SUMMARY

I- Transmission electron microscope:

It is a type of microscope, that is an optical instrument consisting of a combination of lenses used for making enlarged or magnified images of minute objects. The major difference from light microscopy is the use of electrons, electromagnetic lenses and equipments for high vacuum. Its use requires a special fixatives, e.g. osmium tetroxide or glutaraldehyde, embedding in resins, dehydration and staining with lead citrate.

II- Normal Haemopoiesis

1-Thrombopoiesis

The megakaryoblast shows many polysomes and few endoplasmic reticulum in their cytoplasm, large Golgi body, few granules, close to the Golgi, and may contain small tubular structure as maturation goes on. Then platelet starts to appear, mitochondria, microtubules and microfilaments up. Platelet peroxidase could be identified early in the series.

2- Granulopoiesis

Starting with the myeloblast which shows many sacs of rough endoplasmic reticulum, few microtubules, large centrosomes, numerous ribosomes and few granules. As maturation proceeds, neutrophilic granules starts to show up (layered or crystalloid structure in their center) along with changes in the nucleus according to maturation level. The eosinophilic and basophilic series show special granules.

3- Erythropoiesis

The proerythroblast shows very large nucleoli, small centrosomes, golgi, numerous ribosomes, and dispersed ferritin at high magnification. As maturation proceeds, nuclear changes, nuclear ribosomes and ferritin and then haemoglobin appears later.

4- Lymphocytic cell line

Starting with the lymphoblast showing fine chromatin, large nucleolus surrounded with few blocks of nuclear associated chromatin. As maturation proceeds the chromatin becomes in blocks, several multivesicular bodies and microtubules appear.

5- Plasma cells

Show characteristically highly developed endoplasmic reticulum occupying nearly all the cytoplasm, 6-8 large chromatin clumps adhering to the nuclear membrane constituting the nucleus. The younger forms show pale nuclear chromatin and distinct nuclear material.

6- Reticuloendothelial system and monocytes

Show specific nuclear cytoplasm features, many fibrillar bodies.

III- Ultrastructure of Leukaemic Cells:

1- Leukaemic myeloblast show thin indistinct nuclear membrane, little or no chromatin condensation, numerous polyribosomes, abundant mitochondria (round or oblong) and short endoplasmic reticulum. Occasional Auer bodies with its lamellar periodicity are seen.

2- Leukaemic monoblast numerous fine round like rod mitochondria are seen. Aggregated ribosomes, scattered short endoplasmic reticulum, small golgi apparatus and fine granules. The outer membrane show projections and villous processes.

3- Leukaemic megakaryoblast Shows variable nuclear lobulation, ll developed golgi apparatus, short endoplasmic, some mitochondria d few scattered granules with bull's eye appearance.

4- Leukaemic lymphoblast

The chromatin is arranges in fine strands, perinuclear chromatin ndensation. Short thick rod like mitochondria are seen.

'- Ultrastructural Cytochemistry of Leukaemic Blast Cells:

- Peroxidase positive ganules identify the myeloblast.
- platelet peroxidase identifies megakaryoblast.
- Monoblast shows non specific esterase reaction to be most requently unrelated to the membrane bound granules and not all contained in them.

- Ultrastructures of Erythroid Series in Malignant Disorders:

- Asynchrony of maturation.
- Irregular nuclear shape and contour.
- Dilation of nuclear envelope and wide nuclear pores.
- Nuclear splits

5- Karyorrhexis

6- Nuclear inclusions

7- Abnormal mitochondria with aberrant accumulation of iron.

8- Large siderosomes and increased free ferritin molecules.

9- Annulate lamellae.

VI- Hairy Cell Leukaemia

A disease of middle age or elderly showing a typical lymphocyte with hairy like projections that most of the time is acid phosphatase positive and tartarate resistant. The EM shows elongated cytoplasmic projections simulating microvilli if taken from blood or show cyncytium-like aggregates by interdigitating with adjacent hairy cells if taken from solid tissue as spleen. In about 50% of cases cytoplasmic ribosomes lamellar complex are seen.