HW07 - Diet & Nutrition

1 6 points

Select the true statements.

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

2 4 points

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

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

3 6 points

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

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

4 4 points

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

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

5 5 points

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

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

6 5 points

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

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

7 5 points

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

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

8 5 points

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

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

9 5 points

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

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

10 6 points

Choose the correct statements from below:

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

11 4 points

Which functional group is fundamental to a fatty acid?

- ◯ nitrile
- ◯ amide
- ◯ aldehyde
- ◯ amine
- ◯ carboxylic acid

12 6 points

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

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

13 4 points

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

14 5 points

Which of the molecules below have *cis* functionalities?

I

II

III

IV

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

15 5 points

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

P

Q

- ◯ Q
- ◯ P

16 5 points

Which formula below could be a triglyceride?

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

17 6 points

Select the elements with NO known nutritive value.

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

18 4 points

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.

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

19 5 points

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

- ◯ water
- ◯ carbohydrates
- ◯ fats
- ◯ protein

20 5 points

We are constantly converting food energy into both heat and mechanical energy, allowing us to maintain a body temp ~7-8 °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