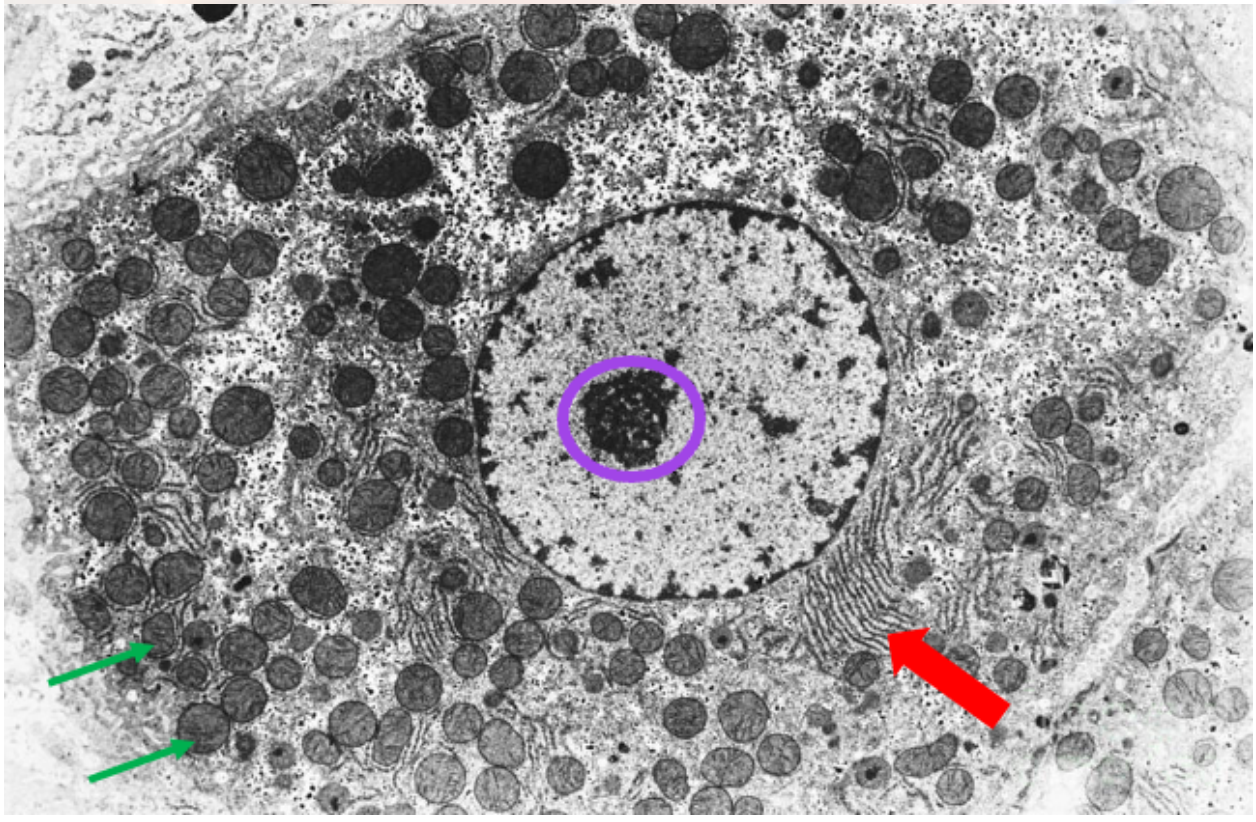
Homework 2

Multiple Choice

1. Cell Fractionation could NOT be useful in answering which of the following questions? Select all that apply. (__/2)
    a. Determining the effect of a chemical on cellular respiration rate
    b. Tracking the origin and destination of specific golgi vesicles
    c. Assessing the expression of certain mRNAs at differently localized ribosomes
    d. Assessing the expression of certain mRNAs at free versus bound ribosomes
    e. Isolating nuclei for cloning

Alex is at a very intense fencing competition where he unfortunately slays his opponent (literally). Deciding not to let the fresh carcass go to waste, he produces a TEM of the nearest organ to the fatal wound (the only thing he could get before the corpse was wrenched from him). For questions 2-3 use the following image.



2. Which of the following is a set of properties shared by the structures pointed to by the arrows, but not by the structure circled in purple? (__/2)
    a. Associated with rRNA
    b. Composed mainly of lipids membranes
    c. Houses an environment unique from the cytosol

d. Manufactures proteins
e. Houses genomic information

3. Based on the ratio of organelles in this cell, which of the following are likely functions of this cell? (__/2)
   a. Protein Manufacture and export
   b. Lipid metabolism
   c. ATP export
   d. Structural support
   e. Cellular Defense

4. Lipid rafts are best characterized as (__/2)
   a. Probability traps
   b. Structural spandrels
   c. Cell rivets
   d. Stochastic aggregations
   e. Evolutionary compromise

5. The vibrio is a bacterial shape that resembles a bean. If a eukaryotic cell were to adopt this conformation which of the following elements would you expect to be overly enriched on the minor groove? (__/2)
   a. Collagen
   b. Microfilaments
   c. Microtubules guess
   d. Cadherins
   e. None of the above

Free Response

6. Plant cells lack collagen and most cytoskeletal elements. Indeed what elements they do have are not structural. Why? (__/2)

   Plant cells don't need collagen or cytoskeletal elements as they are already structured by cell walls

7. You've signed up for an internship with the infamous Dr. Dinkledorf (infamous due to the numerous workplace hazard lawsuits on his hands, but you were desperate). He has recently proposed a new technique he calls ThermoEM after the disastrous failure of PyroEM from a few years ago. ThermoEM uses a protein called Fischer (names pending due to ongoing litigation from the ThermoFischer corporation) which includes a metallic core allowing

electrons to bounce off of it. Would this technique be useful? Would it be more useful as an analog for TEM or SEM? (__/3)

I guess it could be useful to see the cells since this technique is similar to Electron Microscopy. It would be more useful as an analog for TEM because if there are metal atoms attached to the cell, it could bounce off of them and showcase a screen of the specimen. I think that's how TEM works.