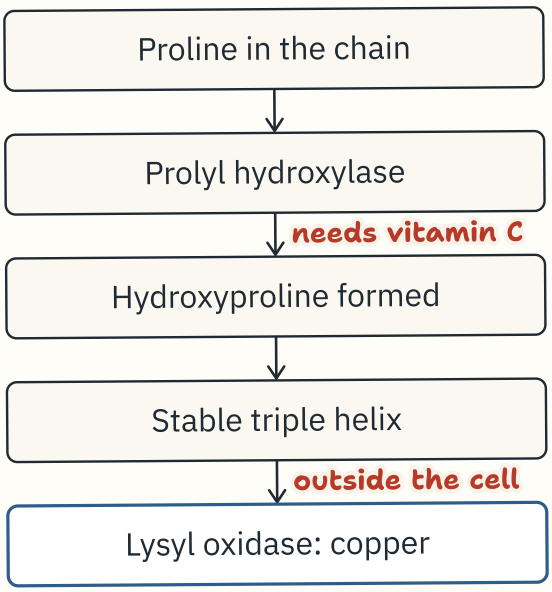
Vitamin C and collagen

Why scurvy bleeds with normal clotting



Step by step

1. Prolyl and lysyl hydroxylase add OH to proline and lysine
2. Vitamin C keeps the iron reduced (Fe^{2+})
3. Hydroxyproline stabilises the triple helix
4. Without vitamin C: unstable collagen, leaky vessels
5. Clotting tests stay normal

Step	Needs
Hydroxylate proline and lysine	Vitamin C, Fe^{2+}, α-ketoglutarate, O_2
Stable triple helix	Hydroxyproline
Trim procollagen ends	Peptidases (outside the cell)
Cross-link fibrils	Lysyl oxidase, copper

Collagen synthesis: who needs what

Order of events

Vitamin C early, inside the cell

Copper later, outside it

Humans cannot make vitamin C: diet only

Exam traps

- Bleeding in scurvy is not a clotting defect: platelets and clotting times are normal.
- Lysyl oxidase needs copper, not vitamin C.
- Gamma-glutamyl carboxylase needs vitamin K; vitamin K deficiency prolongs PT and aPTT.
- About 10 mg a day prevents scurvy; signs appear after a few months.

Vitamin C and collagen synthesis: why scurvy bleeds

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/vitamins-nutrition/vitamin-c-collagen-synthesis-scurvy

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