Final exam prep

Tutorial 10

Tips

- Very similar in structure to midterm
- Take your time, but not too long
- Nearly every included is intentional
- Thought process needs to be clear
    - Can use bullet points, may help
- **Practice using past exams**
- **Use short hand for describe questions**

Tips

- **Include source of data**
  - (eg. "It was higher (Table 1)/(S1:T1)")
- **Answer the question**
  - (if question says use all data, then use **all** data!)
- Mechanism questions: Include all relevent info/data before synthesizing data into a mechanism
  - Example in slides to follow as this was an area that many had difficulty with

Example answer for mechanism question

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- Diet + exercise + metabolism in table 2

Let's go back to what S1 + S2 say (will need background too)

Background

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- Exercise -> GLUT4 -> CHO into muscles

S1: T1

Table 1. Blood glucose concentrations before and during consumption of the meal replacement drink (expressed as glucose area under the curve (gAUC)) during (E1, E3) or after (R1, R2, R3) exercise training.

Treatment Day	Blood glucose (mmol/L)	
	0min	$gAUC_{0\text{-}120min}$
E1	8.84 ± 0.32^{a}	541.3 ± 25.9^{a}
E3	7.26 ± 0.32^{b}	482.1 ± 23.3^{b}
R1	7.34 ± 0.25^{b}	489.3 ± 24.7^{b}
R2	8.20 ± 0.19^{c}	589.4 ± 29.3^{c}
R3	8.41 ± 0.14^{c}	600.1 ± 23.1^{c}

^{abc}Data (mean ± SEM) in columns with different superscripts are significantly different from each other at $p<0.05$.

Figure 1:

S1: F1

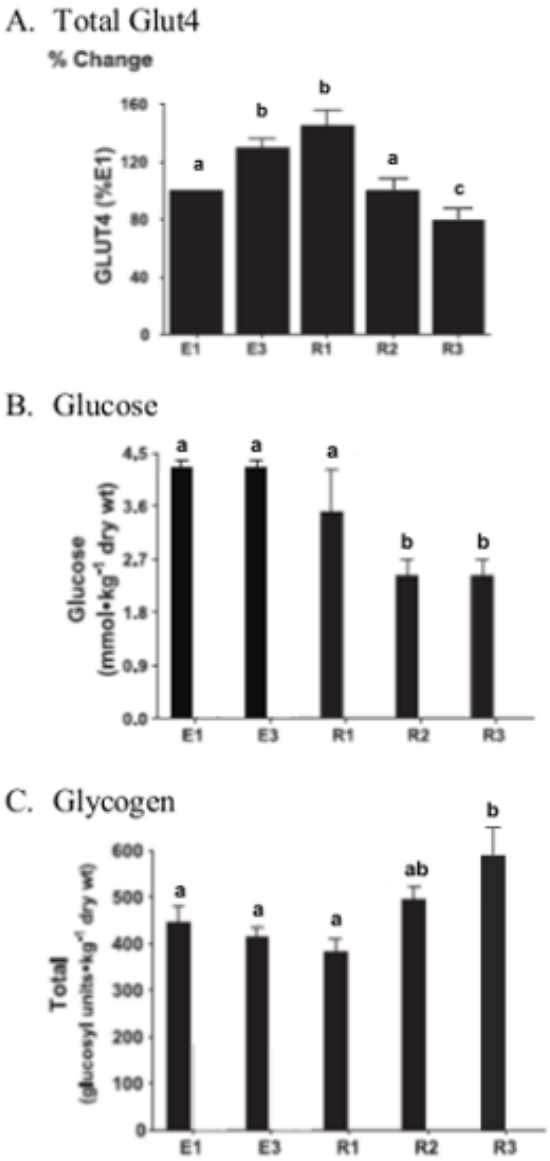

Figure 1. Data presented are means ± SEM.

A. The % change in total GLUT4 protein during the exercise regime. Values for E1 were arbitrarily set at 100 and all other days' values were expressed relative to E1.

B. Total glucose concentrations in quadriceps muscle after consumption of the meal replacement drink.

C. Total glycogen concentrations in quadriceps muscle after consumption of the meal replacement drink.

[abc]Bars with different letters are significantly different from each other at $p<0.05$.

Figure 2:

Wording of results for S1

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Combine results together to be more efficient and cleaner.

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- Fasting glucose + glucose AUC: E1 > (R2 = R3) > (E2 = R1)

F1

- GLUT4: R3 < (E1 = R2) < (E3 = R1)
- Muscle glucose + glycogen: (E1 = E2 = R1) > (R2 = R3)

S2: T2

Table 2. Subject characteristics before and after 3 months of exercise training.

	Baseline		Post-training	
Measure	**LF**	**HF**	**LF**	**HF**
Fasting glucose (mmol/L)	9.2 ± 0.2^{a}	9.4 ± 0.1^{a}	8.5 ± 0.2^{b}	9.5 ± 0.1^{a}
HbA1c (%)	7.3 ± 0.3^{a}	7.5 ± 0.4^{a}	6.9 ± 0.1^{b}	7.4 ± 0.1^{a}
Triglycerides(mmol/L)	2.5 ± 0.1^{a}	2.7 ± 0.2^{a}	2.0 ± 0.1^{b}	2.2 ± 0.2^{b}
Total Cholesterol(mmol/L)	5.2 ± 0.2^{a}	5.3 ± 0.1^{a}	4.8 ± 0.1^{b}	5.0 ± 0.1^{b}

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Figure 3:

S2: F2

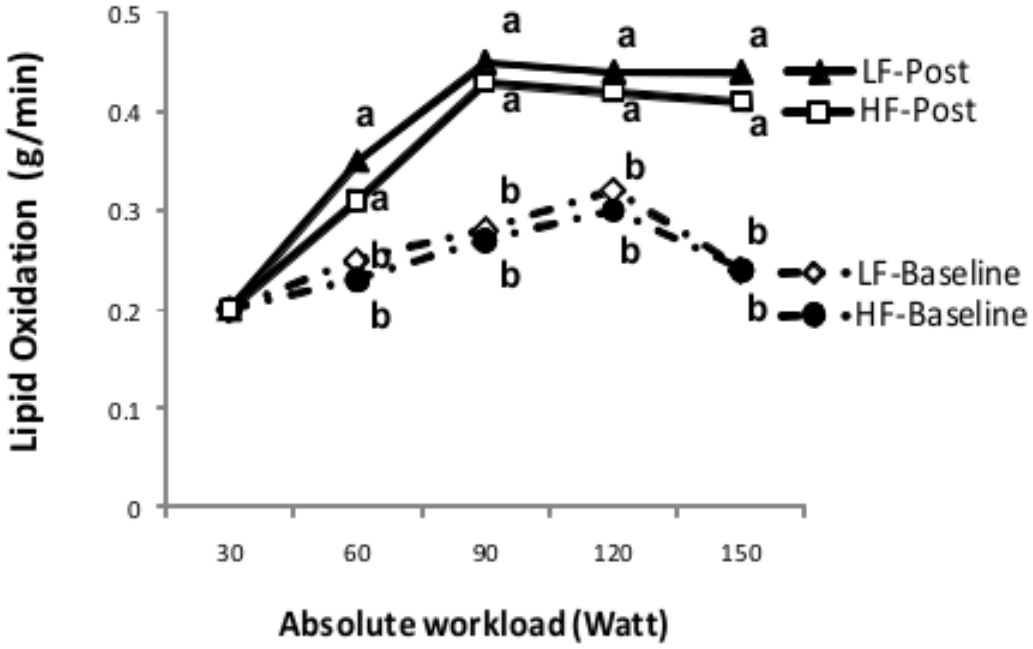

Figure 2. Whole-body lipid oxidation at the end of three months of endurance exercise. Data presented are means ± SEM. [abc]Data with different letters in the same workload are significantly different from each other at $p<0.05$.

Figure 4:

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- Fasting glucose + HbA1c: (Base LF = Base HF = Post HF) > Post LF
- TAG + Cholesterol: (Base Lf = Base HF) > (Post LF = Post HF)

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- Fasting glucose + HbA1c: (Base LF = Base HF = Post HF) > Post LF
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F2

- Lipid Oxid. at 60, 90, 120, 150 Watts: (Base LF = Base HF) < (Post LF = Post HF)

Let's go back to the question:

Propose a mechanism to explain how the different diet and endurance exercise treatments altered the metabolic parameters presented in Table 2. Use only data from Studies 1 and/or 2 to defend your answer.

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Include the background, S1, and S2 info first thing in the answer! It may be redundant, but this is good for you + us!

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  - Exercise acutely increased muscle glucose + glycogen, but dropped after many rest days ((E1 = E2 = R1) > (R2 = R3))

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Then synthesize the answers...

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- Synthesis:
  - Acute exercise reduces blood glucose (S1:T1), because of the increase in GLUT4 (S1:F1; Background), which also lead to an increase in intramuscular glucose and glycogen (S1:F1; Background).
  - However, if exercise is not consistent enough, these gains are diminished (S1:T1 + F1)

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  - The HF diet seems not to influence metabolism much during exercise as both groups decreased TAG + cholesterol equally (S2:T2) and lipid oxidation was equal between diets (S2:F2)
  - The improvements in glucose + HbA1c in the LF diet in S2:T2 may be due to the greater intake of CHO, letting the muscles use more glucose
  - But, lipid oxidation is the same between diets, so it could be that the LF diet may increase GLUT4 expression to use the dietary CHO, reducing blood glucose (as seen in S1:T1) by storing it in the muscles (Background)… However, GLUT4 was not measured in S2 so this is speculation.