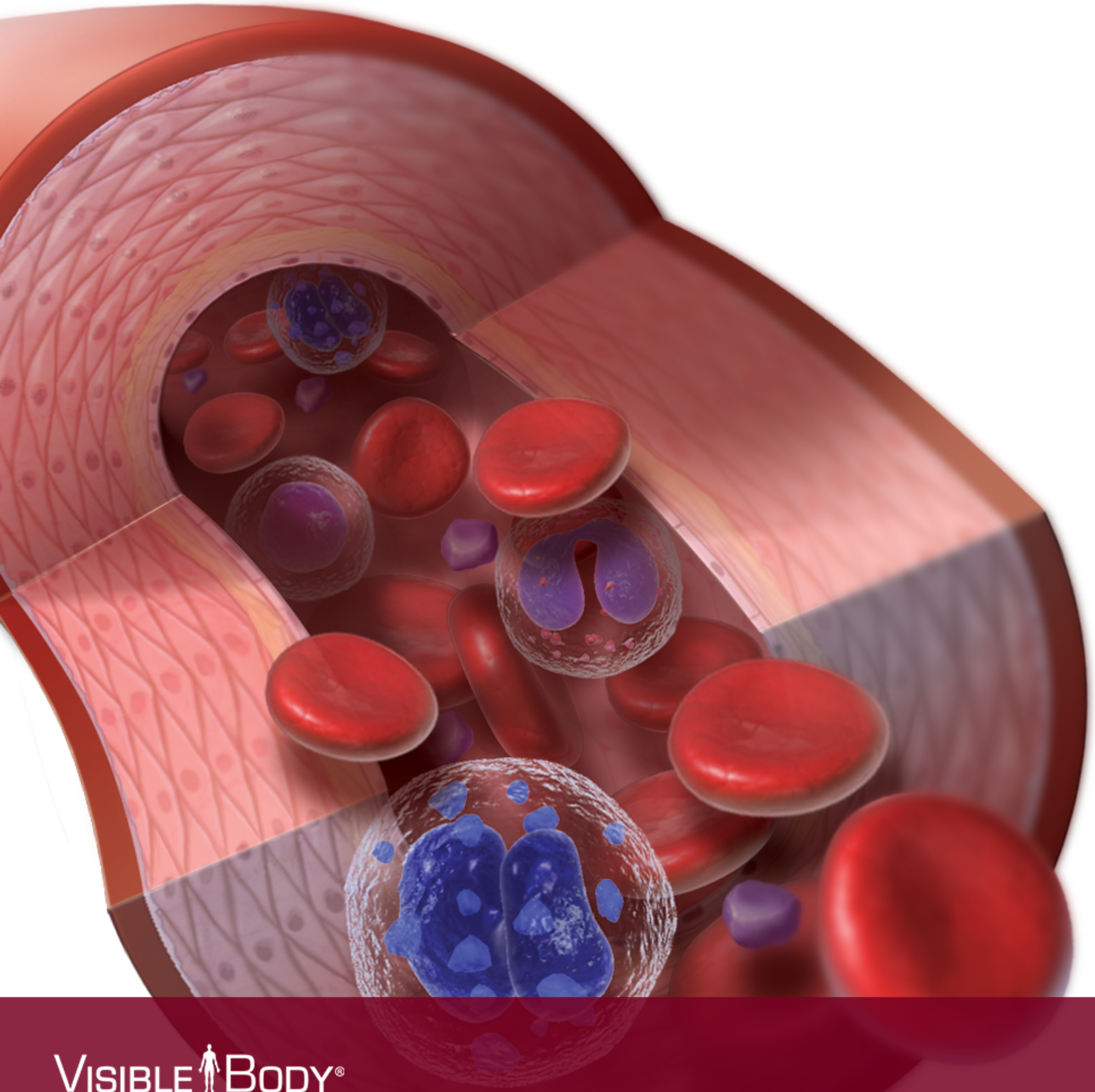

VISIBLE BODY®

Blood

A circulatory system lab activity using Visible Body Suite

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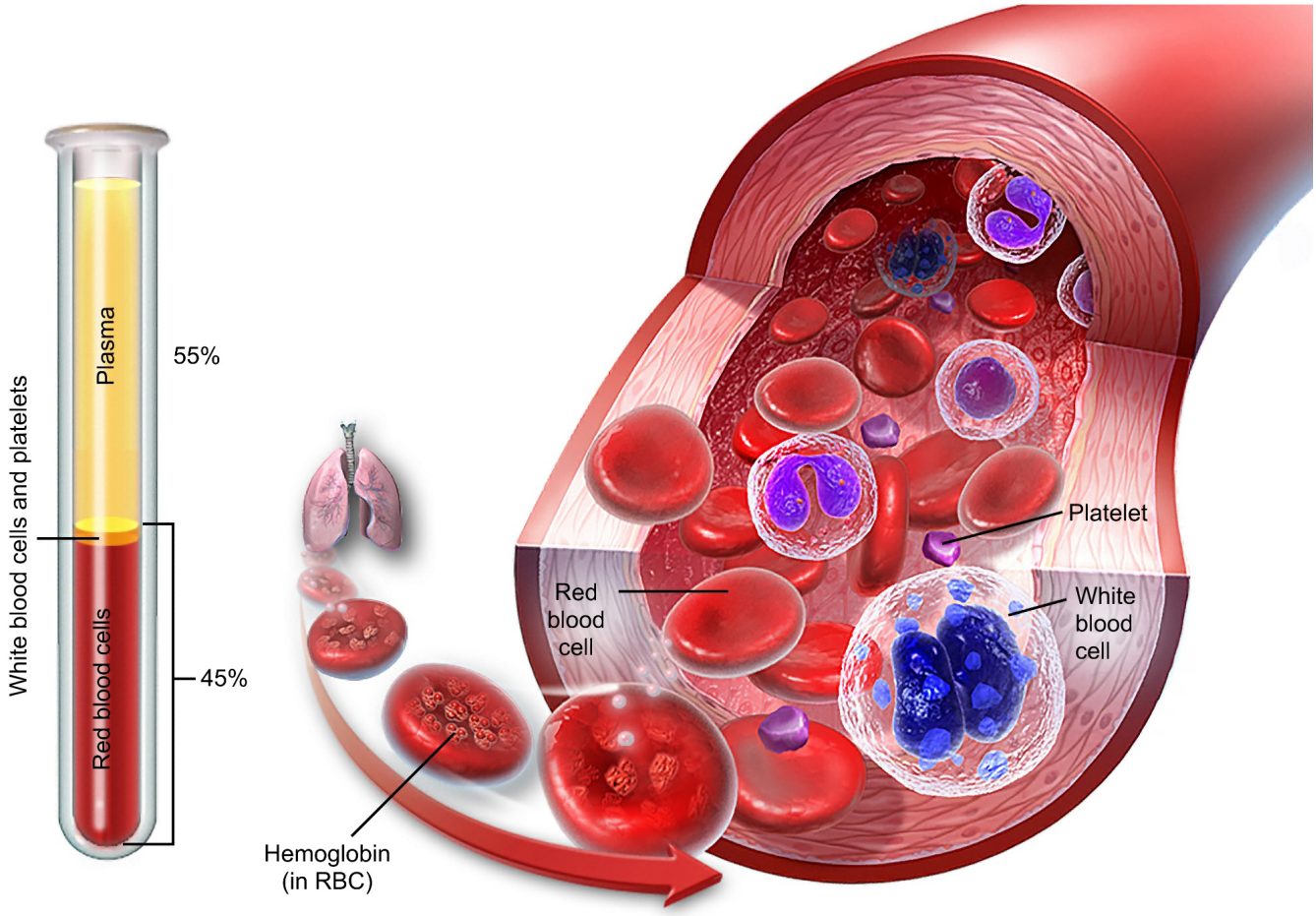
PRE-LAB EXERCISES

Open Visible Body Suite. From the main menu, choose Anatomy & Physiology and select 7. Circulatory System. Scroll to Chapter 28. Blood.

You are responsible for the identification of **all bold terms** and all answers to the questions.

A. Examine the illustration in Module 28.1 Blood Histology and answer the following questions.



1. **Blood** is a kind of _____ tissue.

2. List the main substances that are transported by blood.

3. What important homeostatic parameter is regulated by blood?

4. Blood components also protect the body from _____ and form _____ at sites of injury to prevent blood loss.

5. What percent of blood is composed of the following:

a. **Plasma** _____

b. **Formed elements** _____

6. What are the formed elements of blood?

7. The above illustration shows a test tube that has been spun in a centrifuge to separate the formed elements from the plasma. What do think is the heaviest component of blood?

8. Which formed element contains **hemoglobin**?

IN-LAB EXERCISES

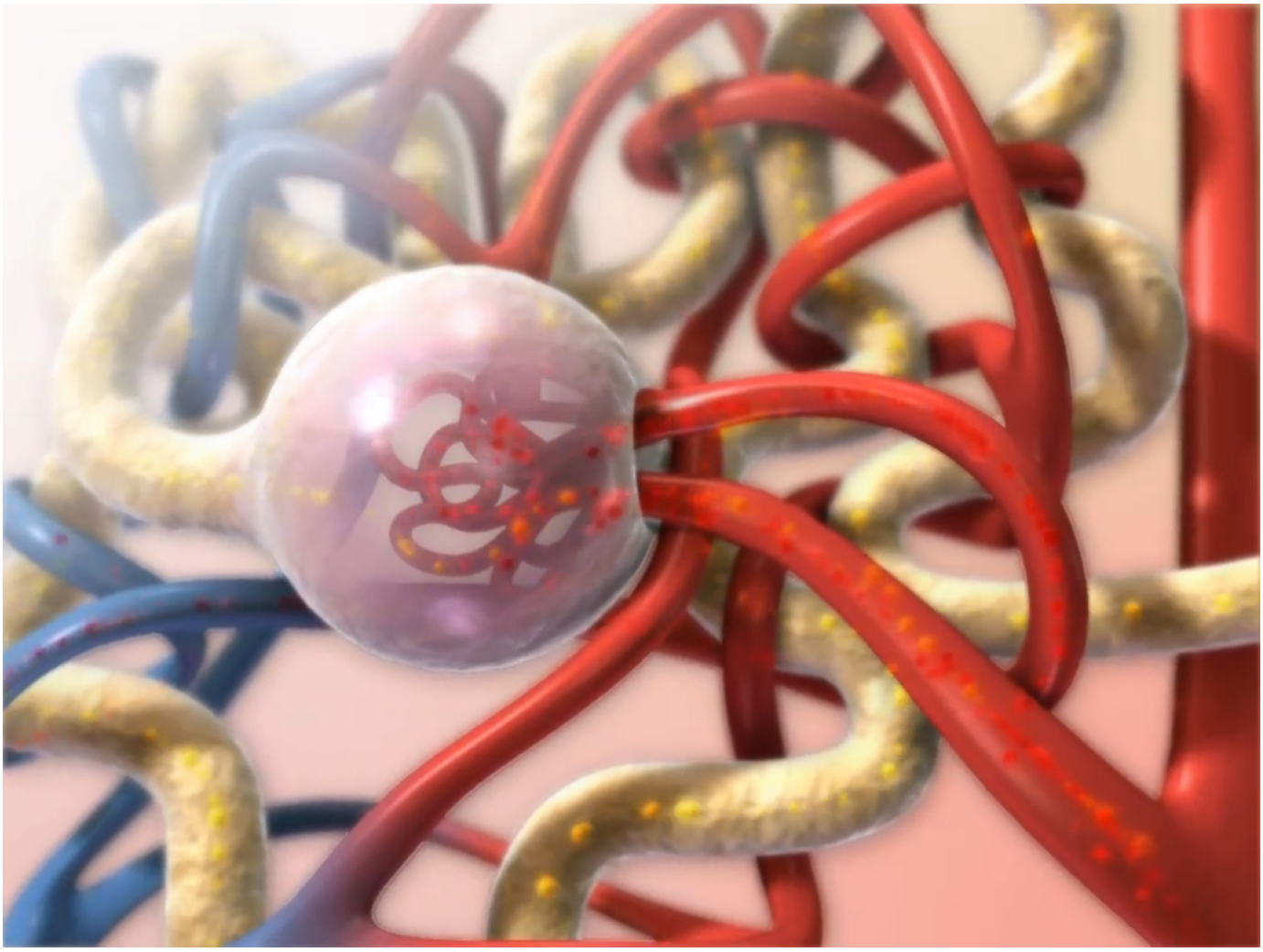
Use the following modules in the VB Suite app to guide your exploration of blood. You can manipulate the images to see different views and isolate each structure. Be sure to select the book icon under the structure name to read information specific to that structure.

You are responsible for the identification of **all bold terms** and all answers to the questions.

From the main menu, choose Anatomy & Physiology and select 7. Circulatory System. Scroll to Chapter 28. Blood.

A. Blood Plasma

1. Watch the video in Module 28.2 The Function of Plasma and answer the following questions.



a. Plasma is _____% water.

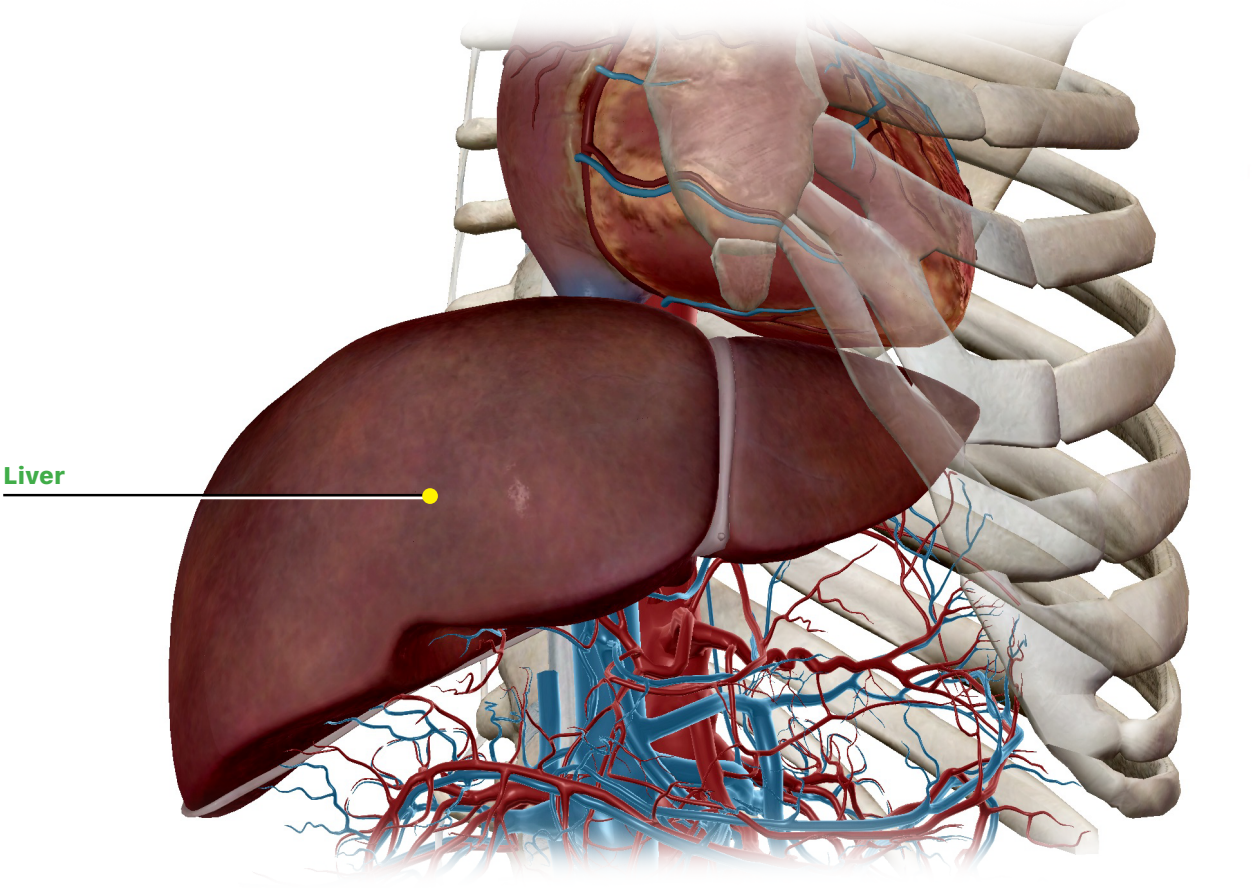
b. List the nutrients from the digestive system that are carried by the bloodstream.

c. Which organs filter waste products from blood?

d. List the waste products that are filtered from the blood by the urinary system.

e. List four more components, other than blood gases, waste, nutrients, and formed elements, that are transported by blood.

2. Explore the 3D anatomical view in Module 28.3 Plasma Protein Production and answer the following questions.

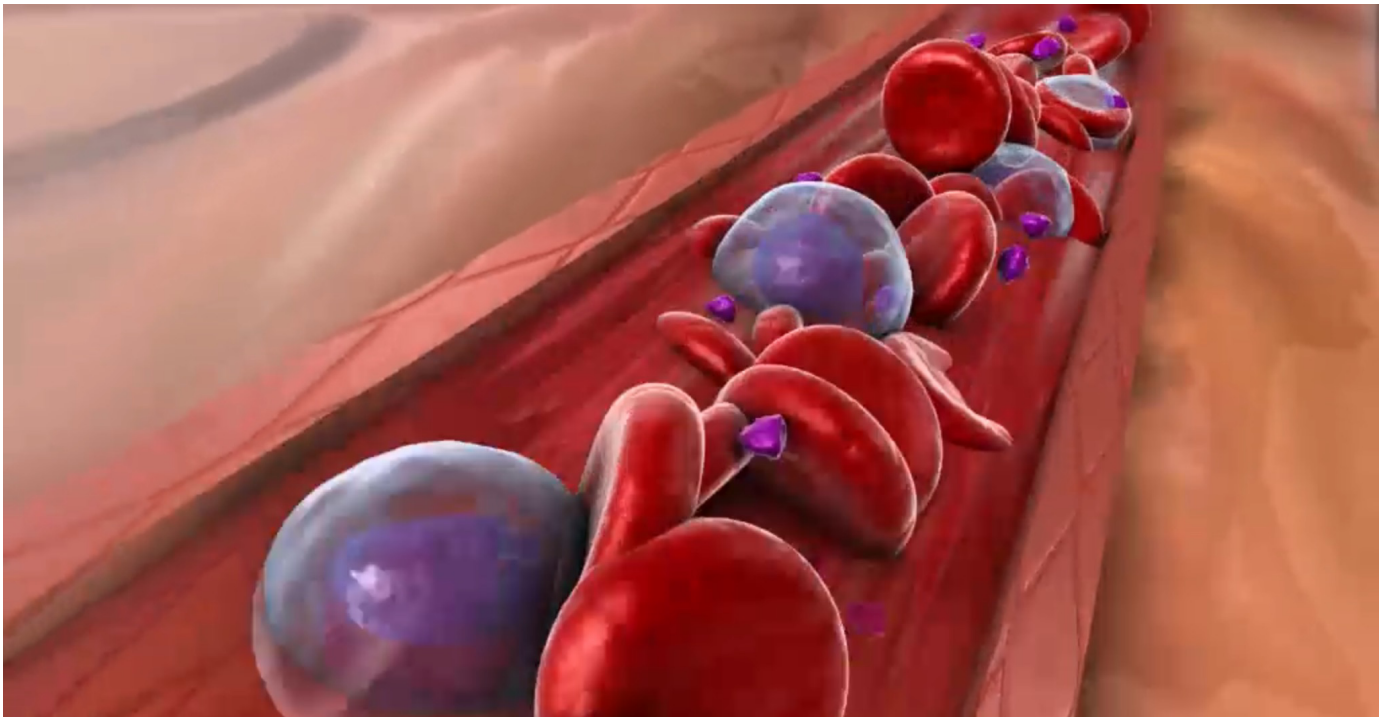


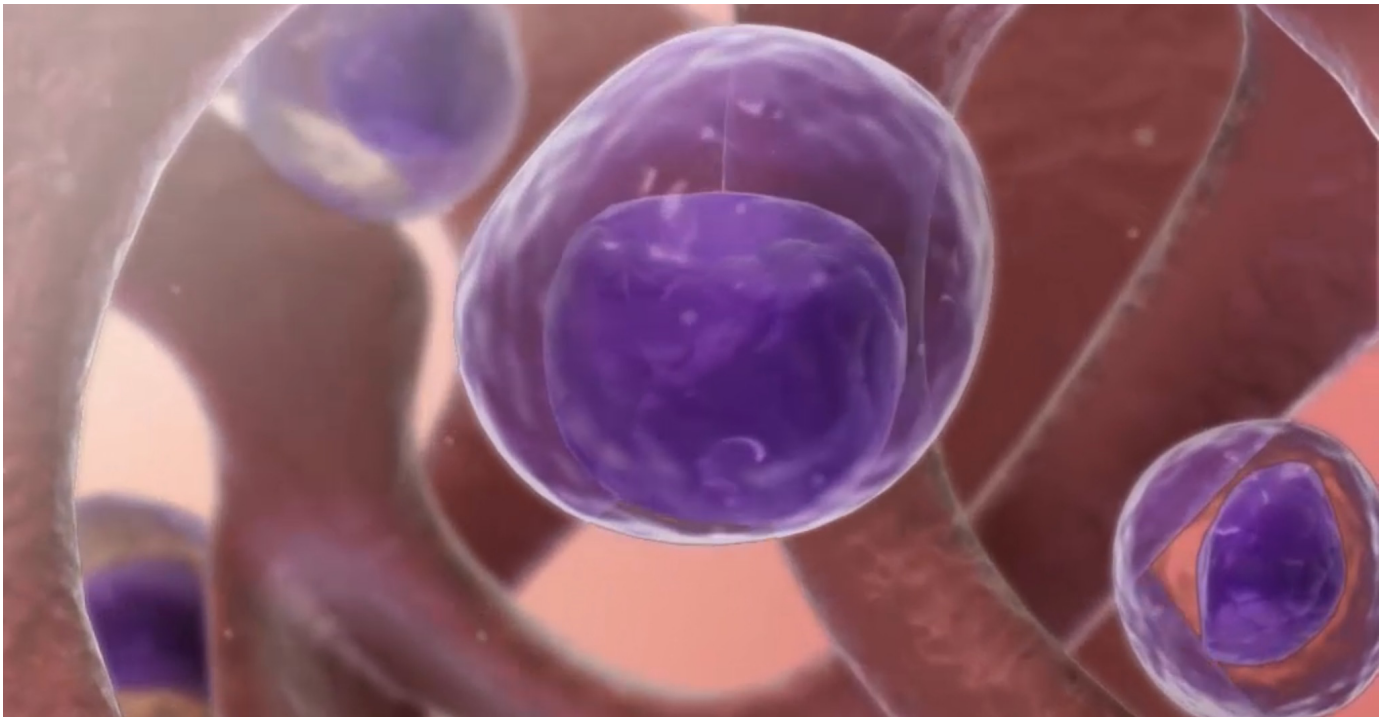
a. There are many proteins, with various functions, that circulate in plasma. Most of them are made in the _____.

b. Many of these proteins act as carriers. List two things that are carried by **plasma proteins**.

B. Blood Cells and Platelets

1. Watch the video in Module 28.4 Red Blood Cell Production and answer the following questions.





a. Red blood cells are also called _____. ("Cyte" means "cell" and "erythro" means red.)

b. Red blood cells make up _____% of total blood volume.

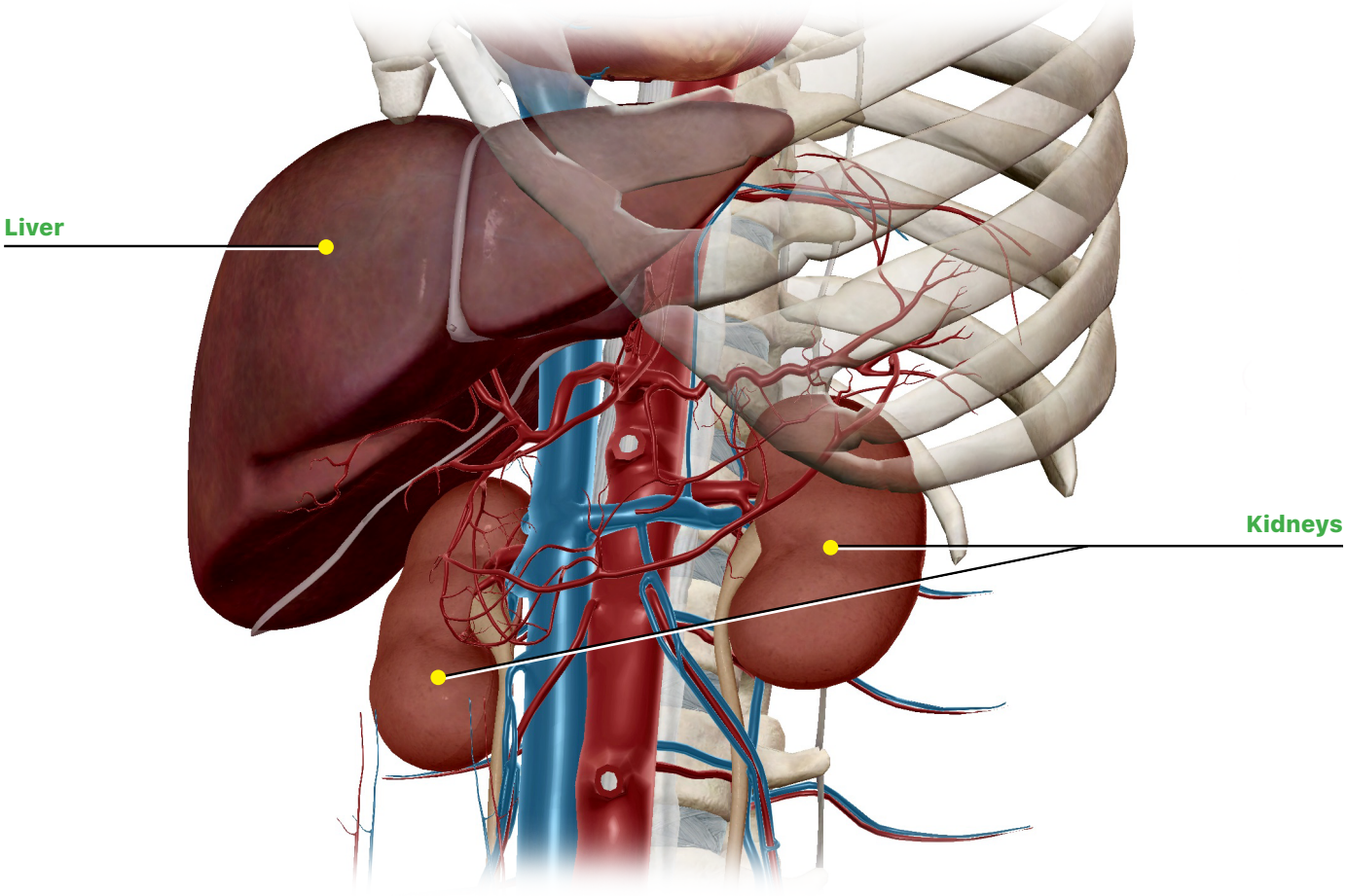
c. What is the main function of red blood cells?

d. Where are red blood cells produced?

e. Immature red blood cells called _____ eject their _____, allowing the cells to carry more hemoglobin, the molecule that transports oxygen.

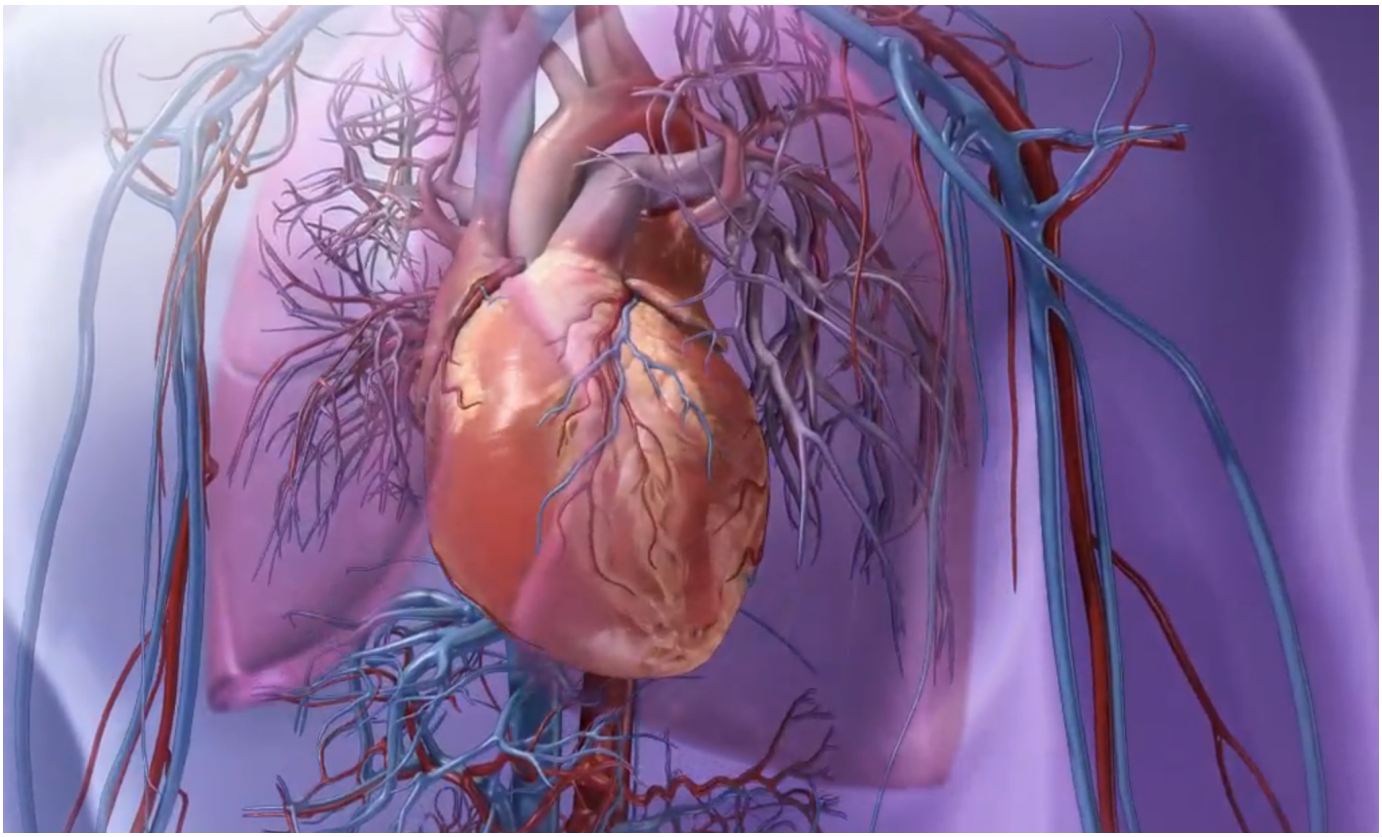
f. When they are mature, red blood cells leave the marrow and enter the bloodstream via enlarged, leaky, specialized capillaries called _____.

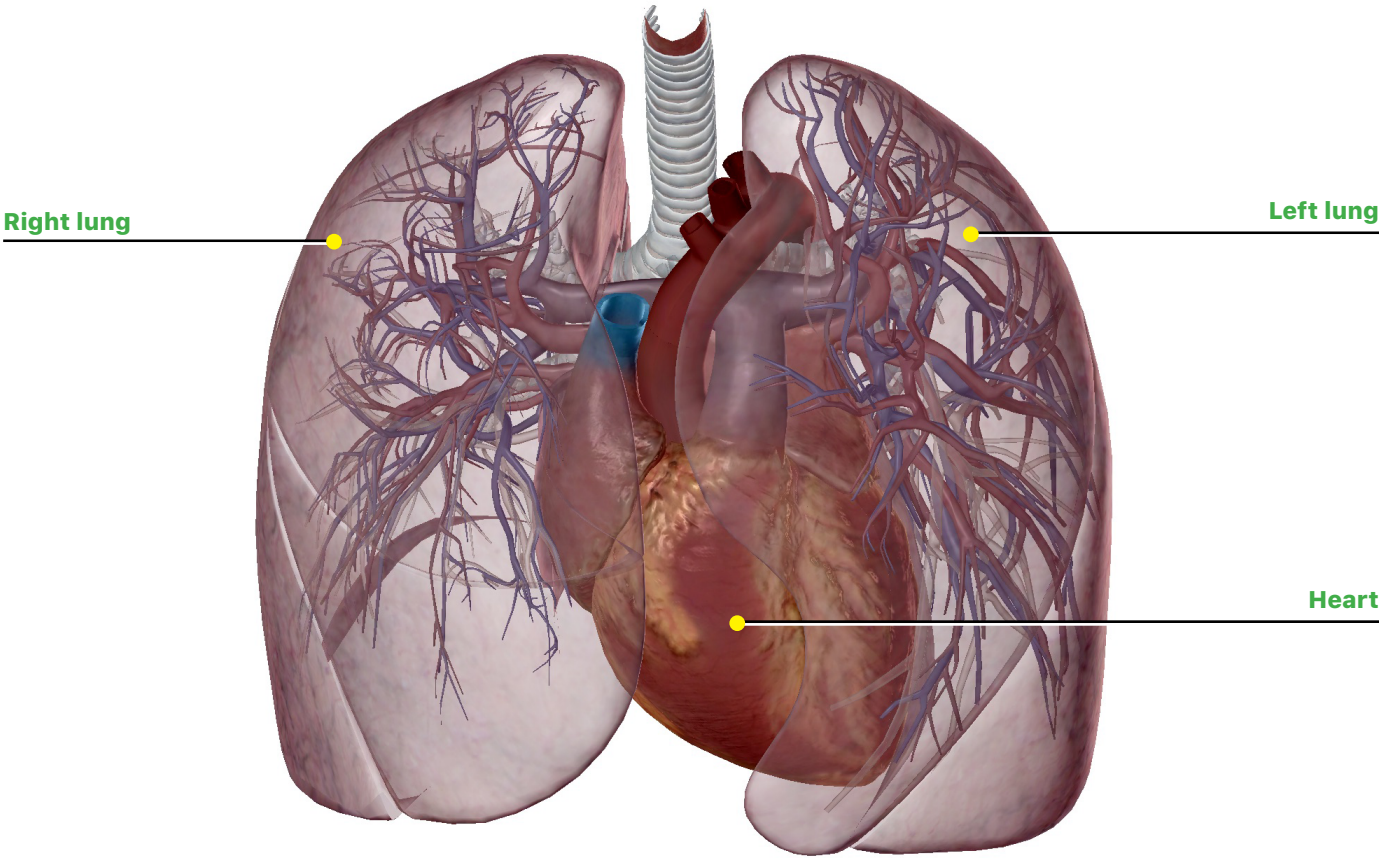
2. Explore the 3D anatomical view in Module 28.5 Erythropoietin and RBC Production and answer the following question.



a. Which two organs produce **erythropoietin**?

3. Watch the video in Module 28.6 Red Blood Cells, explore the 3D anatomical view in Module 28.7 Red Blood Cells and Oxygen Transport, and answer the following questions.





a. Red blood cells carry oxygen on gas-transporting molecules called _____.

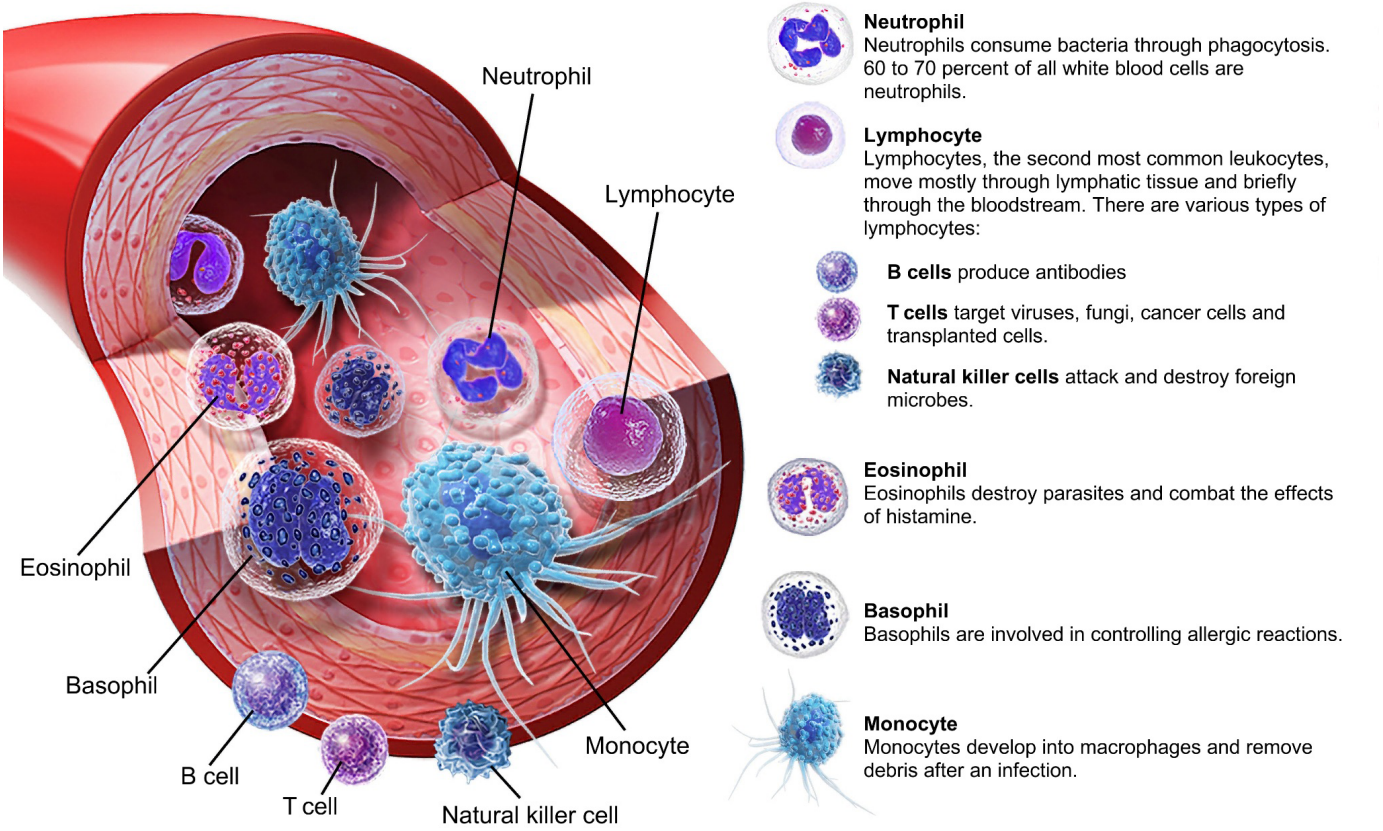
b. In tissues, oxygen diffuses from red blood cells, where oxygen concentration is _____, across the capillary walls into tissue cells, where oxygen concentrations are _____.

c. The reverse is true for _____, which diffuses into the bloodstream from the tissues.

d. Carbon dioxide is carried inside _____ and dissolved in _____.

e. As blood travels through the _____, carbon dioxide is released from the body and oxygen is picked up by red blood cells.

4. Examine the illustration in Module 28.8 White Blood Cell Histology and answer the following questions.



a. **White blood cells** are also called _____. (“Cyte” means “cell” and “leuco/leuko” means white.)

b. White blood cells play a major role in fighting _____.

c. List the different types of white blood cells and state their roles.

i.

ii.

iii.

iv.

v.

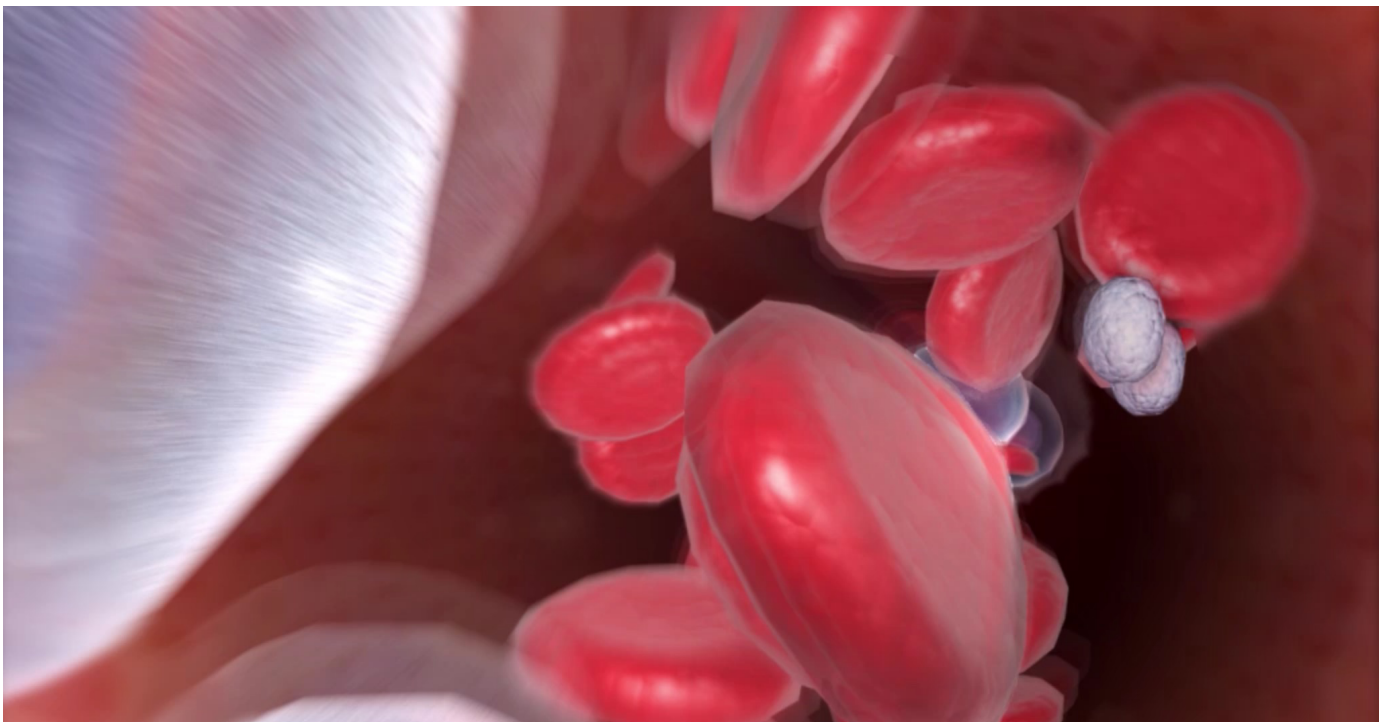
vi.

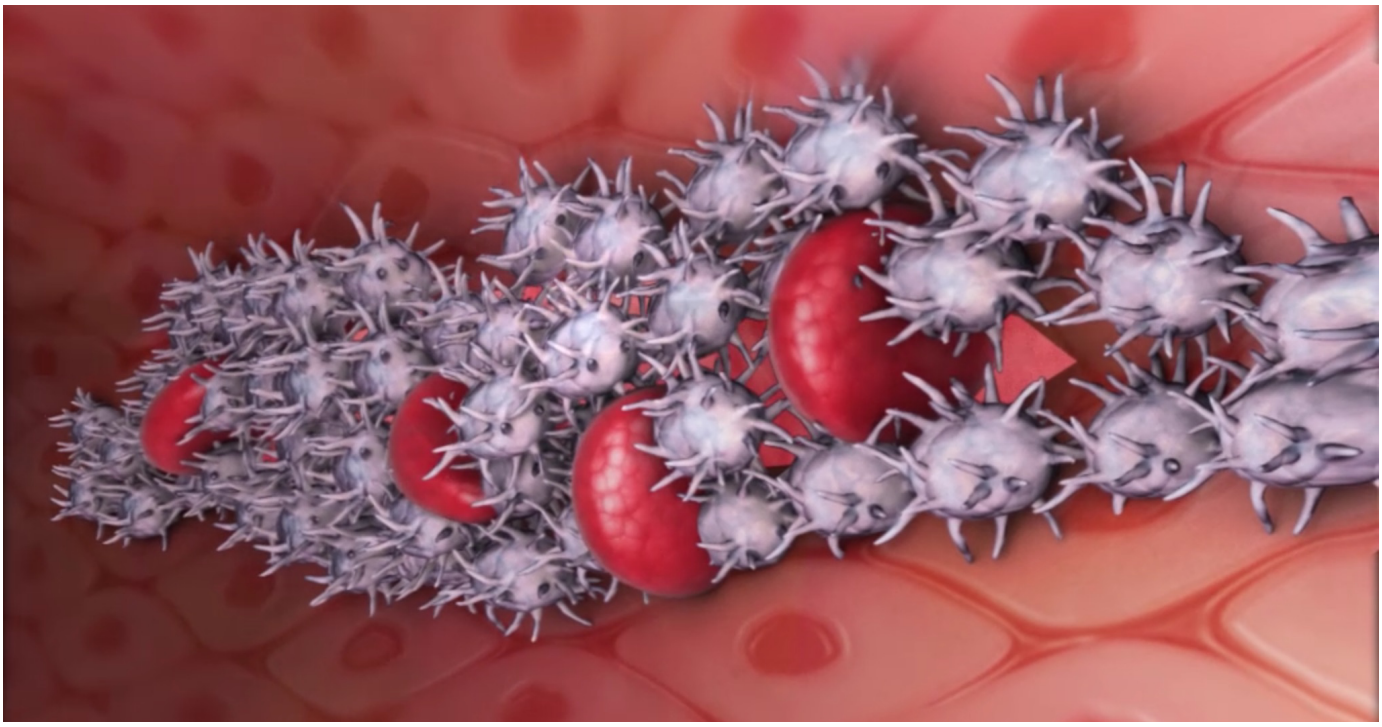
vii.

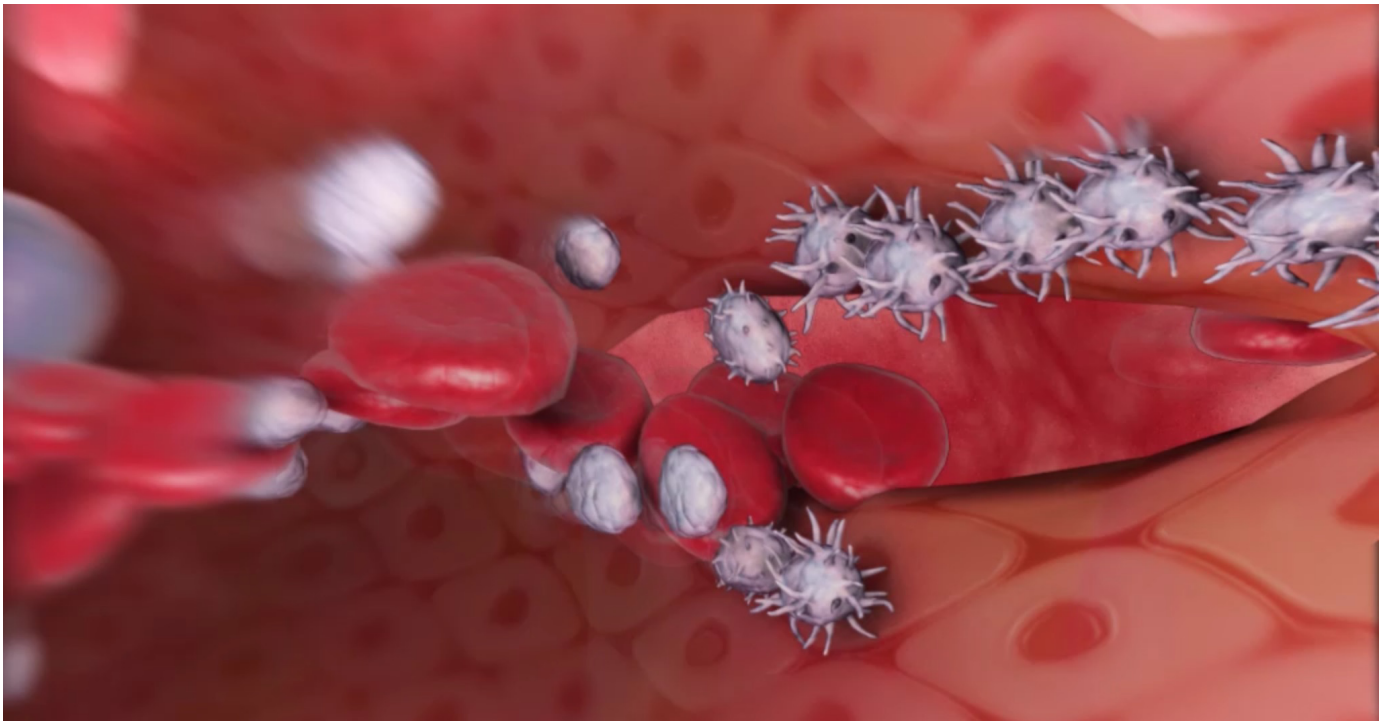
d. Which **leukocytes** are **lymphocytes**?

e. White blood cells make up _____% of total blood volume.

5. Watch the video in Module 28.9 Platelets and answer the following questions.







a. **Platelets** are also called _____.

b. When a vessel tears, platelets adhere to the _____ of the torn vessel. The platelets change shape and release the contents of their_____. After this transformation, platelets adhere to one another. Together with the red blood cells that become trapped with them, these platelets form a platelet plug that begins to reduce blood loss. The **platelet plug** is the first stage in **clot** formation.

c. Platelets also release chemicals that stimulate proteins in the blood, called _____. These blood proteins form _____ threads that stick to the platelets, forming a clot, or **thrombus**. Red blood cells and platelets stick to the **fibrin** mesh and the hole eventually becomes fully sealed, stopping the flow of blood from the damaged vessel.

d. Where are the proteins of the clotting system produced?

e. Why do you think platelets are not considered to be cells?

Note that platelets form from the fragmentation of large cells called megakaryocytes. Since they are not cells, the name “formed elements” is used to describe the fraction of blood that is made from cells and platelets.

f. Platelets make up _____% of total blood volume.

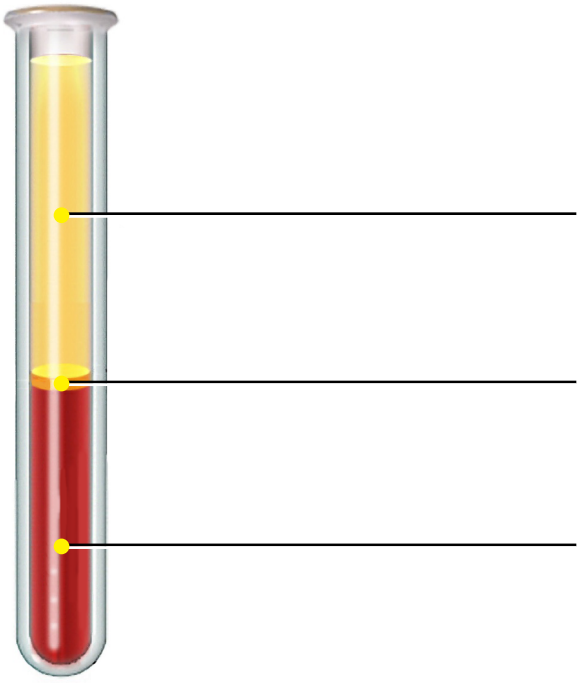
PUTTING IT ALL TOGETHER

1. In the illustration, which shows a test tube that has been spun in a centrifuge to separate the formed elements from the plasma, use the blank lines to label the following components:

    a. Plasma

    b. Red blood cells

    c. White blood cells and platelets

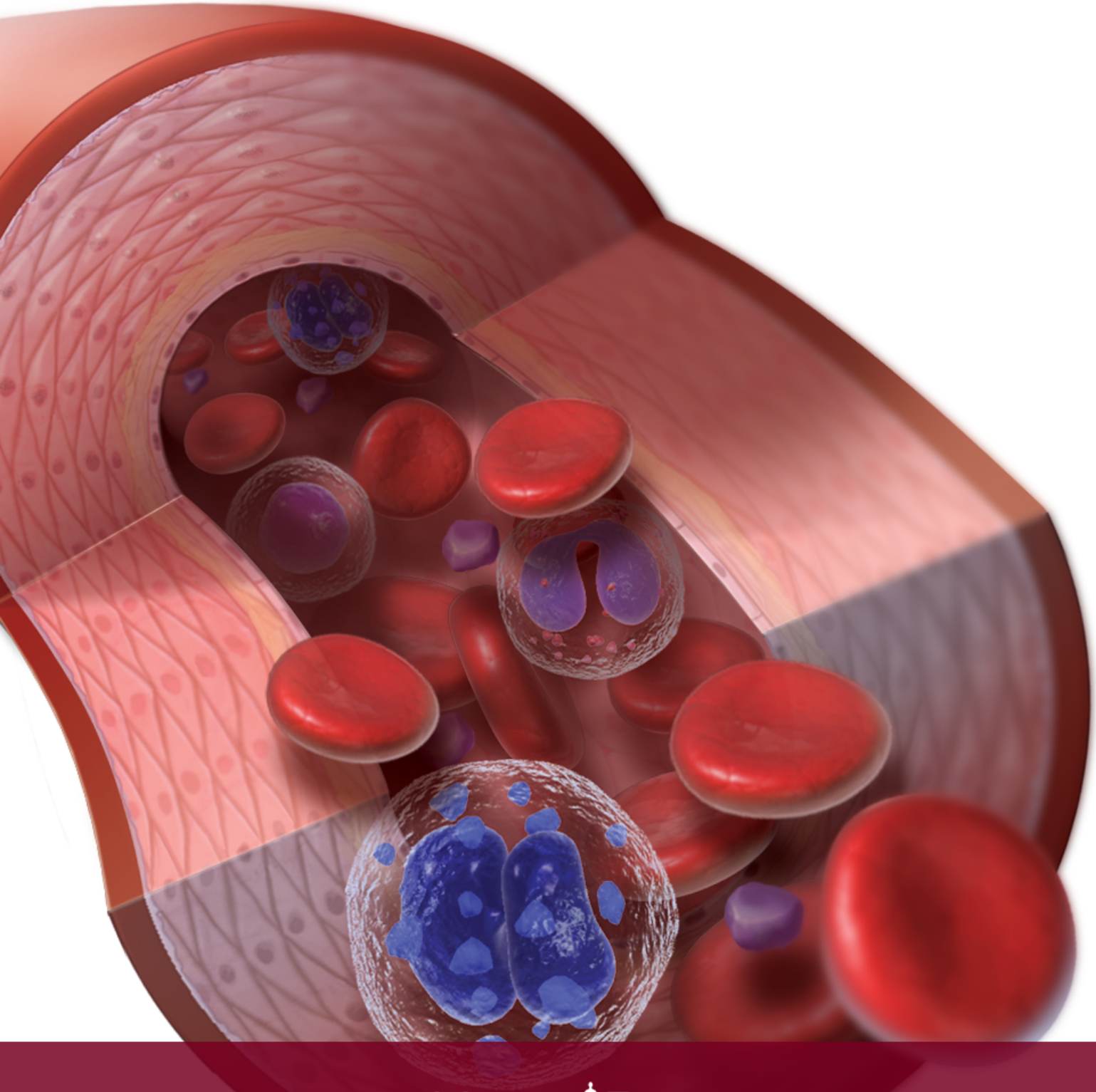


2. List all the components of blood and describe their functions.

3. Describe the process of red blood cell production.

4. Explain why the term “formed elements” is used instead of “blood cells.”

5. List the seven types of white blood cells and give their functions.



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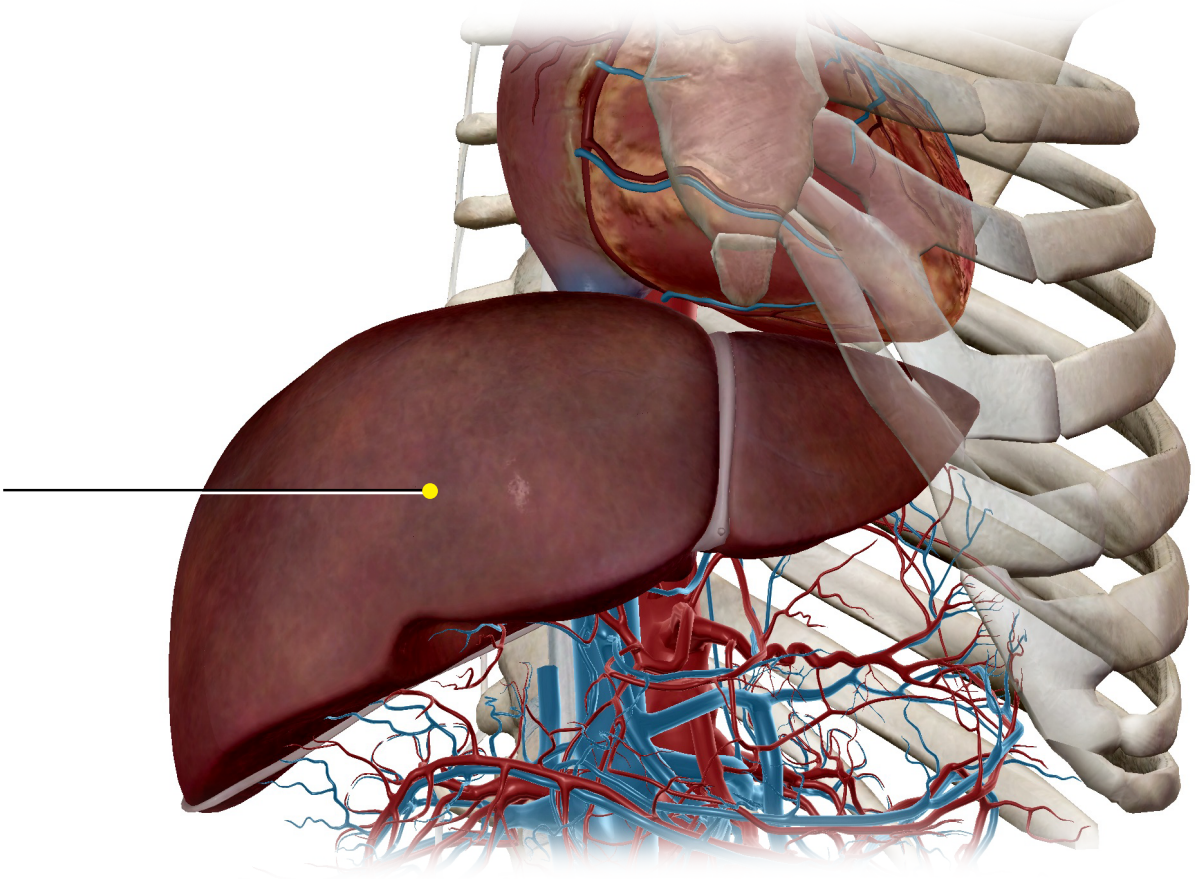
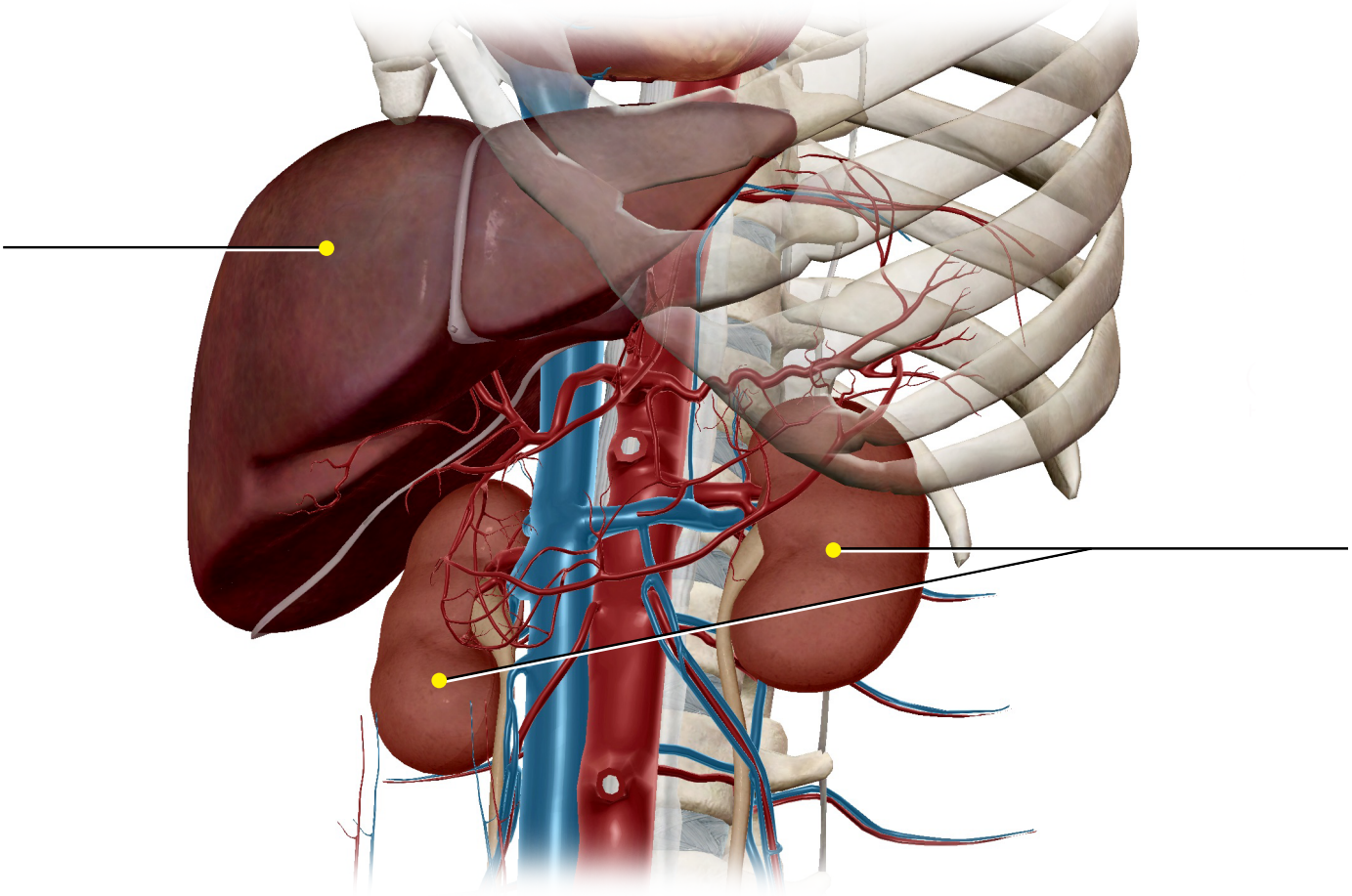
Student Practice

Label the structures in the following figures.

Module 28.3 Plasma Protein Production



Module 28.5 Erythropoietin and RBC Production



Module 28.7 Red Blood Cells and Oxygen Transport