Study Guide — MI Unit 4: When Organs Fail (Pretest)

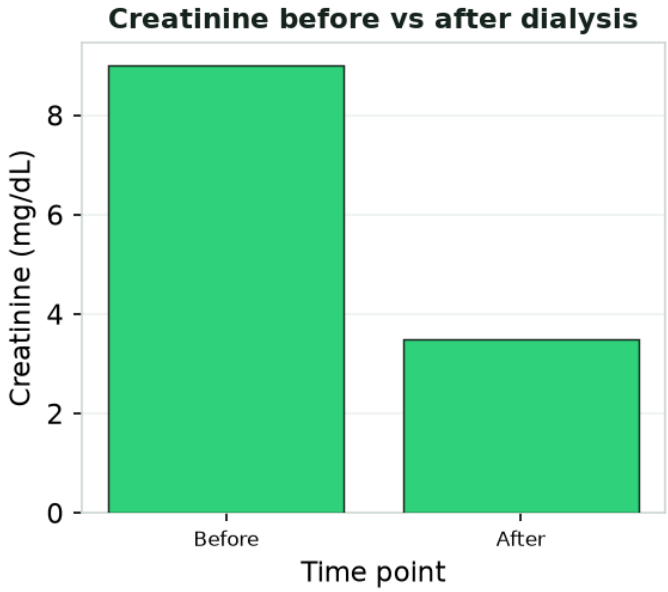
Medical Interventions (Genetics of Disease) · Unit 4 — When Organs Fail · Modeled on the PLTW Guided Review format

Vocabulary to know cold

Term	Definition
Nephron	The microscopic functional unit of the kidney that filters blood and forms urine.
Creatinine	A metabolic waste product cleared by the kidneys; rises in blood when kidney function falls.
Hemodialysis	Treatment that filters waste from blood by passing it across an artificial semipermeable membrane outside
Peritoneal dialysis	Dialysis that uses the patient's own abdominal (peritoneal) lining as the filtering membrane.
Transplant	Surgical replacement of a failed organ with a healthy donor organ.
Immune rejection	The immune system's attack on a transplanted organ recognized as non-self.
Immunosuppressant	A drug that lowers immune activity to help prevent rejection of a transplanted organ.
Antigen	A surface molecule the immune system reads to distinguish self from non-self.
Universal donor	Type O (negative) red blood cells, which lack A and B antigens and can be given to most recipients.
Biomedical device	An engineered tool or machine that supports, monitors, or replaces a body function (e.g., dialysis machine)

Worked examples (follow the reasoning)

Example 1. A patient's serum creatinine is 9.0 mg/dL before dialysis and 3.5 mg/dL after. Explain what this change shows about the treatment.



- Identify creatinine as a waste product the kidneys normally remove.
- Note the value DROPPED from 9.0 to 3.5 mg/dL across the session.
- A drop means waste was cleared from the blood.
- Since the failed kidneys cannot do this, the dialysis machine performed the filtration.

Answer: Dialysis removed waste (creatinine) from the blood, doing the job the failed kidneys could not.

Example 2. Explain why a transplant patient is given immunosuppressant drugs even though the surgery was successful.

- The donor organ carries antigens that differ from the recipient's.
- The immune system reads these antigens as non-self.
- Without intervention, the immune system would attack and reject the organ.
- Immunosuppressants lower immune activity to prevent that rejection.

Answer: To prevent the immune system from rejecting the transplanted organ recognized as non-self.

Practice questions (with reasoning)

1. Which lab value rises when the kidneys can no longer filter blood effectively?

A. Serum creatinine
B. Blood oxygen
C. Vitamin C
D. Insulin

Answer: A. Creatinine accumulates because the failed kidneys cannot clear it.

2. Type O red blood cells can be given to most recipients because they:

A. Carry both A and B antigens
B. Carry no A or B antigens
C. Carry only Rh antigen
D. Cannot be transfused

Answer: B. Lacking A and B antigens, type O red cells avoid attack by most recipients' antibodies.

3. Peritoneal dialysis differs from hemodialysis because it filters using:

A. An external machine membrane only
B. The patient's own peritoneal lining
C. A donor kidney
D. The lungs

Answer: B. Peritoneal dialysis uses the body's abdominal membrane as the filter.