HOW THE BODY STORES CARBOHYDRATES

Glycogen storage in the body
Introduction

Here’s what you’ll learn in this unit:

- How the body stores carbohydrate
- The body’s glycogen stores
- Glycogen storage capacity
- The weight loss behind low-carb dieting
How the body stores carbohydrate

- Carbohydrate is stored as glycogen in the muscles and liver, along with about 3 times its own weight in water.
- In other words, the body additionally stores 3 grams of water for every gram of glycogen.
- That’s a total of 4 grams, with 75% being water.

For this reason, low-carbohydrate diets tend to make people lose quite a lot of weight in the first few days. The weight loss is almost entirely due to loss of glycogen and its accompanying water (!)
The body’s glycogen stores

- There is about 3 times more glycogen stored in the muscles than in the liver. This is to provide direct fuel for muscles.
- The purpose of liver glycogen, however, is to maintain blood glucose levels at rest and during prolonged exercise.
- Glycogen is a large molecule, similar to starch, made up of many glucose units joined together.
- The body can store only a relatively small amount of glycogen – there is no endless supply! Like the petrol tank in a car, the body can hold only a certain amount.
- Small amounts of glucose are present in the blood (approximately 15 grams, which is equivalent to 60 calories) and in the brain (about 2 grams or 8 calories) and their concentrations are kept within a very narrow range, both at rest and during exercise. This allows normal body functions to continue.
Glycogen storage capacity

- The total store of glycogen in the body amounts to about 375 to 500 grams, with approximately:

  275g to 400g in muscles + 100g in the liver

- This store is equivalent to 1500 - 2000 calories... enough to last one day if you were to eat nothing!

- Increasing your muscle mass will also increase your storage capacity for glycogen.

- Endurance athletes have higher muscle glycogen concentrations compared with sedentary people.
Did you know?

Excess carbohydrates are stored as fat in your body.

This happens when muscles and liver supplies have already been replenished. If you eat more carbs than needed, the rest is then converted into triglycerides and shipped into your fat cells!
1. Carbohydrate is stored as _______ in the body, along with about _______ times its own weight in water. So for every gram of _______ the body also stores ____ grams of water.

2. In fact, this is what it looks like visually (choose below):
3. The glycogen stores in the body are as follows:

____ to ____ grams in muscles + ____ grams in the liver

4. The purpose of glycogen in muscles is:

5. And the purpose of glycogen in the liver is:
6. A person follows a ketogenic diet (such as Atkins), with no carbohydrates consumed at all. After a couple of days she loses 500 grams of muscle and liver glycogen. How many kilograms of water will she lose as a result?

7. So, how many kilograms of glycogen and water will she lose altogether?
Exercise Answers

1. Glycogen, 3, Glycogen, 3

2. C is the correct visual representation on how glycogen is stored in the body – 25% glycogen with 75% water

3. 275, 400, 100

4. Provide direct fuel for muscles

5. Maintain blood glucose levels at rest and during prolonged exercise

6. The person following the ketogenic diet will also lose 1.5 kilograms of accompanying water

7. In total, she will lose 2 kilograms (about 4 pounds) of glycogen (0.5kg) and water (1.5kg)