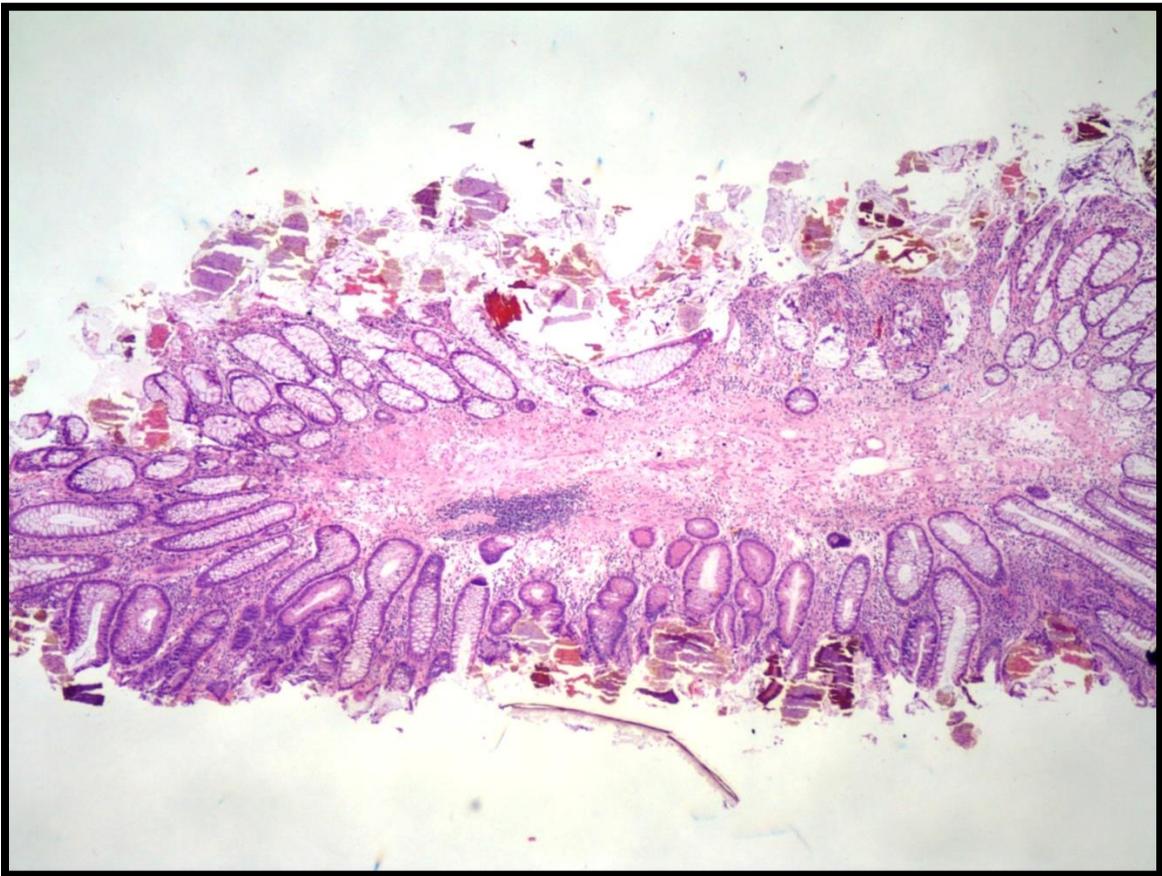
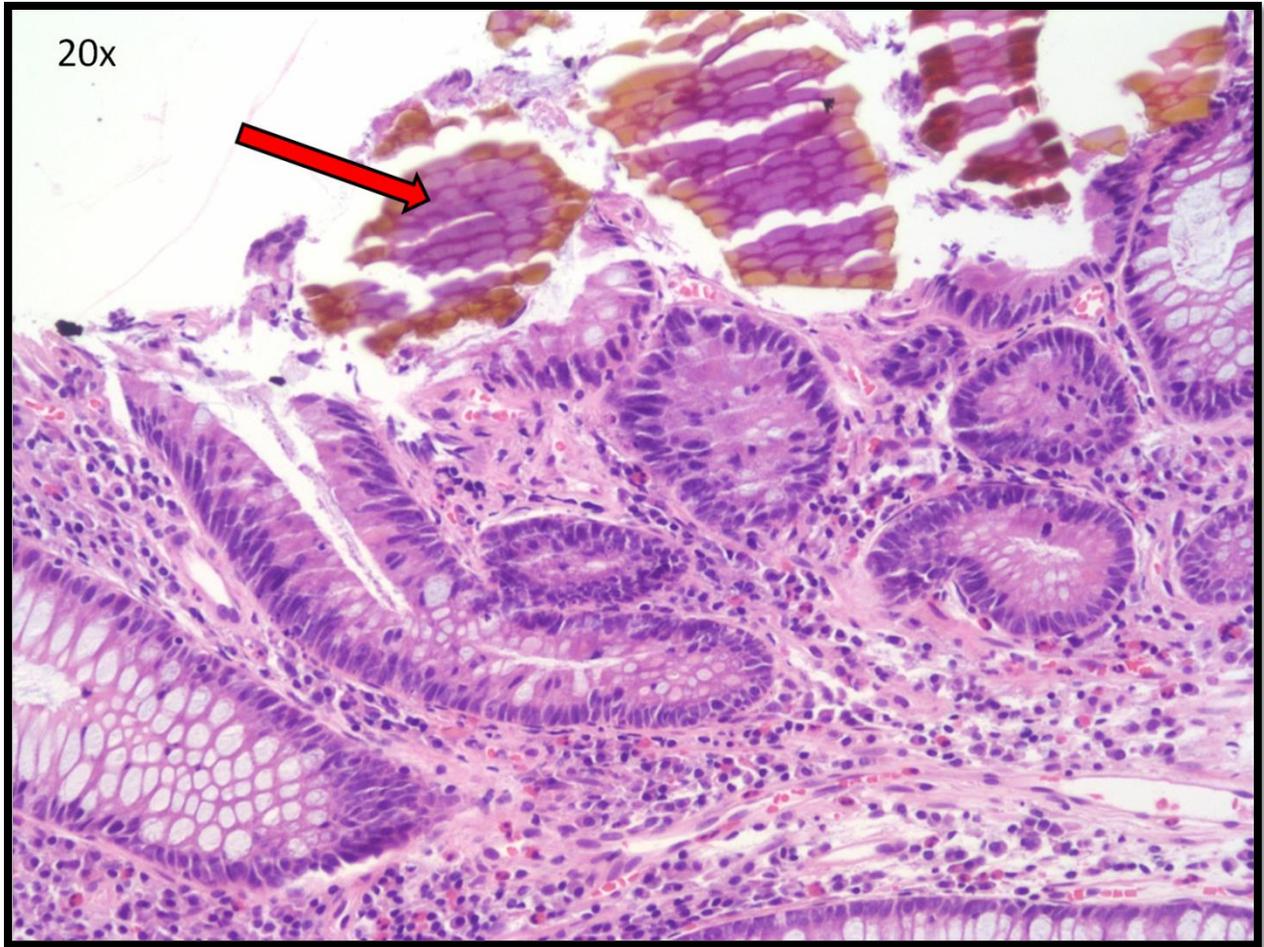


A 60 year old male with chronic kidney disease undergoes polypectomy during routine colonoscopy.





What is the substance (red arrow) present in this tubular adenoma?

- A) Kayexalate
- B) Sevelamer
- C) Vegetable material
- D) Cholestyramine
- E) Colchicine

SCROLL DOWN TO NEXT PAGE FOR CORRECT ANSWER:

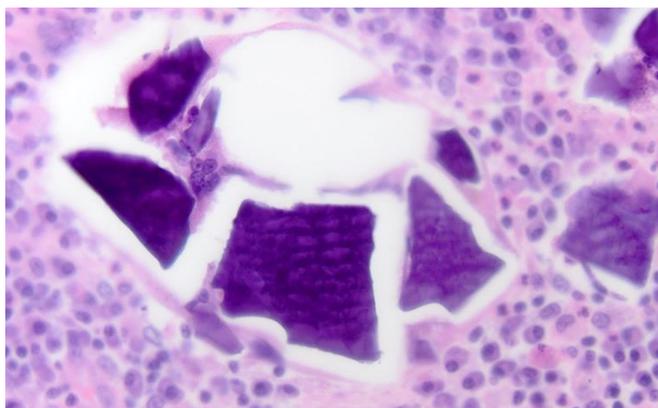
Correct answer: B) Sevelamer

Sevelamer (trade names include Renvela, Renagel, Genzyme) is an ion-exchange resin used to treat hyperphosphatemia in patients with chronic renal disease. Microscopically, Sevelamer crystals are **non-polarizable, irregularly shaped, broad “fish scales”**. The “fish scales” intersect at **curved points**. They usually have a two-toned color on H&E - **bright pink with a rusty yellow background**. They may appear deeply eosinophilic or rusty brown when embedded in ulcers of ischemic tissue. By PAS-D, Sevelamer crystals are violet and maintain their internal structure. Sevelamer crystals are generally seen in patients with gastrointestinal mucosa injury. However, it is not clear if Sevelamer is the causative agent of the mucosal injury or, as in this patient, is merely a coincidental finding.

Incorrect answer choices:

A) Kayexalate

Kayexalate (sodium polystyrene sulfonate) is a cation-exchange resin that is used to treat hyperkalemia in patients with chronic renal failure. It is usually mixed with sorbitol (an osmotic laxative) in order to reduce the risk of constipation and impaction. Necrosis, ischemic pattern injury and ulceration are usually present, along with refractile crystals admixed with the necroinflammatory debris overlying areas of ulceration. Kayexalate crystals have a mosaic pattern of **rectangular** shaped “fish scales”. They have **perpendicular points of intersection** at the edges of each “fish scale”. The crystals are **deeply basophilic on H&E** (see image provided below: courtesy Dr. NC Panarelli; Montefiore) and turn **magenta on PAS-D**. Some believe that the sorbitol is the substance that causes mucosal injury, rather than the Kayexalate itself.



C) Vegetable material Although plant or vegetable material can resemble fish scales, they are usually more **rectangular** and often resemble “window panes”. In addition, vegetable material typically will not have the bright pink/dusky yellow color of Sevelamer crystals.

D) Cholestyramine (Questran, Cholybar)

Cholestyramine crystals are **bright orange-red** on H&E. They do not have a “fish scale” pattern and are **smooth and glassy**. On PAS-D, they appear grey or hot pink in color. Cholestyramine crystals are not thought to cause mucosal injury.

F) Colchicine is an alkaloid used in the treatment of gout. Colchicine toxicity may result in mucosal injury of the esophagus, stomach, and small intestine. Mitoses are often arrested in metaphase with a characteristic ring pattern. Apoptotic debris, regenerative changes, and nuclear pseudostratification can also be seen. **Crystals should not be present.**

References:

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Panarelli NC. Drug-induced injury in the gastrointestinal tract. *Semin Diagn Pathol.* 2014 Mar; 31 (2): 165-75.

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