Principles of Biomedical Science

Virtual Learning

9-12 / PLTW® PBS

April 21, 2020

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Lesson: April 21 2020

Objective/Learning Target:

Students will be able to: Students will research, identify, and describe differences and functions of cholesterol in our cells and body. *Reference: PLTW®* 4.3.1 What is Cholesterol?

Let’s Get Started (Bell Ringer):

Watch Warm up Video: American Heart Association *What is Cholesterol?*

Read Article: **verywell**health *Why some Cholesterol Does Your Body Good*

Lesson/Activity:

Read the following article from: Harvard Health Publishing Harvard Medical School, *How it's made: Cholesterol production in your body*

Activity #1: In your notebook or on a piece of paper, answer the following question after reading information about cholesterol:

What are the five main types of Cholesterol? Explain each and explain their role in the body.

Answers:

- **Chylomicrons** are very large particles that mainly carry triglycerides (fatty acids from your food). They are made in the digestive system and so are influenced by what you eat.
- **Very-low-density lipoprotein (VLDL)** particles also carry triglycerides to tissues. But they are made by the liver. As the body's cells extract fatty acids from VLDLs, the particles turn into intermediate density lipoproteins, and, with further extraction, into LDL particles.
- **Intermediate-density lipoprotein (IDL)** particles form as VLDLs give up their fatty acids. Some are removed rapidly by the liver, and some are changed into low-density lipoproteins.
- **Low-density lipoprotein (LDL)** particles are even richer in pure cholesterol, since most of the triglycerides they carried are gone. LDL is known as "bad" cholesterol because it delivers cholesterol to tissues and is strongly associated with the buildup of artery-clogging plaque.
- **High-density lipoprotein (HDL)** particles are called "good" cholesterol because some of them remove cholesterol from circulation and from artery walls and return it to the liver for excretion.

Lesson/Activity continued:

Read the following article from: MedicineNet *HDL vs. LDL Cholesterol Differences, Symptoms, Cuases (STDs), Treatment, and Cure*

Activity #2: In your notebook or on a piece of paper, create a Cholesterol Level chart that shows what levels are Desirable (Good), Borderline high (OK), and High (Bad), about blood cholesterol levels for both LDL and HDL

Answers:

Total Cholesterol Level	Category
Less than 200mg/dL	Desirable
200-239 mg/dL	Borderline high
240mg/dL and above	High

LDL (Bad) Cholesterol Level	LDL Cholesterol Category
Less than 100mg/dL	Optimal
100-129mg/dL	Near optimal/above optimal
130-159 mg/dL	Borderline high
160-189 mg/dL	High
190 mg/dL and above	Very High

HDL (Good) Cholesterol Level	HDL Cholesterol Category
Less than 40 mg/dL	A major risk factor for heart disease
40—59 mg/dL	The higher, the better
60 mg/dL and higher	Considered protective against heart disease

Practice:

Read the article from thriva health hub *Everything you need to know about cholesterol* and write a reflection about what you learned.

Answers:

Reflections will vary on students opinion and even knowledge on the subject

Additional Practice:

Lets see what you have learned? Try taking: WebMD Quiz: *Test Your Cholesterol Smarts*

Answers:

Answers are revealed as you take the quiz.