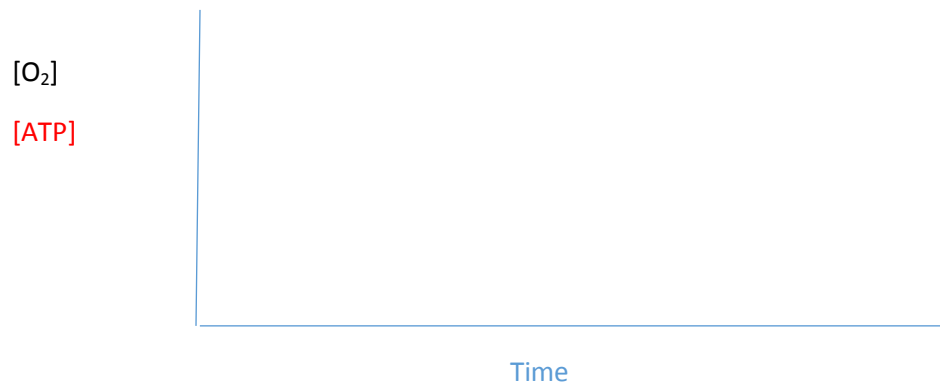


DNP- Exploring Oxidative Phosphorylation

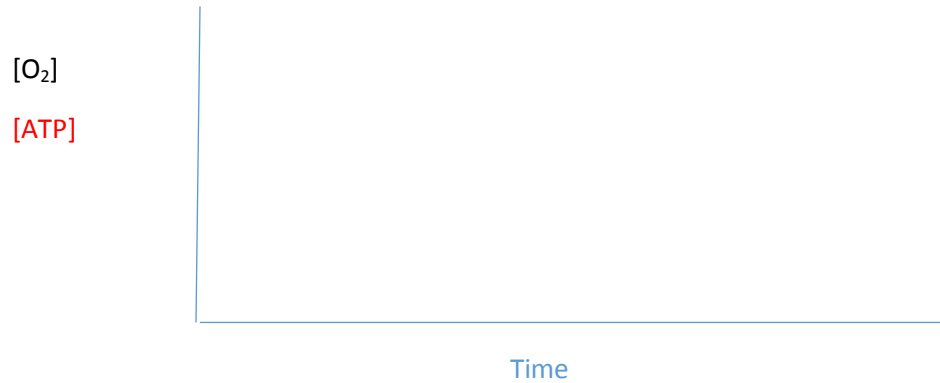
Worksheet for traveling students

After reading the material, take a moment to answer these questions:

1. Complete the statement “oxidative phosphorylation is the process in mitochondria by which”:
2. You incubate isolated intact mitochondria in a buffered solution containing succinate and ADP plus Pi. After 10 minutes you add cyanide (an inhibitor of Complex IV of ETC), you examine the effect of oxygen consumption and the production of ATP. What do you predict to happen? Sometimes sketching a graph can help.

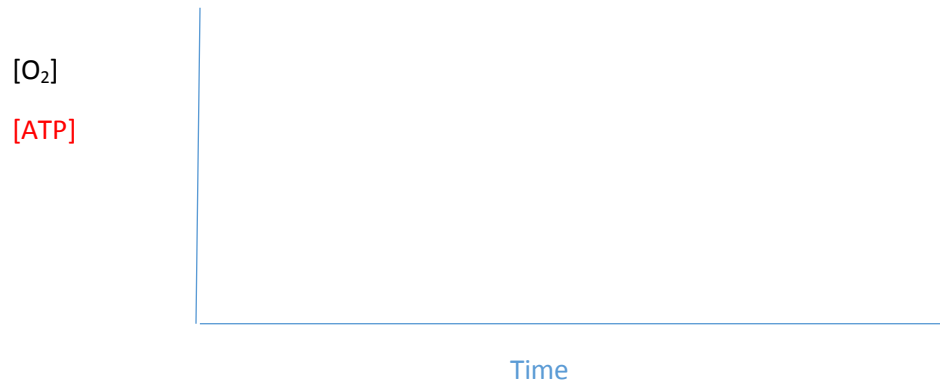


3. In another experiment, you incubate isolated intact mitochondria in a buffered solution with succinate and ADP with P_i . After 10 minutes you add oligomycin, an antibiotic inhibitor of ATP synthase, you examine the effect of oxygen consumption and the production of ATP. What do you predict to occur then? (Here it is important to read up the role of pumping protons in ETC for oxidative phosphorylation).



4. Describe "coupling" as it applies to ETC and oxidative phosphorylation.

5. In a third experiment, intact isolated mitochondria in a buffered solution are incubated with succinate and ADP plus Pi. After 10 minutes you add oligomycin (the ATP synthase inhibitor) and the compound DNP (2,4-dinitrophenol). You examine the effect on oxygen consumption and production of ATP. What do you predict? *Hint – What happened when people took this as a weight-loss drug?*



6. What does DNP do within the mitochondria? How does it act as an “uncoupler” of ETC and oxidative phosphorylation?

7. Discuss how this mechanism of DNP uncoupling oxidative phosphorylation and the ETC can cause death.