

Unit 11 - Week 8

Course outline

How does an NPTEL online course work?

Prerequisite Assignment

MATLAB

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week 4

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Week 8

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64 - Lab: COBRA Toolbox

65 - Understanding FBA

66 - Understanding FBA

67 - Perturbations to Metabolic Networks: Over-expression

68 - Perturbations to Metabolic Networks: Synthetic Lethals

69 - Perturbations to Metabolic Networks: Synthetic Lethals

70 - Constraint-based Modelling of Metabolic Networks

Quiz : Assignment 8

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Computational Systems Biology : Week 8 Feedback Form

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Assignment 8

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-25, 23:59 IST.

1) Consider reactions R1 to R5. Which of the following statements is/are true if the growth medium contains metabolites M1, M2, M5? **1 point**

R1: $M1+M2 \rightarrow M3$
R2: $M3+M1 \rightarrow M4$
R3: $M2+M4 \rightarrow M9$
R4: $M3+M5 \rightarrow M9$
R5: $M9 \rightarrow \text{Biomass}$

- R3 is a single lethal
 R3 and R4 are double lethals
 R1 is a single lethal
 R2 and R5 are double lethals

No, the answer is incorrect.
Score: 0

Accepted Answers:
R3 and R4 are double lethals
R1 is a single lethal

2) Consider the following reactions with gene-protein-reaction relationship: **1 point**

R1: $M1 + M2 \rightarrow M3 + M4$ Gene A and Gene B
R2: $M3 \rightarrow M5 + M7$ Gene C or Gene E
R3: $M1 + M4 \rightarrow M5$ Gene D
R4: $M5 \rightarrow M6$ Gene F

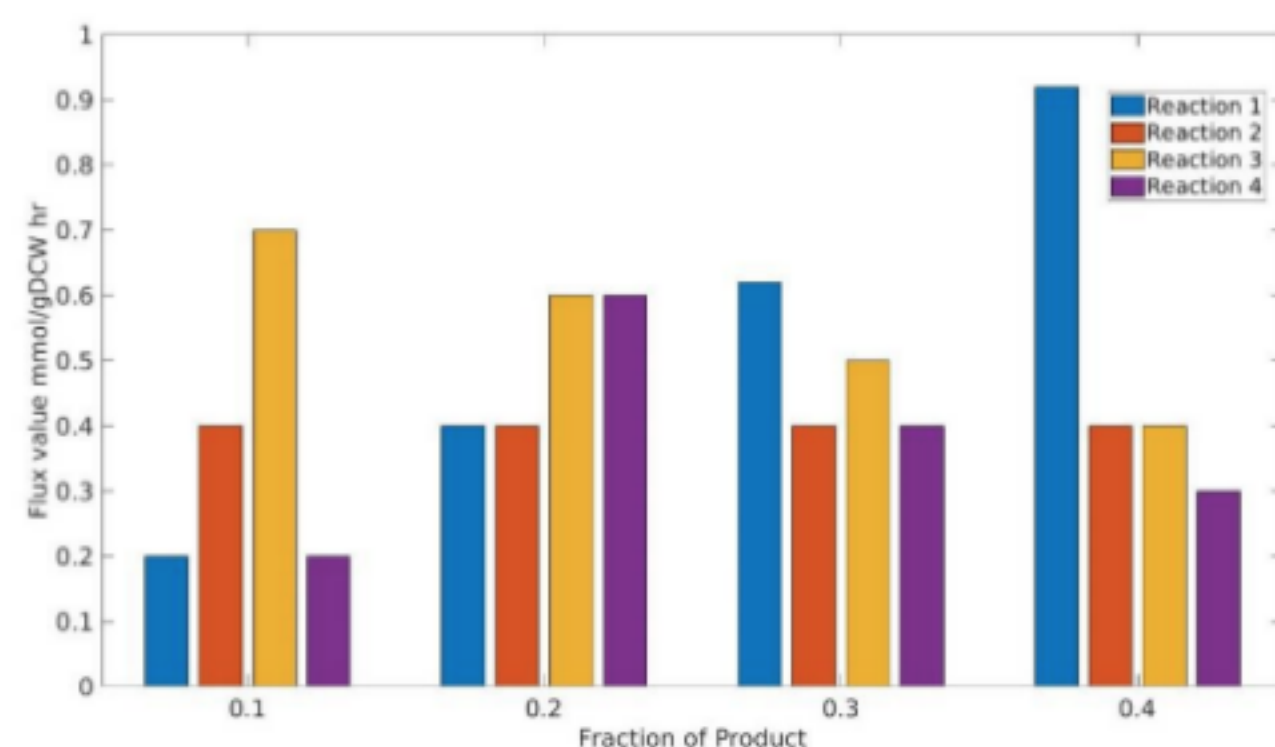
Which of the following statements is/are true in a growth medium containing M1 and M2, if the metabolite M6 is required for cell survival?

- Gene F is a single lethal
 Gene A is a single lethal
 Gene C and Gene E are double lethals
 Gene C and Gene D and Gene E are triple lethals

No, the answer is incorrect.
Score: 0

Accepted Answers:
Gene F is a single lethal
Gene A is a single lethal
Gene C and Gene D and Gene E are triple lethals

3) Using the metabolic model of an organism, FSEOF was carried out by enforcing the flux through reaction 5 at every step and noting the flux change in reactions 1,2,3 and 4 (shown as different colored bars). The following was observed, for different fractions of maximum flux enforced (labelled from decreasing to increasing fractions as 0.1,0.2, ..., 0.5): **1 point**



Which reaction is/are possible targets for overexpression?

- Reaction 1
 Reaction 2
 Reaction 3
 Reaction 4

No, the answer is incorrect.
Score: 0

Accepted Answers:
Reaction 1

4) Under a given a set of conditions, maxflux and minflux of R1 and R2 obtained through Flux Variability Analysis (FVA) are $R1 = (0.94 \ \& \ 0.43)$ and $R2 = (0.56 \ \& \ 0.31)$ respectively. Under the same conditions which of the following flux values is/are possible? **1 point**

- Flux through R1 is 0.22 and flux through R2 is 0.62
 Flux through R1 is 0.56 and flux through R2 is 0.12
 Flux through R1 is 0.96 and flux through R2 is 0
 Flux through R1 is 0.46 and flux through R2 is 0.33
 Flux through R1 is 0 and flux through R2 is 0

No, the answer is incorrect.
Score: 0

Accepted Answers:
Flux through R1 is 0.46 and flux through R2 is 0.33

For the model given ([IML1515.xml](#)), using COBRA Toolbox, answer the following questions

5) What is the growth rate of the model? (Enter values correct to 2 decimal places)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.87,0.89

6) What is the flux through the reaction ASNS2? (Enter values correct to 2 decimal places)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.20,0.22

7) What are the total number of exchange metabolites?

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 337

8) Change the uptake rate of glucose (reaction number 183 in the model) to -5 and find the growth rate. (Enter values correct to 2 decimal places)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.41,0.43

0 points