

TRANSMISSION ELECTRON MICROSCOPE (EM)

OPERATION

- resolves structures down to 0.2 nm
- magnifies images up to 250,000 times since the electron is so small (wavelength of 0.004 nm)
- electrons are propelled as a beam down the column, through the specimen and onto a fluorescent screen at the bottom
- the fluorescent screen transforms electrical energy into light energy for viewing
- focusing of the beam and the image is by electromagnetic lenses mounted in a series down the column
- the interior of the column must be a vacuum as electrons are impeded by air molecules

SAMPLE PREPARATION

- biological sample is first infiltrated with plastic
- ultrathin sections are cut and mounted on mesh grid
- sample is stained with heavy metal
- image appears light when the electrons pass straight through the grid (background)
- electrons hitting the heavy metal impregnated specimen are deflected resulting in an image with varying degrees of darker depending on thickness/composition of the specimen.
- image produced is grayscale