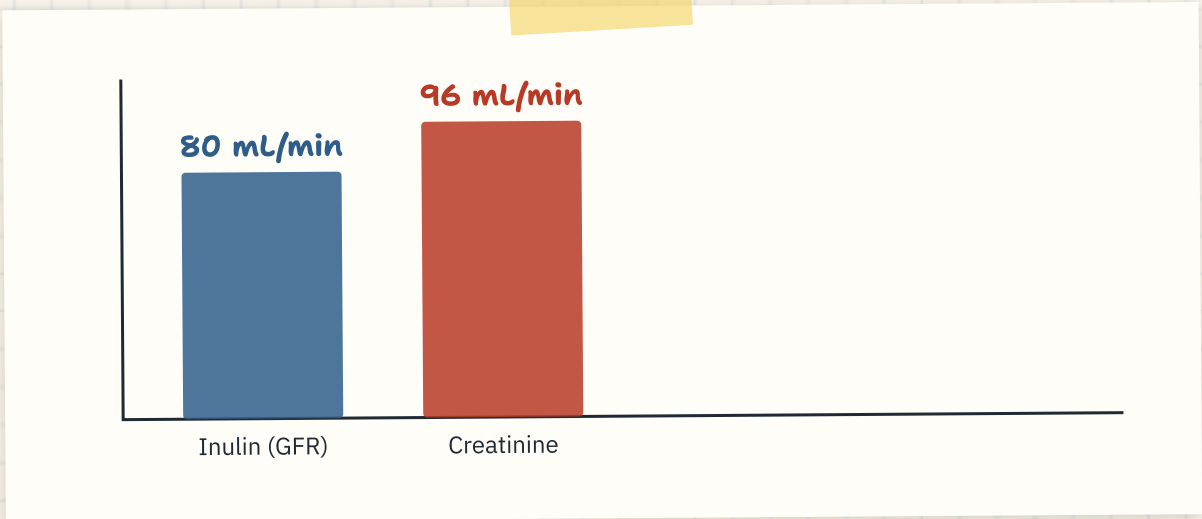
Renal clearance in one page

Inulin, creatinine, PAH and the reading rule



Step by step

1. Clearance = U × V / P
2. Inulin clearance = GFR; creatinine slightly higher
3. PAH clearance = effective plasma flow
4. FF = GFR / plasma flow; blood flow = plasma flow / (1 – Hct)
5. Above GFR: secretion. Below GFR: reabsorption

CLEARANCE

$$C = (U \times V) / P$$

mL/min; a virtual plasma volume cleared per minute, not a real flow

Marker	Clearance gives	Key point
Inulin	GFR	Freely filtered, not reabsorbed or secreted; infused
Creatinine	GFR, slightly high	Slightly secreted; about 10–20 percent above GFR
PAH	Effective plasma flow	About 90 percent removed in one pass at low plasma levels
GFR / plasma flow	Filtration fraction	About 0.2
Plasma flow / (1 – Hct)	Renal blood flow	Hct 0.40: 600 / 0.6 = 1000

What each clearance gives

Rule of thumb

Above GFR: secreted. Below GFR: reabsorbed. Equal: neither

Only for freely filtered substances

Exam traps

- Clearance is bookkeeping, not a real flow.
- Creatinine clearance overestimates GFR modestly because of tubular secretion.
- PAH clearance is the effective plasma flow, about 10 percent under the true flow.
- The reading rule applies to freely filtered substances only.

Renal clearance: inulin, creatinine and PAH

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/renal-physiology/renal-clearance-inulin-creatinine-pah

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