

Disease and Disorders

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Objectives

- Diseases and disorders
 - Diabetes
 - Nephritis
 - Uremia
 - Urinary Calculi (Kidney stones)
- Artificial kidney
- Kidney transplant
 - Black market

Diabetes

- Disease in which there is a high concentration of glucose in the blood (too much)
- The glucose is filtered but not all are reabsorbed – unlike healthy individuals who have 100% absorption rate so there is glucose in the urine for diabetic individuals.
- A hormone named insulin is made to regulate the amount of glucose in the blood
- Diabetics do not make enough insulin or any at all to regulate glucose amount

Diabetes

- So there is too much glucose in the blood = hyperglycemic
- Diabetics have to inject insulin into their blood stream to break down the glucose
- But if they inject too much insulin → hypoglycemic and go into shock
- So they have to eat food containing lots of glucose immediately

Nephritis

- **Nephritis** is inflammation of the kidney.
 - Nephritis is often caused by infections, toxins, and auto-immune diseases
 - Inflammation – swelling, redness, pain and/or feeling of heat in an area of a body part

Uremia

- Accumulation of urea in blood caused by the failure of the kidneys to excrete urea as they are produced by the liver

Urinary Calculi (kidney stones)

- Insoluble deposits of
 - Calcium phosphate
 - Calcium oxalate
 - Uric acid



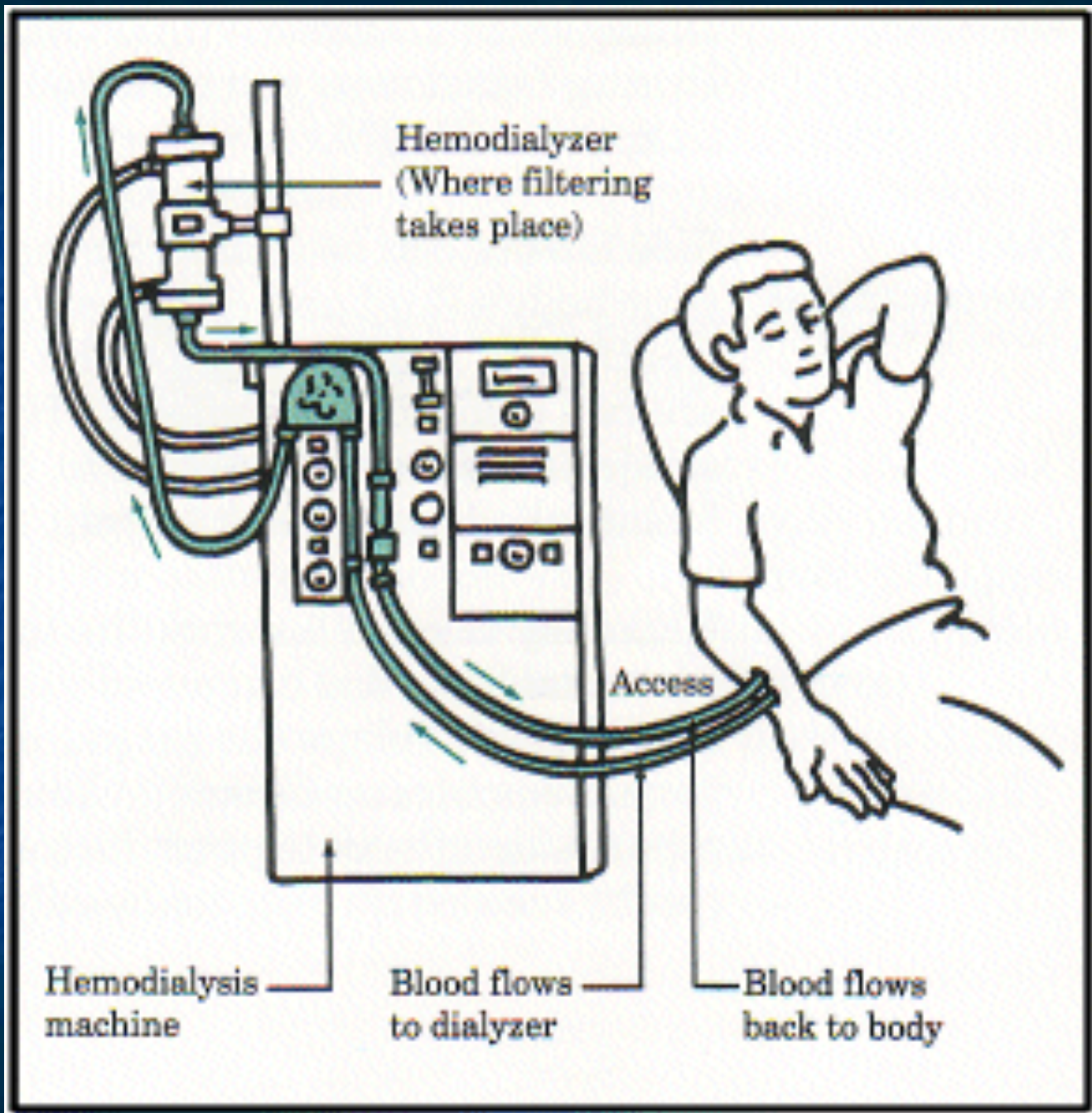
- Stones may become lodged in urethra
- Could be passed out but painful
- Larger ones would require surgery

Artificial Kidney

- What would you need to design an artificial kidney
- How would it function?
- What does it have to filter?

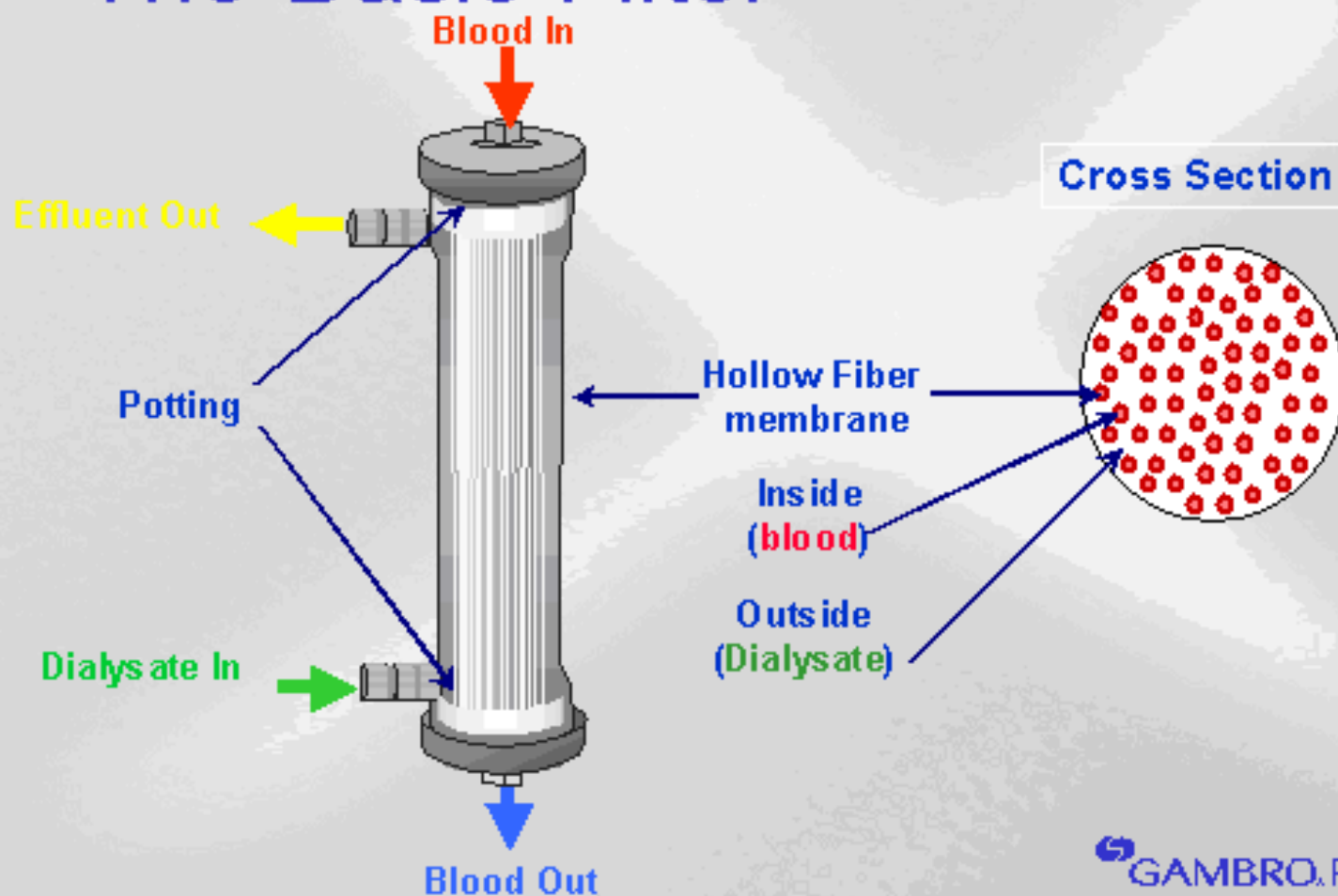
Artificial kidney

- Purifies blood when kidney fails when one has malfunctioning kidneys
- Contains a selective permeable membrane (like our nephron) to filtrate
- Thin cellophane arranged in layers/coils with tiny pores
- The apparatus immersed in tank containing dialysis fluid (with same concentration and salt content as blood)
- Urea, uric acid, ammonia and salt passes through
- But larger molecules (proteins, amino acids, glucose, and red blood cells) are kept





The Basic Filter



Kidney Black Market

- Since we can function with just 1 kidney
- Should we be allowed to sell our body parts?
- What is the price for a kidney?
- Should people under poverty accept large sums of money (from rich people)?
- Should rich people exploit the poorer people by offering large sums of money for their kidneys?

- Video

