕士生和本(专)科生选用。《实用血液学图谱》主要选取河北医科大学第二医院血液实验室和浙江大学医学院附属第二医院血液实验室拍摄的血液和骨髓图片编辑而成。全书共分四部分:正常血细胞形态学、异常血细胞形态学、骨髓检查、血液系统疾病。书中共展示全真图 531 幅,并配有少量细胞化学、免疫细胞化学、病理切片图像。在本书编著过程中得到河北医科大学第二医院血液实验室和浙江大学医学院附属第二医院血液实验室全体人员的热情关怀与大力支持,在此深表谢意。

编者

Preface

Morphology of blood cells is not only the basis of examination for blood and bone marrow, but also one of the most important means for diagnosis, differential diagnosis and evaluating therapeutic effect for hematological diseases. After the national forum of experts in morphology in Beijing, laboratory medicine department of high medical institute has paid more attention of morphological diagnosis to improve the quality of morphological education. Although a number of domestic blood cell atlas have been published, it is insufficient to satisfy the practice of clinical physicians, hematological laboratory staffs, undergraduate students and scientific researchers. So a concise and practical book is necessary. The figures of this “Practical Atlas of Hematology” were mainly collected from the hematologic laboratory of Second Hospital, Hebei Medical University and hematologic laboratory of Second Affiliated Hospital, Zhejiang University. Four chapters are included: morphology of normal blood cell, morphology of abnormal blood cell, bone marrow examination and hematological diseases. There are 531 figures and a number of figures of cytochemistry, immunocytochemistry and pathological image. This atlas can be used as a reference book for clinicians, laboratory technicians, scientific researchers and medical students. We thank all the colleagues who helped us during the course of compiling and publishing the atlas.

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第一部分 正常血细胞形态

Part 1 Morphology of normal blood cell

骨髓中血细胞包括粒细胞系统、红细胞系统、单核细胞系统、淋巴细胞系统、浆细胞系统及巨核细胞系统等，其中粒细胞系统、红细胞系统及巨核细胞系统在血液系统疾病诊断中最为重要。正常情况下，骨髓中粒细胞系统占 40% ~ 60%，各期幼红细胞占 15% ~ 25%，淋巴细胞系统占 20% ~ 25%，单核细胞、浆细胞及巨核细胞较少，而前期的淋巴细胞和单核细胞、组织细胞、成骨细胞、破骨细胞、脂肪细胞、肥大细胞等偶见或罕见。正常血细胞形态学是血象和骨髓象检验的基础。

Blood cells in bone marrow include cells of myeloid lineage, erythroid lineage, monocytic lineage, lymphocytic lineage, plasmacytic and megakaryocytic lineage in which granulocytic lineage, erythroid lineage and megakaryocytic lineage are the most important in diagnosis. Under normal circumstances, myeloid lineage accounts for about 40% ~ 60%, erythroid about 15% ~ 25%, lymphocytic about 20% ~ 25% of the marrow nucleated cells while monocytes, plasma cells. Megakaryocytes are less and the precursors of lymphocytes and monocytes, histiocytes, osteoblasts, fat cells and mast cells are occasionally seen. Being familiar with normal blood cell morphology in peripheral blood and bone marrow is very important.

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第 1 章 红细胞系统

Chapter 1 Erythrocytic series



图 1

原始红细胞 Proerythroblast (图 1)

胞体呈圆形或椭圆形，直径为 $15 \sim 22\mu\text{m}$ ，细胞边缘可见瘤状突起。胞核呈圆形或椭圆形，约占细胞直径的 $4/5$ ，居中或略偏于一侧。

Round or oval cell often with marginal protuberance. Round or oval nucleus locating centrally or slightly eccentrically. (Fig.1)

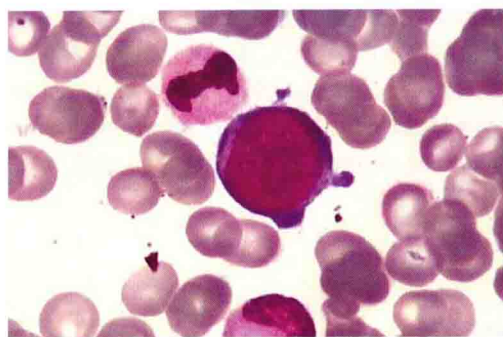


图 2

原始红细胞 Proerythroblast (图 2)

胞核染色质为颗粒状，有聚集趋势；核仁 $0 \sim 4$ 个，为淡蓝色，核膜较清楚。胞质量较少，呈不透明的深蓝色，核周有淡染区，无颗粒。

Granular nuclear chromatin tending to aggregate with $0 \sim 4$ light blue nucleoli, clear nuclear membrane, stained dark blue and agranular cytoplasm, and a perinuclear region of pallor. (Fig.2)

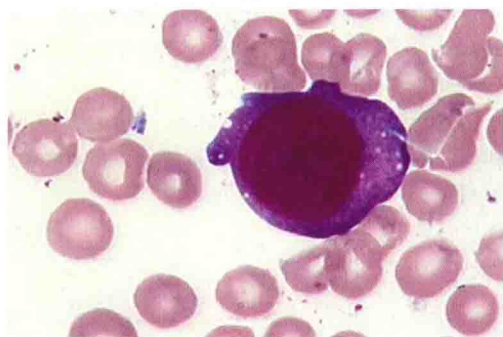


图 3

早幼红细胞 Basophilic erythroblast (图 3)

胞体呈圆形或椭圆形，直径为 $15 \sim 20\mu\text{m}$ 。胞核呈圆形或椭圆形，占细胞直径的 $2/3$ 以上，居中或稍偏位。

Round or oval in shape, about $15 \sim 20\mu\text{m}$ in diameter. Round or oval nucleus, locating centrally or slightly eccentrically. (Fig.3)

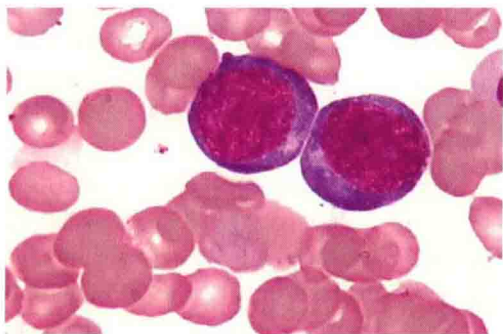


图 4

早幼红细胞 Basophilic erythroblast (图 4)

核染色质聚集，呈粗颗粒状；核仁消失。胞质量增多，呈不透明深蓝色，胞质中无颗粒，可见核周淡染区。

Clumped and coarse granular nuclear chromatin, invisible nucleolus. Basophilic and agranular cytoplasm and a perinuclear region of pallor. (Fig.4)

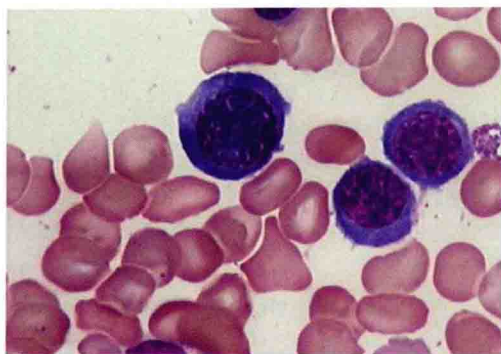


图 5

中幼红细胞 Polychromatic erythroblast (图 5)

胞体呈圆形或椭圆形，直径为 $8 \sim 15\mu\text{m}$ 。胞核圆形或椭圆形，居中或偏位，占细胞直径的 $1/2 \sim 2/3$ ；核染色质凝聚呈深紫色，染色质粗糙、浓染呈块状，副染色质明显，有碎墨感。

Round or oval cell, round or oval nucleus locating centrally or slightly eccentrically. Coarse chromatin as dispersed ink. (Fig.5)

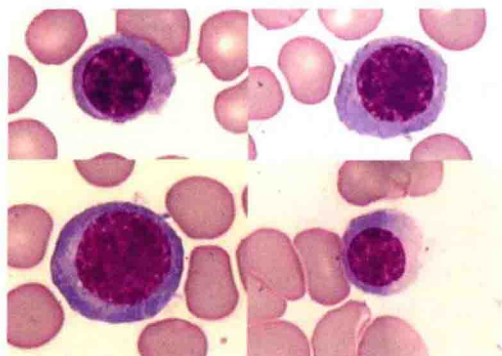


图 6

中幼红细胞 Polychromatic erythroblast (图 6)

核仁完全消失。胞质量多，无颗粒，由于胞质中已有血红蛋白出现，使其呈现不同程度的嗜多色性，如灰蓝色、灰色、粉灰色等。

Absence of nucleolus, plenty of agranular cytoplasm showing various degree of polychromatic due to presence of hemoglobin. (Fig.6)

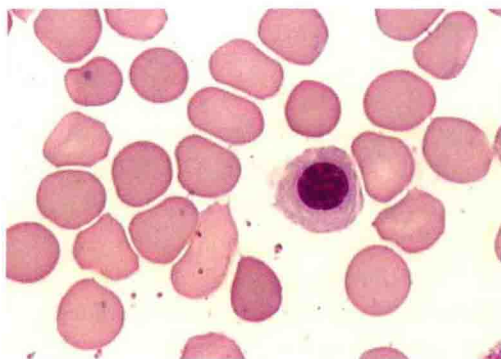


图 7

晚幼红细胞 Orthochromatic erythroblast (图 7)

胞体较小，多为圆形，直径为 $7 \sim 10\mu\text{m}$ 。胞核圆形占细胞直径的 $1/2$ 以下，居中或稍偏位。

Small in size ($7 \sim 10\mu\text{m}$) and round in shape. Round or oval nucleus is locating centrally or slightly eccentrically. (Fig.7)

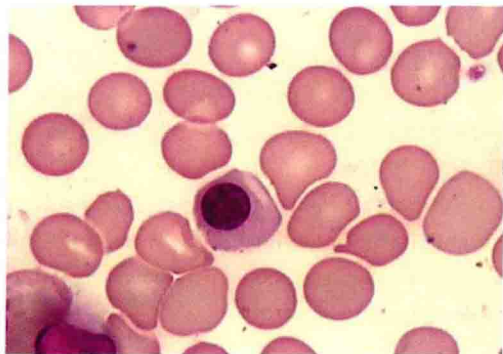


图 8

晚幼红细胞 Orthochromatic erythroblast (图 8)

核染色质浓聚、固缩为深紫红色或紫黑色团块，副染色质可见或消失，有时胞核碎裂或正处在脱核状态。胞质量多，呈浅灰红色或粉红色，无颗粒。

Coarsely clumped nuclear chromatin is condensed in dark purple-red mass, visible or invisible parachromatin, sometimes nucleus shows karyorrhexis or is picked off, plentiful agranular pink-grey or pink-red cytoplasm. (Fig.8)

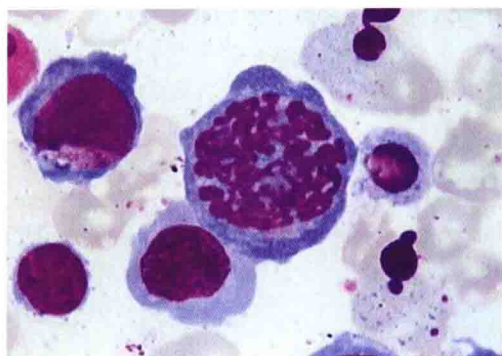


图 9

红系有丝分裂细胞 Mitotic erythroblast in prophase (图 9)

分裂前期细胞, 染色质聚集、变粗、成条索状, 染色质进一步聚集成一个缠绕的丝球状。

The chromatin condenses to form plectonemic chromatin like a sphere.(Fig.9)

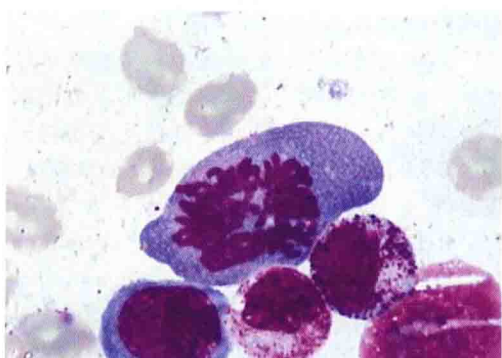


图 10

红系有丝分裂细胞 Mitotic erythroblast in metaphase (图 10)

分裂中期细胞, 染色质变成染色体, 排列在细胞的中央, 呈放射状。

The chromatin is broken to form chromosomes radially arranged in the center of the cell.(Fig.10)

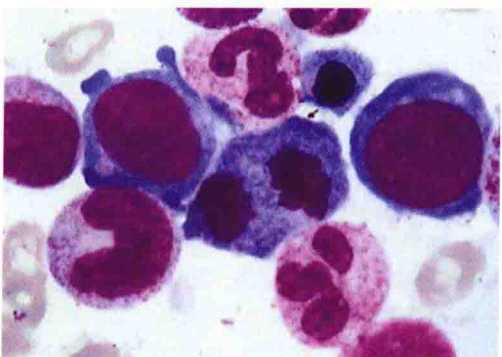


图 11

红系有丝分裂细胞 Mitotic erythroblast in anaphase (图 11)

分裂后期细胞, 染色质变成染色体后向两极分去, 形成双丝球状。

Chromosomes migrating oppositely forms two linear spheres.(Fig.11)

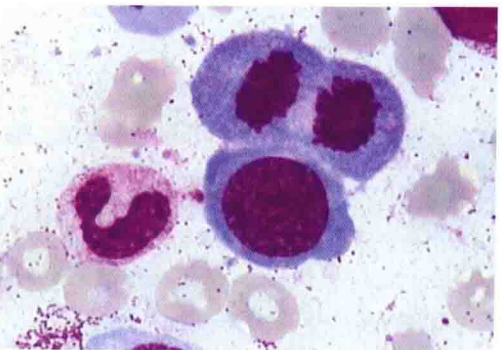


图 12

红系有丝分裂细胞 Mitotic erythroblast in telophase (图 12)

分裂末期细胞, 一个细胞经有丝分裂成两个子细胞。

After mitosis, two identical progeny cells are generated.(Fig.12)

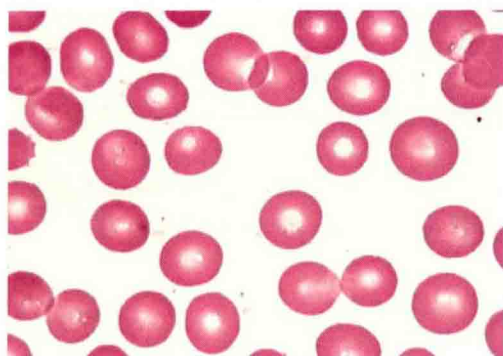


图 13

红细胞 Erythrocyte (图 13)

正常红细胞胞体直径平均为 $7.2\mu\text{m}$ ，两面呈微凹盘状，无核，胞质浅红色，中央部分淡染。

Averagely $7.2\mu\text{m}$ in diameter, double concave discshaped without nucleus and agranular pink-red cytoplasm with hypochromatic center. (Fig.13)

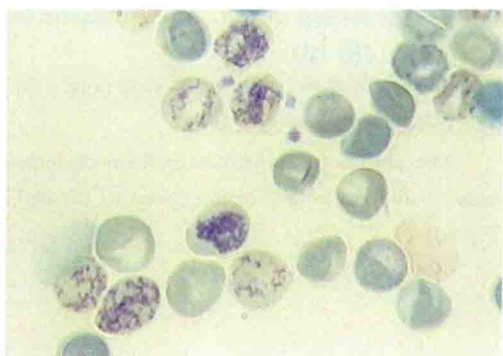


图 14

网织红细胞 Reticulocyte (图 14)

煌焦油蓝染色，红细胞中可见蓝黑色颗粒状、线条状或网状结构，图中可见各型网织红细胞，I型呈丝球状，II型呈线圈样开始松散，III型呈枝点状排列，IV型呈分散颗粒、短丝状。

Reticulocyte is an erythrocyte containing thready or reticular structure in cytoplasm after brilliant cresyl blue staining. This figure shows all types of reticulocytes. Type I shows fibril spheroid structure, type II is loosen coil-like, type III shows branched and punctated stucture and type IV shows scattered granules and short fibrils.(Fig.14)

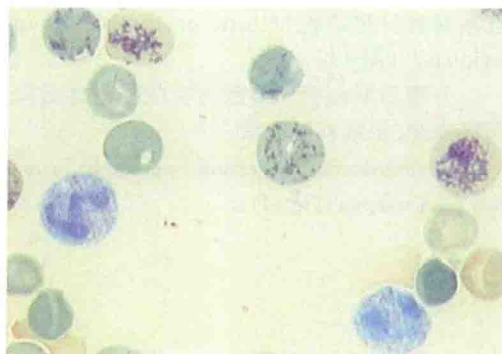


图 15

网织红细胞 Reticulocyte (图 15)

煌焦油蓝染色，红细胞中可见蓝黑色颗粒状、线条状或网状结构，以II型、III型为主，中性粒细胞染浅蓝色，胞核清晰，易于区别。

Brilliant cresyl blue staining: reticulocytes mainly type II and III are easily to be distinguished from neutrophil.(Fig.15)

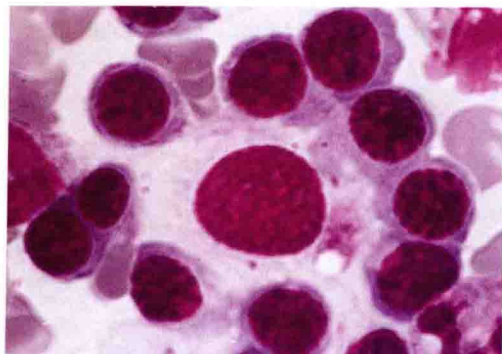


图 16

幼红细胞造血岛 Erythroblasts island (图 16)

中央为巨噬细胞，外围绕一些幼红细胞者为幼红细胞造血岛。

Erythroblast island is composed of a macrophage surrounded with erythroblasts.(Fig.16)

第 2 章 粒细胞系统

Chapter 2 Granulocytic series



图 17

原始粒细胞 Myeloblast (图 17)

胞体呈圆形或椭圆形，直径为 $12 \sim 20\mu\text{m}$ 。胞核大，呈圆形或椭圆形，居中或稍偏于一侧，胞核占细胞直径的 $2/3$ 以上。

Round or oval cell with diameter about $12 \sim 20\mu\text{m}$, large round or oval nucleus lying centrally or eccentrically. The nuclear diameter reaches more than $2/3$ of cell. (Fig. 17)

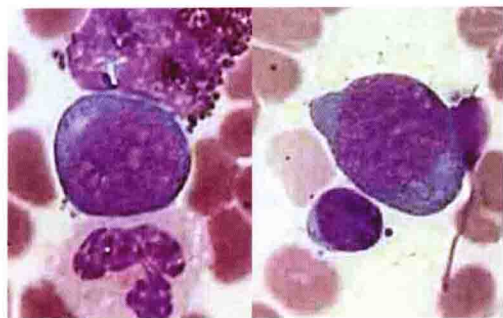


图 18

原始粒细胞 Myeloblast (图 18)

染色质呈淡紫红色细颗粒状，分布均匀，形如一层薄纱；核膜薄，核仁小而多，清楚易见，通常为 $2 \sim 5$ 个，染为淡蓝色。胞质量少，呈透明天蓝色，无颗粒。

The nuclear membrane is thin, generally two to five small, distinct, and light bluish nucleoli can be seen, evenly distributed chromatin is in form of fine purplish red granules, and transparent basophilic cytoplasm without granules. (Fig. 18)

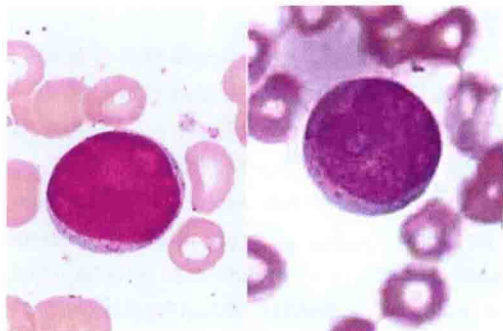


图 19

原始粒细胞 Myeloblast (图 19)

部分原始粒细胞与上述原始粒细胞形态近似，但胞质内有少许细小的紫红色颗粒，在髓系肿瘤中被描述为 II 型原始粒细胞。

A proportion of myeloblasts are similar to above mentioned cells (fig. 18), showing few azurophilic granules in cytoplasm termed type II myeloblast in myeloid tumors. (Fig. 19)

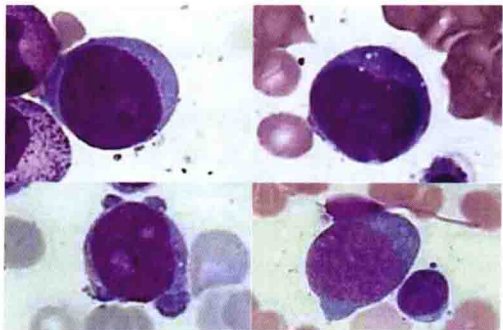


图 20

原始粒细胞 Myeloblast (图 20)

原始粒细胞在正常骨髓中较少见，占骨髓有核细胞的 $0 \sim 1.8\%$ 。

Myeloblast is rare in normal marrow and constitutes $0 \sim 1.8\%$ of nucleated cells in bone marrow. (Fig. 20)



图 21

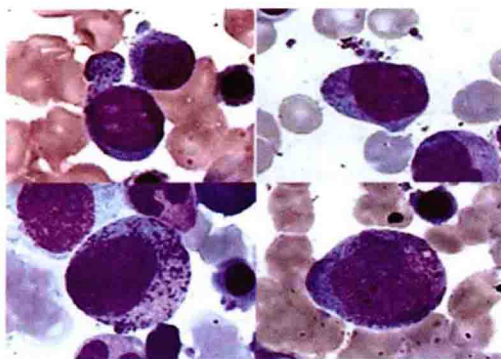


图 22

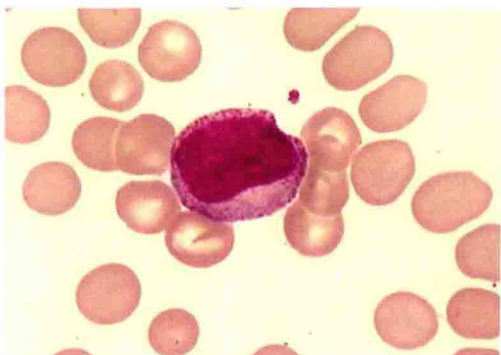


图 23

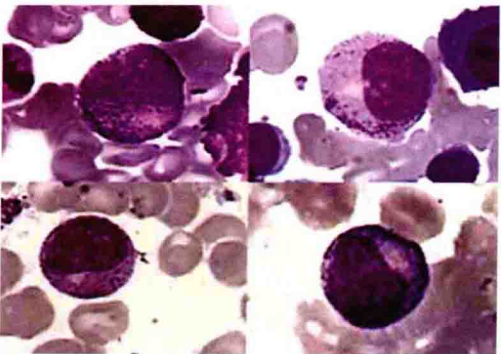


图 24

早幼粒细胞 Promyelocyte (图 21)

胞体多为圆形或椭圆形，比原始粒细胞略大，直径为 $12 \sim 22\mu\text{m}$ 。胞核较大呈圆形或椭圆形，常偏于细胞一侧；核染色质呈粗颗粒状，排列紧密，可有聚集。

Round or oval cell, larger than myeloblast, with diameter of $12 \sim 22\mu\text{m}$. An eccentric nucleus is large, round or oval. Nuclear chromatin shows coarse, compact even clumping granulation. (Fig.21)

早幼粒细胞 Promyelocyte (图 22)

核仁可见或消失，多为 1 个。胞质量丰富，呈淡蓝色，近核处常有不着色区，胞质中可见数量不等、粗细不均的紫红色嗜天青颗粒。

Chromatin granules are coarse, compact or clumped; Nucleolus is single, visible or disappeared. Slightly basophilic cytoplasm with azurophilic granules and a pallor region near nucleus. (Fig.22)

中性中幼粒细胞 Neutrophilic myelocyte (图 23)

自中幼阶段，胞质中出现特异性颗粒，胞体较早幼粒细胞小，多呈圆形或椭圆形，直径为 $10 \sim 18\mu\text{m}$ 。胞核变小，占细胞直径的 $2/3 \sim 1/2$ ，呈圆形、椭圆形或略有凹陷。

Round or oval cell, smaller than promyelocyte, showing specific neutrophilic granules in addition to azurophilic granules in cytoplasm and round, oval or indented nucleus. (Fig.23)

中性中幼粒细胞 Neutrophilic myelocyte (图 24)

核染色质粗糙呈致密颗粒状；核仁消失。胞质量丰富，淡红色，其中含有许多细小、均匀的紫红色中性颗粒。

Coarse and clumped nuclear chromatin, no nucleolus, abundant cytoplasm with numerous evenly distributed, tiny reddish purple granules. (Fig.24)