Bi1x, Spring 2009

Assignment 1

Due: Tuesday, April 14 at 9:00 AM

I. Microscopy

Please turn images of the following samples, preferably as uploads to Snowdome:

1. Resolution target ("graticule") – picture with the 100x objective
2. Fluorescent eukaryotic cells – picture in 3 fluorescence channels *(see section II)*
3. *E. coli* – phase image and fluorescence image
4. Pond water from Caltech ponds
5. marine diatoms – single nice picture (optional -- only if you have time)

All images must include scale bars (see section II, below).

II. MATLAB

1. Use Matlab to determine the relation between pixels and real space dimensions in the resolution target image. **Then, put scale bars on all images using this calibration.**

2. Use Matlab to merge your separate fluorescence channel images into one tricolor image.

III. Analysis

Perform a side by side comparison of your image of a eukaryote and a typical eukaryote cartoon diagram (see figure on the following page). Identify the structures in your photo and give a one sentence explanation of : **nucleus, endoplasmic reticulum, Golgi apparatus, mitochondria, actin, and microtubules.** Give characteristic sizes and comment on functions.

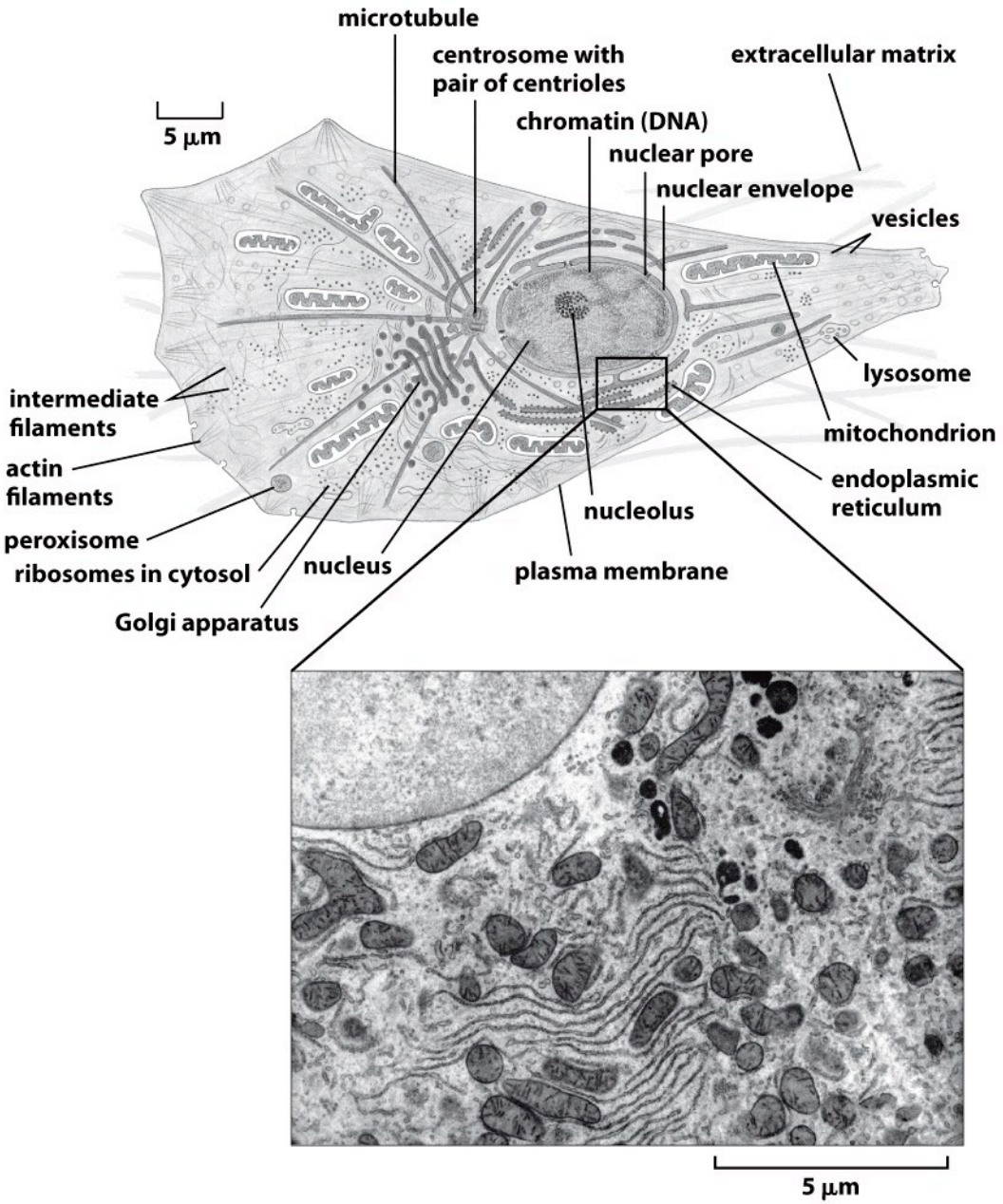

Figure 2.13 Physical Biology of the Cell (© Garland Science 2009)