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Student Lab Handout Answer Key

Recall the simulation protocol we decided on:

Fibrous tomato (V8 drink)	= Erythrocytes
Olive oil	= Plasma
Butter	= Globulins
Petroleum jelly	= Fibrinogen
Beet extract containing salt	= Reduced protein concentration by increasing the electrolyte content
Starch solution	= White blood cells
Beet shavings	= Sickle cell

For your reference:

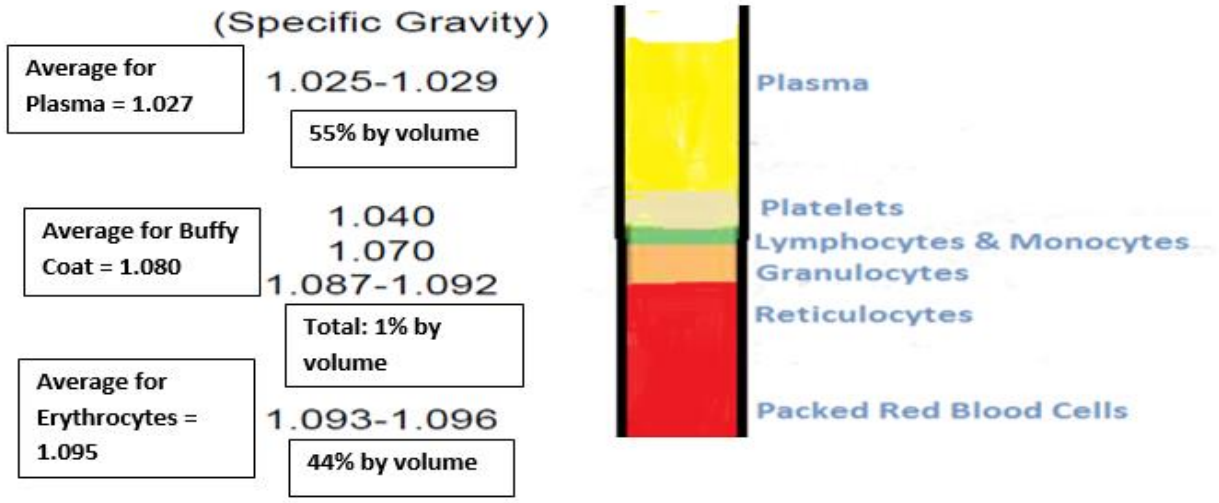

Figure 1. Percent composition and specific gravity of separated layers of blood obtained by the centrifugation process. The average specific gravity of normal human blood is 1.060.

Source: Adapted with permission from Stec, Theresa C. "What is in the Bag?" Accessed December 2014. (34-slide PDF file; an overview of blood and blood products), page 19. http://c.ymcdn.com/sites/www.apheresis.org/resource/collection/387FC8D3-D586-4DC2-A60D-EA1A83285A68/Fri_1515._2_ES_V_Stec_Seacliff_A_&_B_update.pdf

Lab Work

Your Task: Each team member makes one of the five sample blood models required. However, all group members note the composition for each sample blood model.

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Sample Blood Model for Normal Blood

In a graduated test tube with screw cap, mix 4.5 ml of V8 drink, 5.5 ml of olive oil containing 1% petroleum jelly.

Shake the sample well.

Let it stand for 60 minutes on a flat surface with no vibrations or disturbances nearby.

At the 60th minute, note the height in cm of the clear liquid on the top of the sediment.

Sample Blood Model for High ESR-1: Rheumatoid Arthritis

(Note: This ESR value should be higher than the ESR value for the normal sample blood model.)

In a graduated test tube with screw cap, mix 4.5 ml of V8 drink, 5.0 ml of olive oil containing 1% petroleum jelly and 0.5 ml of olive oil containing 0.5% butter.

Shake the sample well.

Let it stand for 60 minutes on a flat surface with no vibrations or disturbances nearby.

At the 60th minute, note the height in cm of the clear liquid on the top of the sediment.

Sample Blood Model for High ESR-2: Anemia

(Note: This ESR value should be higher than the High ESR-1.)

In a graduated test tube with screw cap, mix 3.0 ml of V8 drink, 6.0 ml of olive oil containing 1% petroleum jelly, and 1.0 ml of olive oil containing 1.0% butter.

Shake the sample well.

Let it stand for 60 minutes on a flat surface with no vibrations or disturbances nearby.

At the 60th minute, note the height in cm of the clear liquid on the top of the sediment.

Sample Blood Model for Low ESR – 1: Leukocytosis

(Note: This ESR value should be lower than the ESR value for the normal sample blood model.)

In a graduated test tube with screw cap, mix 4.0 ml V8 drink, 5.5 ml of olive oil containing 1% petroleum jelly, and 0.5 ml of 5% starch solution.

Shake the sample well.

Let it stand for 60 minutes on a flat surface with no vibrations or disturbances nearby.

At the 60th minute, note the height in cm of the clear liquid on the top of the sediment.

Sample Blood Model for Low ESR – 2: Sickle-Cell Anemia

(Note: This ESR value should be lower than the ESR value for the normal sample blood model.)

In a graduated test tube with screw cap, take 2.0 ml V8 drink, 2.0 ml beet extract; using very small tweezers, add a very small amount of beet shaving, shake well and add 5.5 ml of olive oil containing 1% petroleum jelly.

Shake the sample well.

Let it stand for 60 minutes on a flat surface with no vibrations or disturbances nearby.

At the 60th minute, note the height in cm of the clear liquid on the top of the sediment.

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Data Collection

At the 60th minute, record below the ESR test values of the sample blood models.

#	Blood Model Composition	ESR Value (mm/hr)
1	4.5 ml of V8 drink, 5.5 ml of olive oil containing 1% petroleum jelly.	20
2	4.5 ml of V8 drink, 5.0 ml of olive oil containing 1% petroleum jelly and 0.5 ml of olive oil containing 0.5% butter.	28
3	3.0 ml of V8 drink, 6.0 ml of olive oil containing 1% petroleum jelly, and 1.0 ml of olive oil containing 1.0% butter.	34
4	4.0 ml V8 drink, 5.5 ml of olive oil containing 1% petroleum jelly, and 0.5 ml of 5% starch solution.	14
5	2.0 ml V8 drink, 2.0 ml beetroot extract, using very small tweezers, add a very small amount of beet shaving, shake well and add 5.5 ml of olive oil containing 1% petroleum jelly.	9

Analyze and Summarize Findings

From the ESR values, predict which sample blood model closely corresponds to the blood characteristics of which disease.

#	Blood Model Composition	Probable Disease Condition
1	4.5 ml of V8 drink, 5.5 ml of olive oil containing 1% petroleum jelly.	none and normal
2	4.5 ml of V8 drink, 5.0 ml of olive oil containing 1% petroleum jelly and 0.5 ml of olive oil containing 0.5% butter.	rheumatoid arthritis
3	3.0 ml of V8 drink, 6.0 ml of olive oil containing 1% petroleum jelly, and 1.0 ml of olive oil containing 1.0% butter.	anemia
4	4.0 ml V8 drink, 5.5 ml of olive oil containing 1% petroleum jelly, and 0.5 ml of 5% starch solution.	leukocytosis
5	2.0 ml V8 drink, 2.0 ml beetroot extract, using very small tweezers, add a very small amount of beet shaving, shake well and add 5.5 ml of olive oil containing 1% petroleum jelly.	sickle-cell anemia