

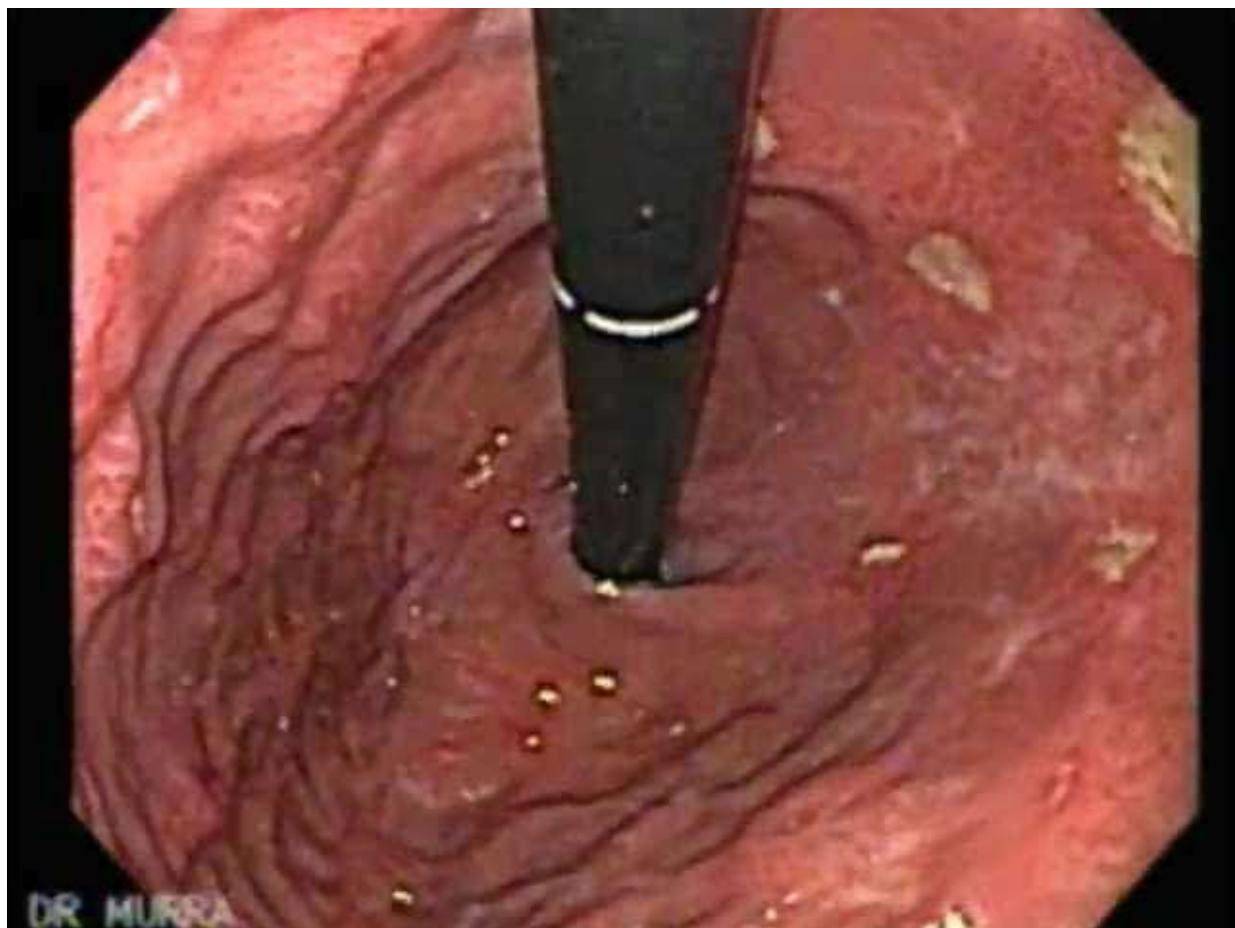
UNIT 1 PUZZLES (PART II)

TOPIC: H₂ ANTAGONIST

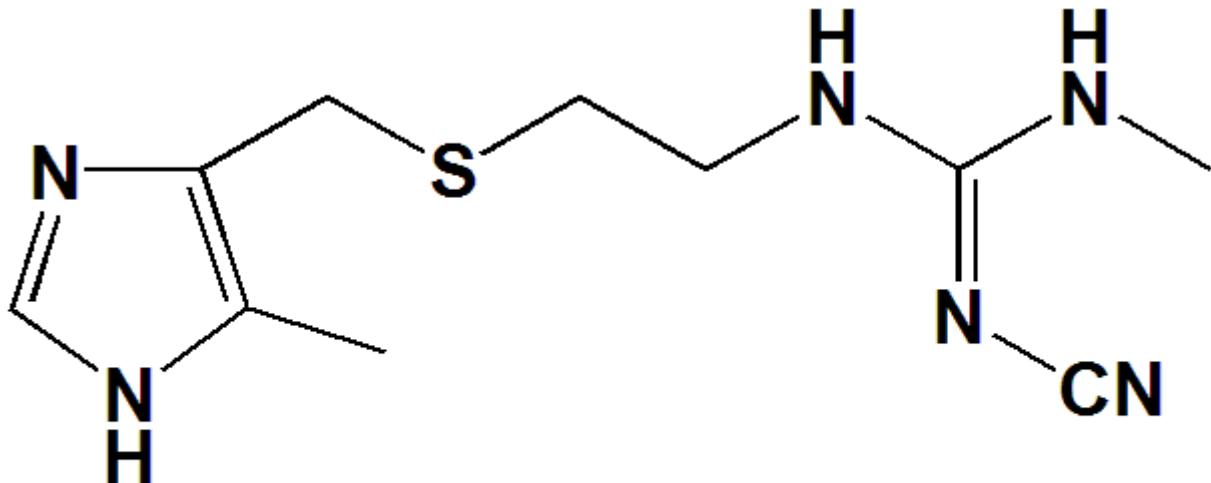
SUBJECT: MEDICINAL CHEMISTRY II

Case Study Puzzle 1: Elderly Patient with Peptic Ulcer and Drug

Interaction Risk A 70-year-old man with a duodenal ulcer is prescribed an H₂-antagonist. He is also on warfarin for atrial fibrillation and theophylline for COPD. The physician chooses cimetidine initially, but notices prolonged INR and theophylline toxicity after a few weeks.



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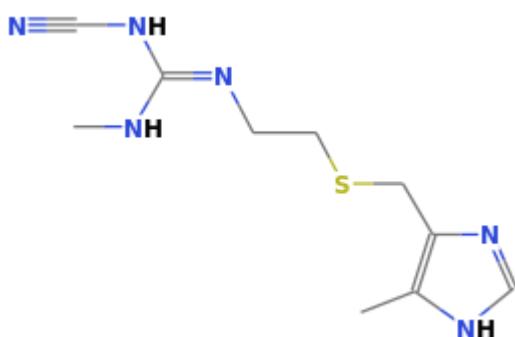


Cimetidine

Questions:

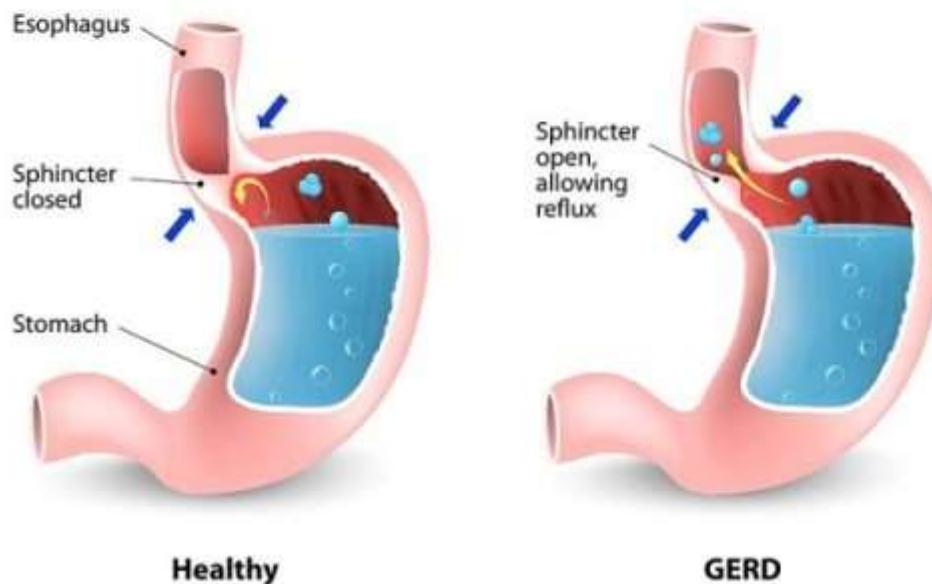
1. Which H₂-antagonist is likely causing the interactions, and why?
2. What mechanism explains this?
3. Which alternative (famotidine or ranitidine) would be safer here?
4. If switched, would efficacy for ulcer healing change significantly?

Case Study Puzzle 2: Middle-Aged Man Developing Gynecomastia A 55-year-old man with GERD has been on high-dose H₂-antagonist therapy (1-1.6 g/day) for 6 months. He develops bilateral breast enlargement and tenderness, with normal prolactin but altered estrogen-androgen balance.



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Gastroesophageal reflux disease



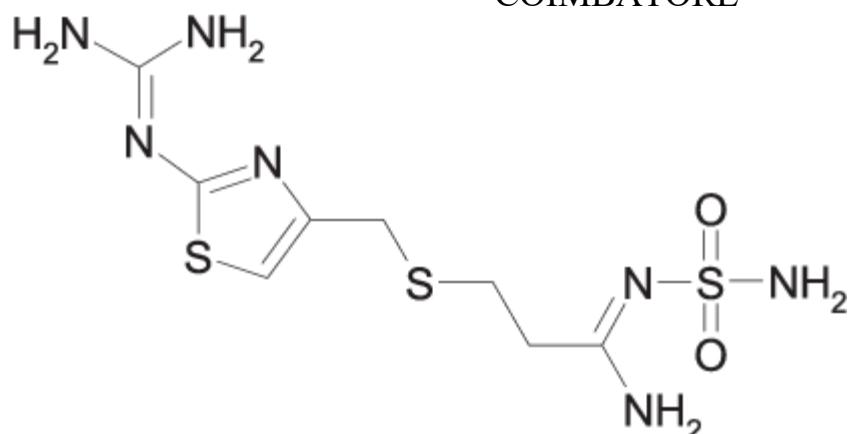
Questions:

1. Which drug is most likely responsible?
2. What are the proposed mechanisms?
3. Would switching to another H2-antagonist resolve it?
4. Why is this more common with high doses/long-term use?

Case Study Puzzle 3: Zollinger-Ellison Syndrome Patient Requiring High Doses A patient with Zollinger-Ellison syndrome (severe acid hypersecretion) requires escalating doses. On cimetidine, needs 7-13 g/day; on ranitidine, 2-3 g/day; but stabilizes on much lower doses of another agent.

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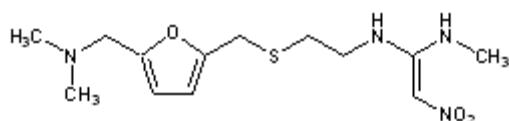
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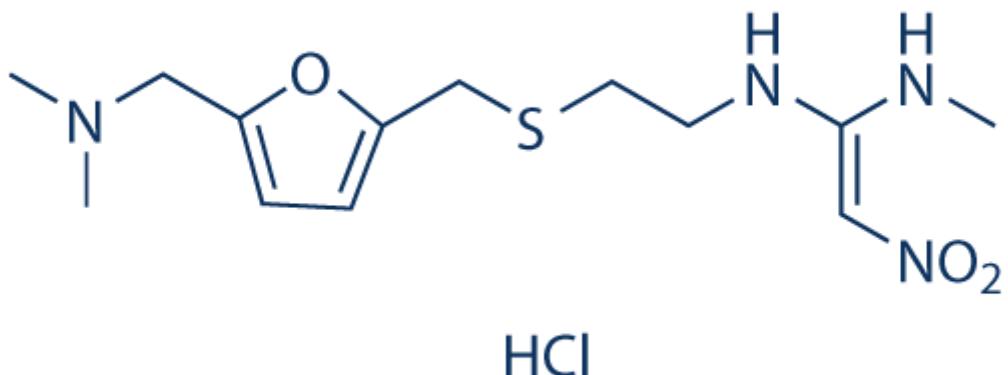
Questions:

1. Which H2-antagonist allows the lowest dose?
2. Compare potencies (weight basis).
3. Why is longer duration beneficial here?
4. Any safety advantage for this drug in high doses?

Case Study Puzzle 4: Heartburn Patient Affected by Global Recall In 2019-2020, a patient using over-the-counter ranitidine (Zantac) for chronic heartburn learns of FDA recalls after tests show increasing levels of a probable carcinogen over time/storage.



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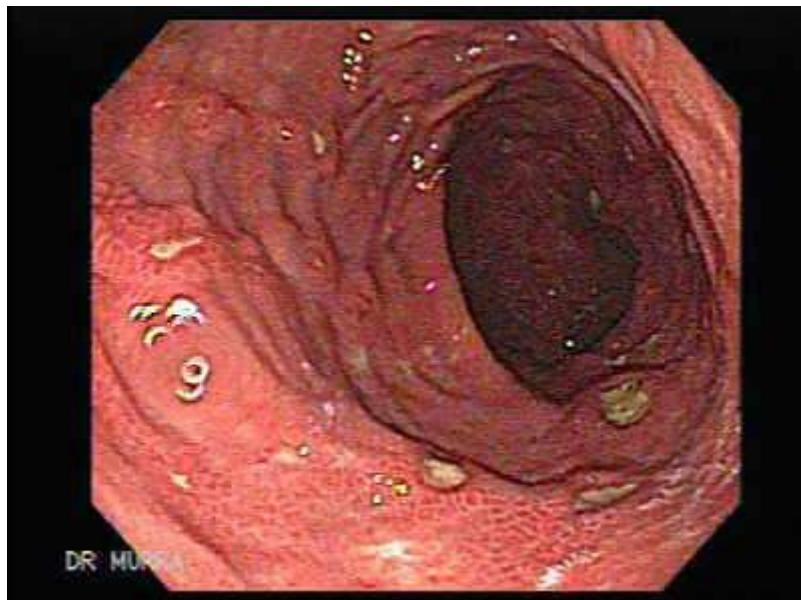
Questions:

1. What contaminant led to ranitidine's withdrawal?
2. Why does it increase over time?
3. Which H₂-antagonist replaced it commonly (still available)?
4. Is the risk similar for other H₂-antagonists?

Case Study Puzzle 5: Comparative Healing in Duodenal Ulcer Trial In a clinical trial, patients with active duodenal ulcers receive either famotidine 40 mg nocturnal or ranitidine 300 mg nocturnal. Healing rates at 4 weeks are similar (~60-70%), with rapid pain relief in both.

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Questions:

1. Why similar efficacy despite potency difference?
2. Advantage of nocturnal dosing?
3. If patient has renal impairment, which is preferred?
4. Why might famotidine be chosen over cimetidine here?