

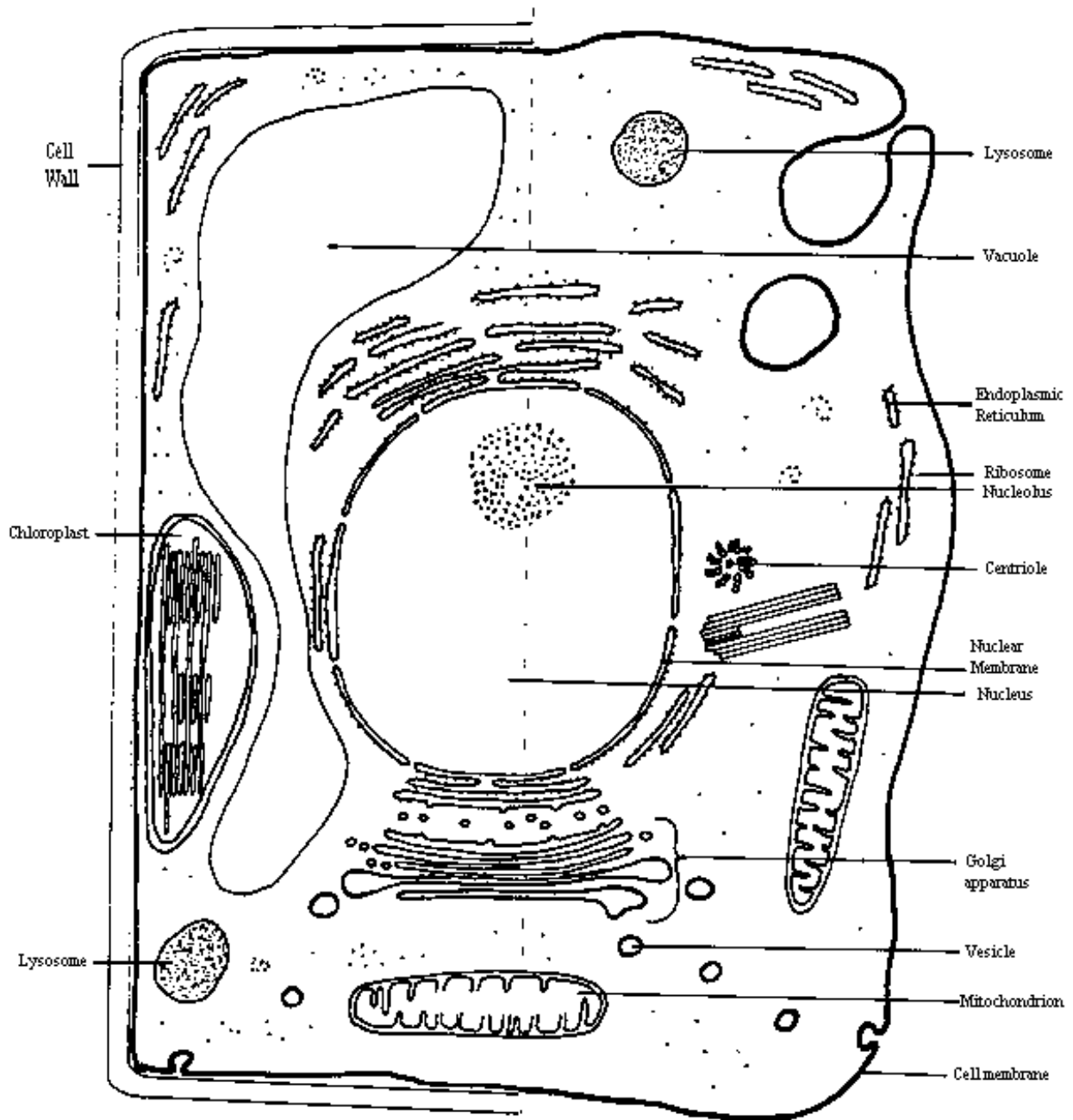
Handout for Protozoan Cell Biology

BIOMOLECULE	BUILDING BLOCK	MAJOR FUNCTION
DNA	Deoxyribonucleotide	Genetic Material
RNA	Ribonucleotide	Template for protein synthesis
PROTEIN	Amino Acids	Cellular structure and function
LIPID	Fatty acids	Membrane component and energy
SACCHARIDE	Glucose	Energy storage

CELLULAR COMPARTMENT	DESCRIPTION/MAJOR FUNCTION
PLASMA MEMBRANE	Defines cell; exchange of material; extracellular interactions.
NUCLEUS	Storage of genetic material; transcription (RNA synthesis) site.
NUCLEOLUS	Specialized region of nucleus for ribosome assembly.
RIBOSOMES	Protein/RNA particle; site of translation (protein synthesis).
SMOOTH ENODPLASMIC RETICULUM	Tubular intracellular membrane; site of lipid metabolism.
ROUGH ENDOPLASMIC RETICULUM	Flatten membrane sheets plus ribosomes; site of membrane protein synthesis.
GOLGI APPARATUS	Stacked membrane-bound sacs; trafficking and processing of proteins.
LYSOSOMES	Membrane-bound vesicle; intracellular digestion.
MICROBODIES (EG. PERIXOSOMES)	Membrane-bound vesicle; specialized metabolic functions (eg., oxidation).
MITOCHONDRIA	Double membrane structure; ATP synthesis (i.e., energy production).
CHLOROPLASTS	Organelle of plants; convert light energy into ATP.
CYTOSKELETON	Filamentous systems responsible for cell structure and cell motility.
CILIA/FLAGELLA	Filamentous cytoskeletal elements involved in motility.
CYTOPLASM (OR CYTOSOL)	Soluble component after cell lysis and centrifugation.

Plant Cell

Animal Cell



Light Microscopy

- image form by absorption and scattering of light
- limit of resolution ($\sim 0.5 \mu\text{m}$)
 - determined by the wavelength

Sample Preparation

- none, or ...
- (\pm) fixation (preserve)
- (\pm) section tissues
- (\pm) stain with dyes

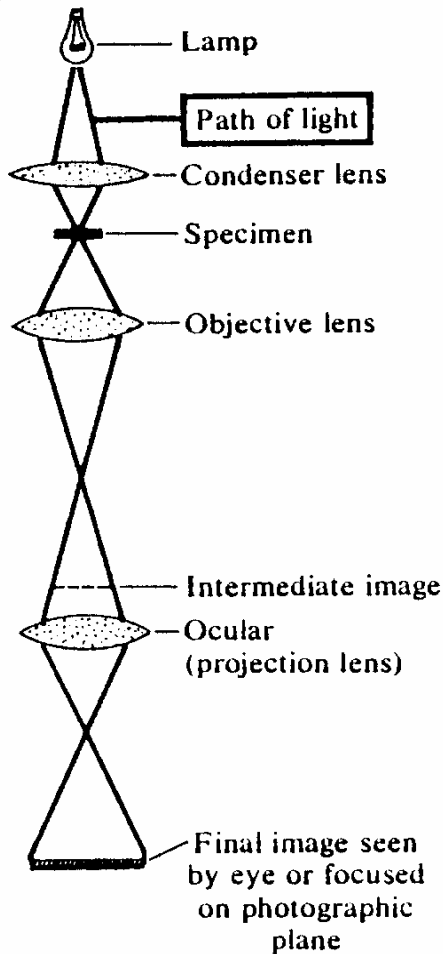
Electron Microscopy

- based on absorption and scattering of electrons
- resolutions of 2 nm (10^{-9}) or less
- wavelength = $1/\text{velocity}$

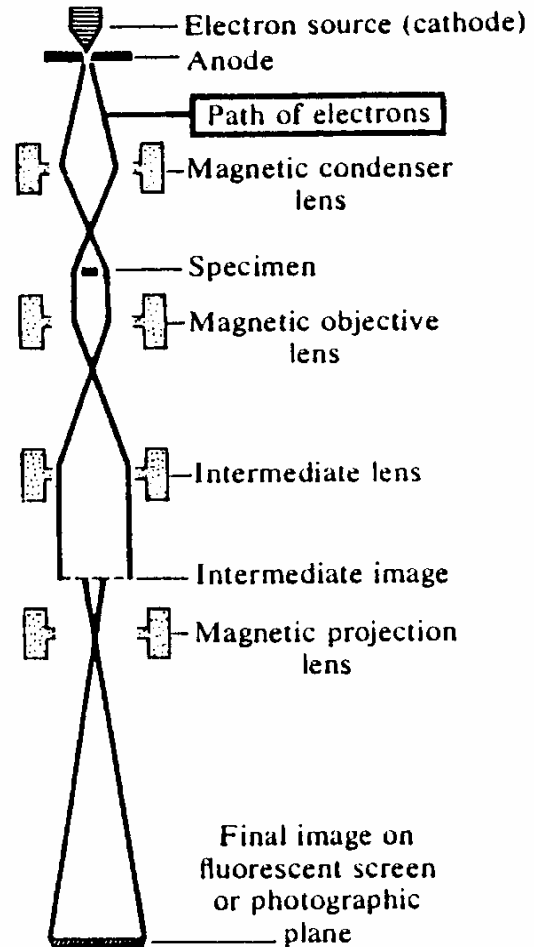
Sample Preparation

- fixation necessary
- ultrathin sections
- stain with heavy metals

Light microscope



Electron microscope



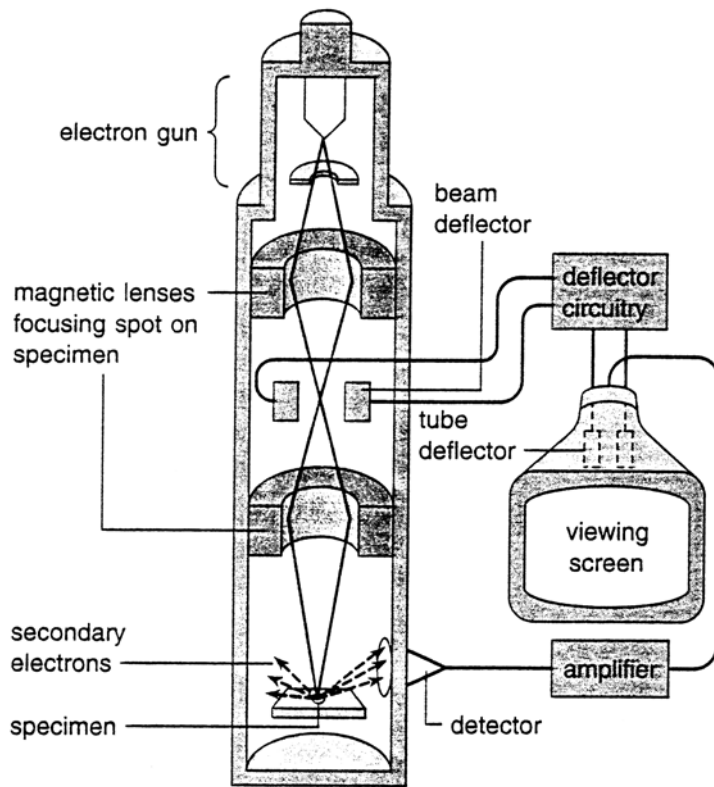
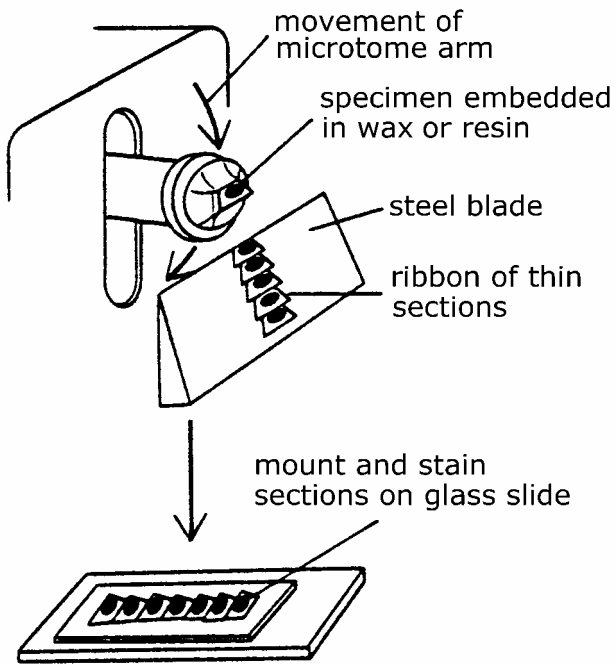


Figure 4-10 The scanning electron microscope (see text).