

CHAPTER 9
HANDOUT

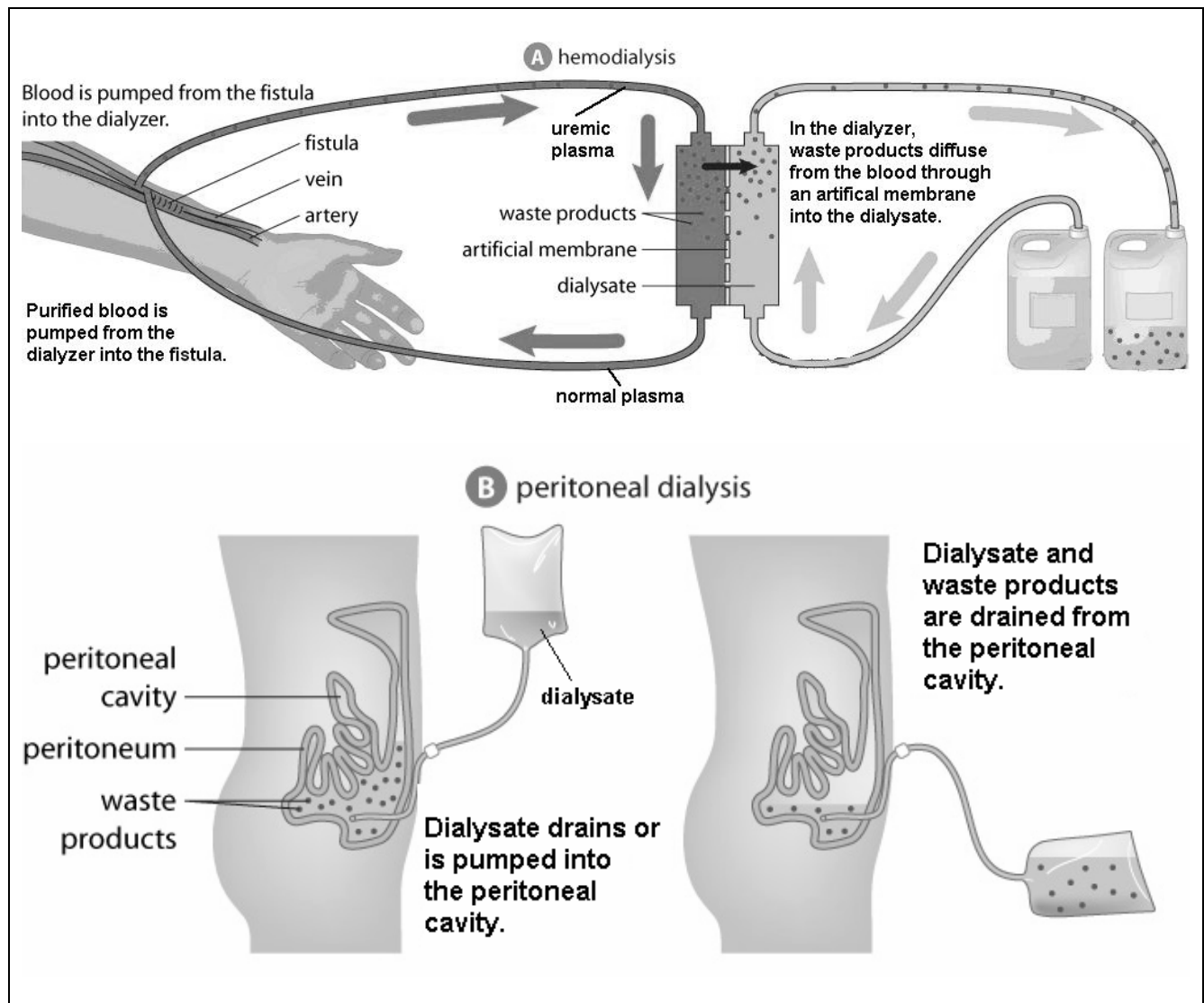
Hemodialysis and Peritoneal Dialysis

BLM 9.3.5

When kidney failure occurs, blood plasma is said to become uremic, because urea molecules accumulate to dangerous levels. Imbalances in other substances also occur.

Dialysis is a medical procedure in which the composition of the plasma can be corrected through simple diffusion. Dialysing fluid (dialysate) is separated from the patient's blood (uremic plasma) by thin semipermeable membranes. Molecules and ions diffuse into or out of the patient's plasma, depending upon the composition of the dialysate. Thus, careful formulation of dialysate is the key to correcting the composition of uremic plasma.

In hemodialysis, diffusion occurs across artificial membranes. In peritoneal dialysis, it occurs across the intestinal lining (peritoneum). These procedures are illustrated below.



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Use the table below, which shows the composition of the dialysate compared to normal plasma and uremic plasma, to answer the questions that follow.

Composition of Plasma and Dialysing Fluid (various units)

Component	Normal Plasma	Uremic Plasma	Dialysate
Potassium (K^+)	5	8	5
Bicarbonate (HCO_3^-)	27	14	27
Glucose	100	100	125
Urea	26	200	0

1. Explain why the dialysate is produced with a concentration of 5 units of potassium ions.

2. What is the function of bicarbonate ions in the blood? Suggest an explanation for the decreased concentration of bicarbonate ions in uremic plasma.

3. What evidence is given in the table that kidney failure has little effect upon glucose metabolism? Given the glucose concentration of normal plasma, why might dialysate be made to contain 125 units of glucose?

4. What is the concentration of urea in normal plasma? Suggest an explanation for the lack of urea in the dialysate.
