Problem Set 3 Answers

MCDB 108B

1a) F; b) T; c) F

2a) pyruvate → acetyl CoA + CO_2; oxidation state of C's in:
pyruvate: methyl C – 7; carbonyl C – 2; carboxylate C – 1
acetyl CoA: methyl C – 7; carbonyl C – 1
CO_2 – 0
Therefore, 2 e's transfered.

b) pyruvate → acetaldehyde + CO_2; oxidation state of C's in acetaldehyde: methyl C – 7; carbonyl C – 3
Therefore, no e's transferred.

c) Inability to activate PDH. TCA cycle is shut down, but glycolysis is accelerated (because citrate is not made). Lactate accumulates.

3a) β and γ C's become labeled. b) All steps in which NADH is a product are subject product inhibition by NADH. These are steps 1,4,5,9. At high NADH, TCA cycle is inhibited; gluconeogenesis is activated.

4) only the γ C becomes labeled

5. 1)1,4,5; 2)1,5,7; 3)2,6,8; 4)1,4,5,9; 5)1; 6)10; 7)1,5; 8)1

6. see lecture on pyruvate dehydrogenase

7. a) F; b) T; c) T; d) T

8. see lecture on gluconeogenesis - G6Pase activity

9. a) F; b) T; c) F

10. see lecture on isoforms of lactate dehydrogenase