

HW07 - Diet & Nutrition

Question 1

6 pts

Select the true statements.

- You can be simultaneously malnourished and overweight
- Malnourishment is fundamentally a problem of too few calories
- Undernourishment is fundamentally a problem of too few calories
- You can be simultaneously malnourished and underweight
- Malnourished and undernourished mean the same thing

Question 2

4 pts

A carbohydrate used for directly fueling metabolic processes is typically a _____, while a carbohydrate used for energy storage is typically a _____.

- polysaccharide, monosaccharide
- β -D glucose, D-glucose
- monosaccharide, polysaccharide
- cellulose, fructose

Question 3

6 pts

Plants and animals naturally produce which of the following? (select all that apply)

- Cis fatty acids
- Monounsaturated fats
- Free fatty acids
- Trans fatty acids

Question 4

4 pts

An amino acid has a phenol functional group on its side chain. This side chain is characterized as...

- nonpolar, basic
- nonpolar, neutral
- nonpolar, acidic
- polar, basic
- polar, neutral

Question 5

5 pts

The polar amino acid side chains are divided into which set of subcategories?

- hydrophilic and hydrophobic
- acidic, basic, and neutral
- combustible, nutritional

Question 6

5 pts

An amino acid has a methyl group side chain. Which of the following best characterizes the amino acid?

- nonpolar, hydrophilic
- nonpolar, hydrophobic
- polar, hydrophobic
- polar, hydrophilic

Question 7

5 pts

What functional group is present on the **side chain** of all basic amino acids?

- a phenol
- a carboxylic acid
- an amine
- a nonpolar methyl group

Question 8

5 pts

Which two amino acids have amide functional groups on their side chain?

- asparagine and glutamine
- aspartate and glutamate
- tryptophan and leucine
- arginine and lysine
- aspartate and arginine

Question 9

5 pts

Consider the alanine molecule in the human body. What is the charge on nitrogen, oxygen, and the overall alanine molecule?

- 0, +1, +1
- +1, -1, 0
- +1, +1, 0
- 0, 0, 0
- +1, -1, -2
- +1, -1, +2
- +1, +1, +2
- 0, -1, -1

Question 10

6 pts

Choose the correct statements from below:

- Oleic acid is a trans fatty acid.
- Oleic acid is a cis mono-unsaturated fatty acid.
- The main oil component of olive oil is a trans fat.
- The carbon chains on oleic acid are on the same side of the double bond.
- A main oil component of olive oil is oleic acid

Question 11

4 pts

Which functional group is fundamental to a fatty acid?

- carboxylic acid
- aldehyde
- nitrile
- amine
- amide

Question 12

6 pts

Which component of saturated fatty acids is worth noting with respect to the health risk associated with their consumption?

- A more linear structure in the fatty acid chain results in more regions of overlap, causing a greater viscosity/thickness in the body
- A more branched structure in the fatty acid chain causes the fat to have a greater viscosity/thickness.

Question 13

4 pts

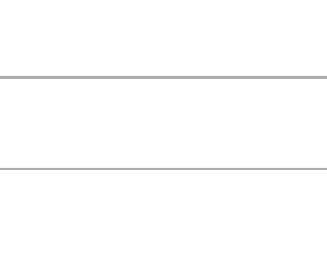
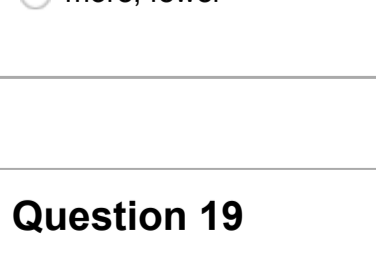
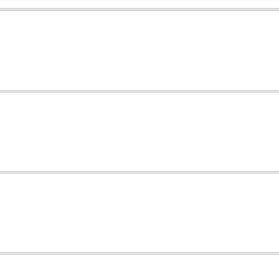
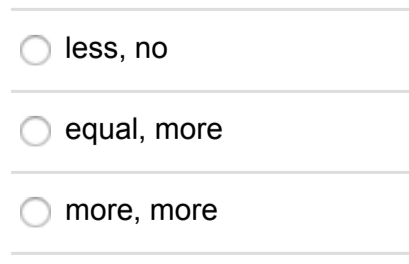
Hydrogenating oils have which of the following **two** impacts on a fatty acid chain?

- creates a healthier, less viscous mixture
- reduces branching in the fatty acid molecule
- creates more branching in the fatty acid molecule
- creates a more viscous oil

Question 14

5 pts

Which of the molecules below have *cis* functionalities?



- I and II
- III and IV
- I and IV
- II and III

Question 15

5 pts

Which of the two fatty acids pictured below would be expected to have a higher melting point?



- P
- Q

Question 16

5 pts

Which formula below could be a triglyceride?

- $C_{20}H_{40}O_2$
- $C_{27}H_{50}O_6$
- $C_{18}H_{38}$

Question 17

6 pts

Select the elements with NO known nutritive value.

- I
- Fe
- Cd
- Cu
- Ca
- Hg
- Se
- Pb
- Co
- Mg
- Na
- B
- Cl
- Zn

Question 18

4 pts

A mass of cellulose can provide _____ combustion heat energy as/than an equal mass of starch.

The same mass of cellulose provides _____ nutritive calories to humans compared to the starch.

- equal, no
- less, fewer
- less, no
- equal, more
- more, more
- more, fewer

Question 19

5 pts

Which of the following macronutrients provides the most calories per gram?

- protein
- carbohydrates
- fats
- water

Question 20

5 pts

We are constantly converting food energy into both heat and mechanical energy, allowing us to maintain a body temp $\sim 7-8^\circ\text{C}$ above "room temperature" all day, and to move around the world and interact with it. If instead you treated the human body as a 70 kg sack of water that started each day at 25°C , how hot could a person get from 2000 Calories of food (assuming it metabolized the food perfectly to heat energy)?

- 98°F
- 54°F
- 129°F