

Solutions

2.1

- $2 + 1 + 1.5 + 2.5 + 0.5 + 1.5 + 1 = 10$ ($\approx 9 \pm$ secretions estimate) ✓.

2.2

- The ileum; intrinsic factor (from the stomach).

2.3

- The enteric nervous system's fasting cycle (motilin-timed housekeeping).

3.1

- Toxin ADP-ribosylates Gs $\rightarrow$ constitutive adenylyl cyclase $\rightarrow$ maximal cAMP $\rightarrow$ Cl⁻ channels open $\rightarrow$ salt and water pour out.
- The epithelium is intact (no invasion): secretion, not destruction – histology is normal.
- Replace the lost fluid and electrolytes (volume is the killer, not the toxin, which decays).

3.2

- B12 deficiency (years of stores) and bile-salt loss with steatorrhoea AND bile-acid diarrhoea (months).
- The pool recycles ileum $\rightarrow$ liver $\rightarrow$ gut $\sim 6\times$ /day: each lost cycle shrinks it until fat digestion fails.
- B12 injections (bypass the gut); bile-salt sequestrants or fat restriction for the diarrhoea.