PhysioEx Lab Report

Exercise 1: Cell Transport Mechanisms and Permeability

Activity 4: Simulating Filtration

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Pre-lab Quiz Results

You scored 100% by answering 4 out of 4 questions correctly.

1. Filtration is a process that

   You correctly answered: is passive.

2. Filtration is dependent upon a

   You correctly answered: hydrostatic pressure gradient.

3. The filtrate

   You correctly answered: All of these answers are correct.

4. An important place that filtration takes place in the body is in

   You correctly answered: the kidneys.

Experiment Results

Predict Questions

1. Predict Question 1: What effect will increasing the pore size of the filter have on the filtration rate?

   Your answer: The filtration rate will increase.

2. Predict Question 2: What will happen if you increase the pressure above the beaker (the driving pressure)?

   Your answer: The filtration rate will increase.

Stop & Think Questions

1. The reason none of the solutes were present in the filtrate was that

   You correctly answered: the solutes were all too large to pass through.

2 What does an increase in the driving pressure correspond to in the body?

You correctly answered: an increase in blood pressure.

Experiment Data

Run Number	Solute	MWCO	Pressure (mm Hg)	Filter Rate (ml/sec)	Residue	Start Conc. (mg/ml)	Filter Conc. (mg/ml)
1	Na^+ Cl^-	20	50	1.00	present	5	0.00
1	Urea	20	50	1.00	present	5	0.00
1	Glucose	20	50	1.00	present	5	0.00
1	Powdered Charcoal	20	50	1.00	present	5	0.00
2	Na^+ Cl^-	50	50	2.50	present	5	4.81
2	Urea	50	50	2.50	present	5	0.00
2	Glucose	50	50	2.50	present	5	0.00
2	Powdered Charcoal	50	50	2.50	present	5	0.00
3	Na^+ Cl^-	200	50	10.00	present	5	4.81
3	Urea	200	50	10.00	present	5	4.74
3	Glucose	200	50	10.00	present	5	4.39
3	Powdered Charcoal	200	50	10.00	present	5	0.00
4	Na^+ Cl^-	200	100	20.00	present	5	4.81
4	Urea	200	100	20.00	present	5	4.74
4	Glucose	200	100	20.00	present	5	4.39
4	Powdered Charcoal	200	100	20.00	present	5	0.00

Post-lab Quiz Results

You scored 100% by answering 4 out of 4 questions correctly.

1 After filtration, substances that pass through the filter are called the filtrate, which includes

You correctly answered: all of the above.

2 The top beaker in the simulation corresponds to

You correctly answered: the blood capillary.

3 Why was there not 100% recovery of the Na^+Cl^- solute with any of the membranes?

You correctly answered: Some of the solute remained on the membrane filter.

4 An increase in blood pressure would probably initially _____ filtration in the kidneys.

You correctly answered: increase the rate of.

Review Sheet Results

1 Explain in your own words why increasing the pore size increased the filtration rate. Use an analogy to support your statement. How well did the results compare with your prediction?

Your answer:

solutions run faster through a filtered membrane faster if you increase the size of the pore. The larger the opening the more space there is for movement.

2 Which solute did not appear in the filtrate using any of the membranes? Explain why.

Your answer:

Powdered Charcoal did not appear in any of the filtrates, due to the fact that it's size is smaller than any of the pores used.

3 Why did increasing the pressure increase the filtration rate but not the concentration of solutes? How well did the results compare with your prediction?

Your answer:

Increasing the pressure above the beaker only makes the running solution faster, but the solute concentration stays the same. Solute concentrations aren't affected by pressure.