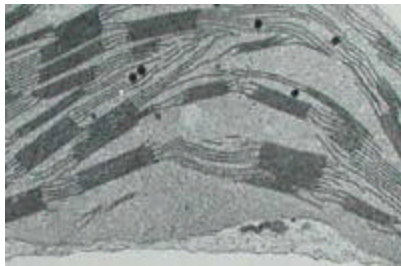


BIOSCI 1820
Quiz #4
MAR 2002

I. The following depicts an electron micrograph of a section through a chloroplast. With a line and label, please indicate precisely the (A) STROMAL LAMELLAE and (B) GRANAL LAMELLAE. Also, indicate in which lamellae Photosystem I is located, and in which lamellae Photosystem II is located.

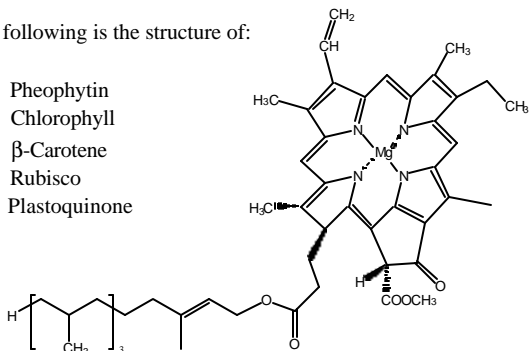


II. Ribulose-1,5-Bisphosphate-oxygenase is activated by:

- A. High magnesium and low pH
- B. Low magnesium and low pH
- C. High magnesium and high pH
- D. Low magnesium and high pH
- E. It is an unregulated enzyme

III. The following is the structure of:

- A. Pheophytin
- B. Chlorophyll
- C. β -Carotene
- D. Rubisco
- E. Plastoquinone



IV. Short Answer:

- A. Plants must "choose between making starch and sucrose. Based on their structures, and although it can yield less energy, what advantage do you think sucrose has over starch?

- B. The substance dichlorophenyl dimethyl urea (DCMU) is an herbicide that inhibits photosynthesis by blocking electron transfer between plastoquinones in Photosystem II. What effect would DCMU have on cyclic electron transfer?

- C. Through genetic engineering, it was possible to create a plant that could not do photorespiration (Nature, 1996). The resulting plants were found to be highly sensitive to extreme sunlight (i.e. they died prematurely). Why do you think this is so?

V. The net reaction for photosynthesis can be described as:

Which reactant will be reduced? _____

Which reactant will be oxidized? _____

VI. A molecule of $^{14}\text{CO}_2$ (radioactive carbon dioxide, in which the carbon is radioactive) is added to Rubisco. Draw the structure(s) of the product(s) and indicate where the radioactive carbon will reside.

VII. Draw the structures of the products of the following reactions:

