Welcome to this lesson today on red blood cells. Today we will be discussing the structure, function, and how new red blood cells are produced.

So red blood cells are also known as erythrocytes. So whenever you see or hear the word erythrocytes, just think red blood cells. That's another name for them.

So erythrocytes make up about 45% of total blood volume. So remember, our blood is composed of red blood cells. It's also composed of platelets. And it's also composed of white blood cells and plasma. So those are the different components of blood. So erythrocytes make up about 45% of our total blood volume.

And basically their main role is to carry oxygen to cells and to carry carbon dioxide away from cells and tissues. And the shape of a red blood cell is that it's shaped like a disk. And this disk has kind of a little indentation in the middle of it like this. So the shape of a red blood cell is important to its function.

And a component of red blood cells is a protein called hemoglobin. So red blood cells are actually red in color due to this protein hemoglobin. So hemoglobin is a protein found on red blood cells that allows the red blood cells to carry oxygen to cells and tissues.

And so the lifespan of a red blood cell is about 120 days. And after that, basically the cell will die and the different parts can be recycled throughout the body.

And a cell count is the number of cells in a microliter of blood. So this varies a little bit from person to person, depending on the person's size and whether they're a male or female and whatnot. But the average cell count is between 4.8 to 5.4 million. So if you think about that, in one microliter of blood, the average person has between 4.8 and 5.4 million red blood cells.

So maintaining a stable count is important for homeostasis. We need to have this stable red blood cell count in order to ensure that our cells and our tissues are getting the oxygen that they need, because again, remember, the main function of red blood cells is to carry oxygen to cells and tissues and remove carbon dioxide waste. So it's important that we maintain this stable cell count to help maintain homeostasis.

So the next thing that we're going to talk about in this lesson is how new red blood cells are produced. So we're going to take a look at this diagram to help explain that. So this structure right here would be your kidneys. And your kidneys play a large role in filtering blood.

So as blood is being filtered through the kidneys, they help to monitor oxygen levels in the blood. So let's say that

as blood is being filtered through the kidney, the kidneys detect that there's been a decrease in oxygen levels. So blood is flowing in, kidneys detect a decrease in oxygen levels.

So what they're going to do at that point then is to create a hormone called erythropoietin. So the kidneys detect a decrease in oxygen levels as they're filtering blood. And so they secrete this hormone. So let's pretend these little blue dots around the red blood cells is this hormone here.

Erythropoietin, abbreviated as EPO, will then stimulate bone marrow to produce new red blood cells. So you might know that red blood cells are produced in bone marrow. So when the body detects an increase in EPO, it stimulates the bone marrow to produce more red blood cells, or more erythrocytes.

So this bone marro will then produce more red blood cells. And at that point, we would have more oxygen in the blood as well, because the red blood cells would be able to bind to more oxygen. So as we have more red blood cells, we would have more oxygen.

And then this is an example of a negative feedback loop, because basically our change was detected and then reversed. So our change was that there was a drop in oxygen levels, something happened to reverse that change, and now we're back to a homeostatic level. So that's a negative feedback loop. So at this point, secretion of erythropoietin would stop. We no longer need more red blood cells to be produced, because we're now back at a more stable level of red blood cells. And therefore, there's more oxygen in the blood.

So the kidneys would continue to filter this blood. And if for some reason the oxygen levels dropped again, this process would start over again. So that's a negative feedback loop. And that's how new red blood cells are produced.

So this lesson has been an overview on the structure and function of red blood cells, as well as how new red blood cells are produced.