Case #138

NAME Educational Activities Committee

Case provided by:

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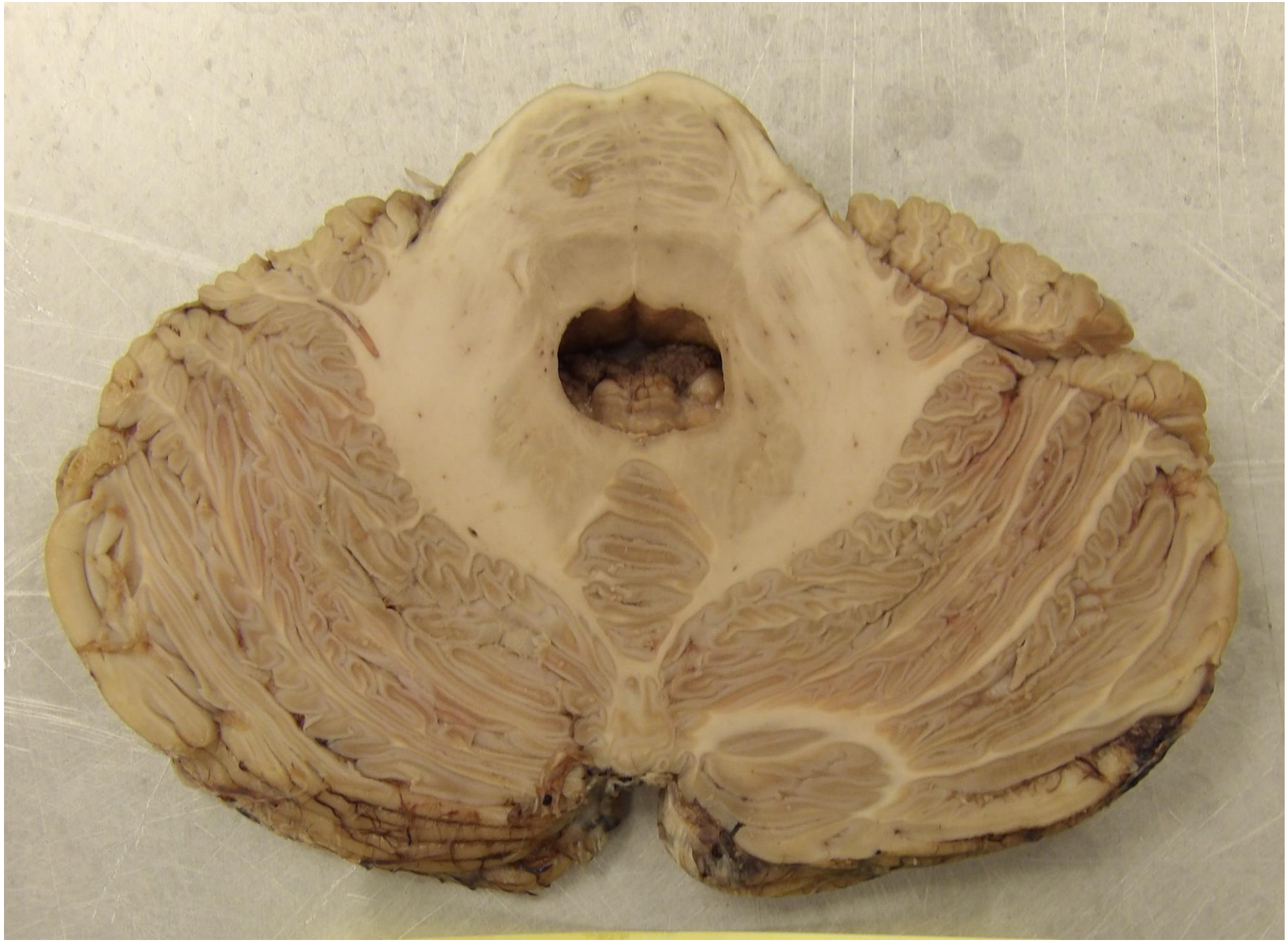
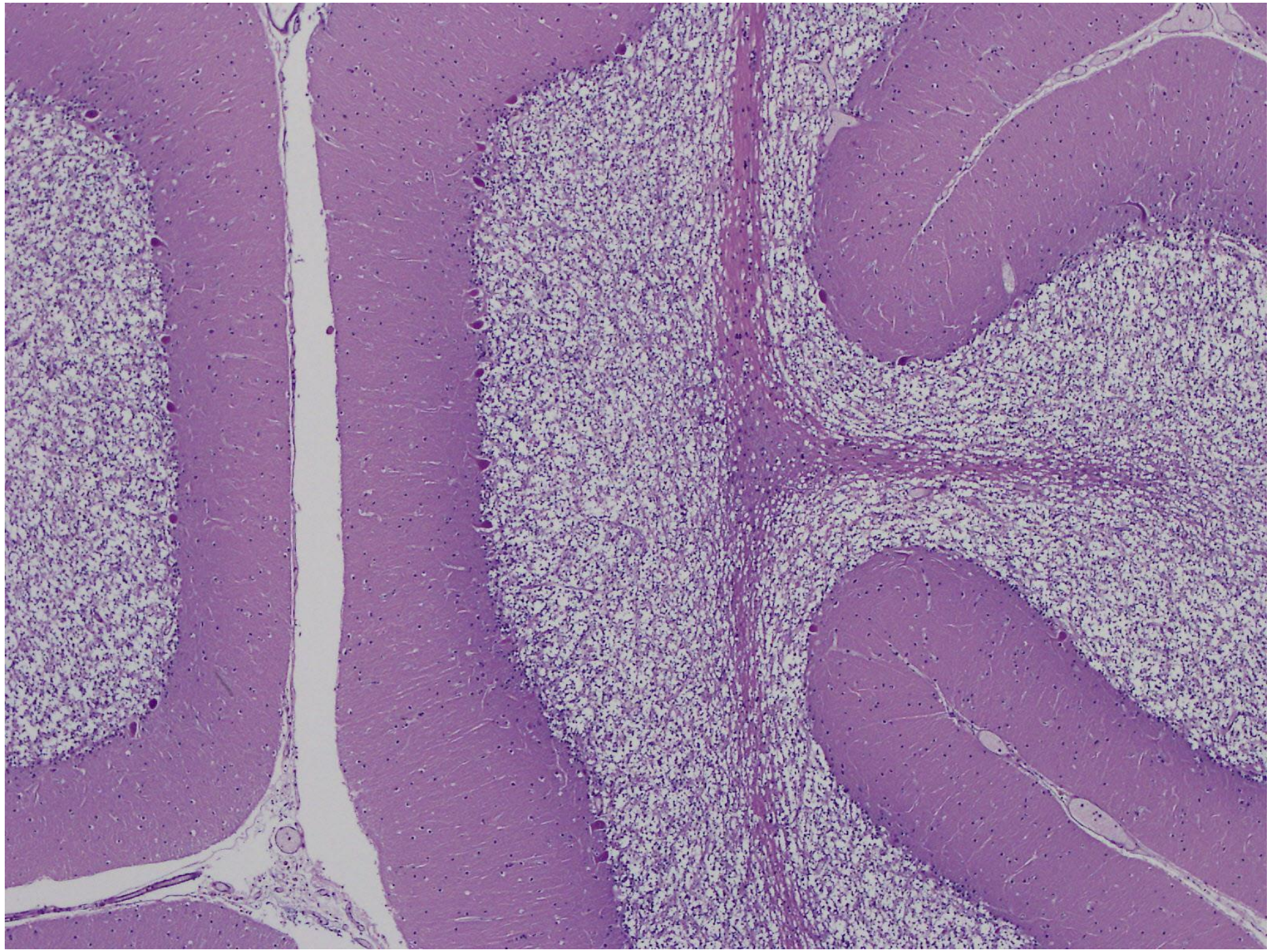
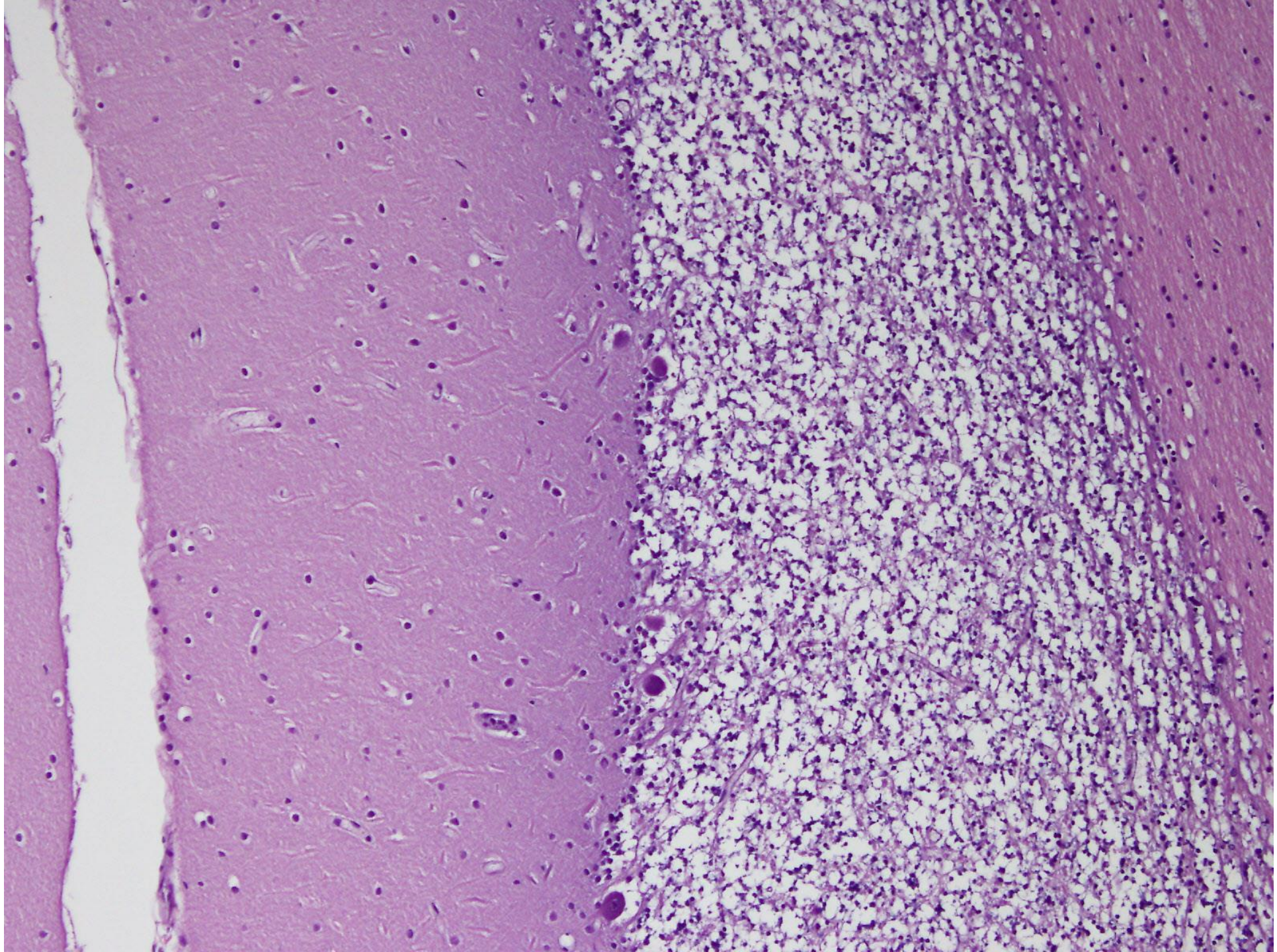






1. The decedent was a 32-year-old male found deceased in his shared residence. Roommates reported that he had been intermittently vomiting for the previous 24 hours.

   Which of the following most accurately characterizes the appearance of the cerebellum in the gross and histologic images shown?

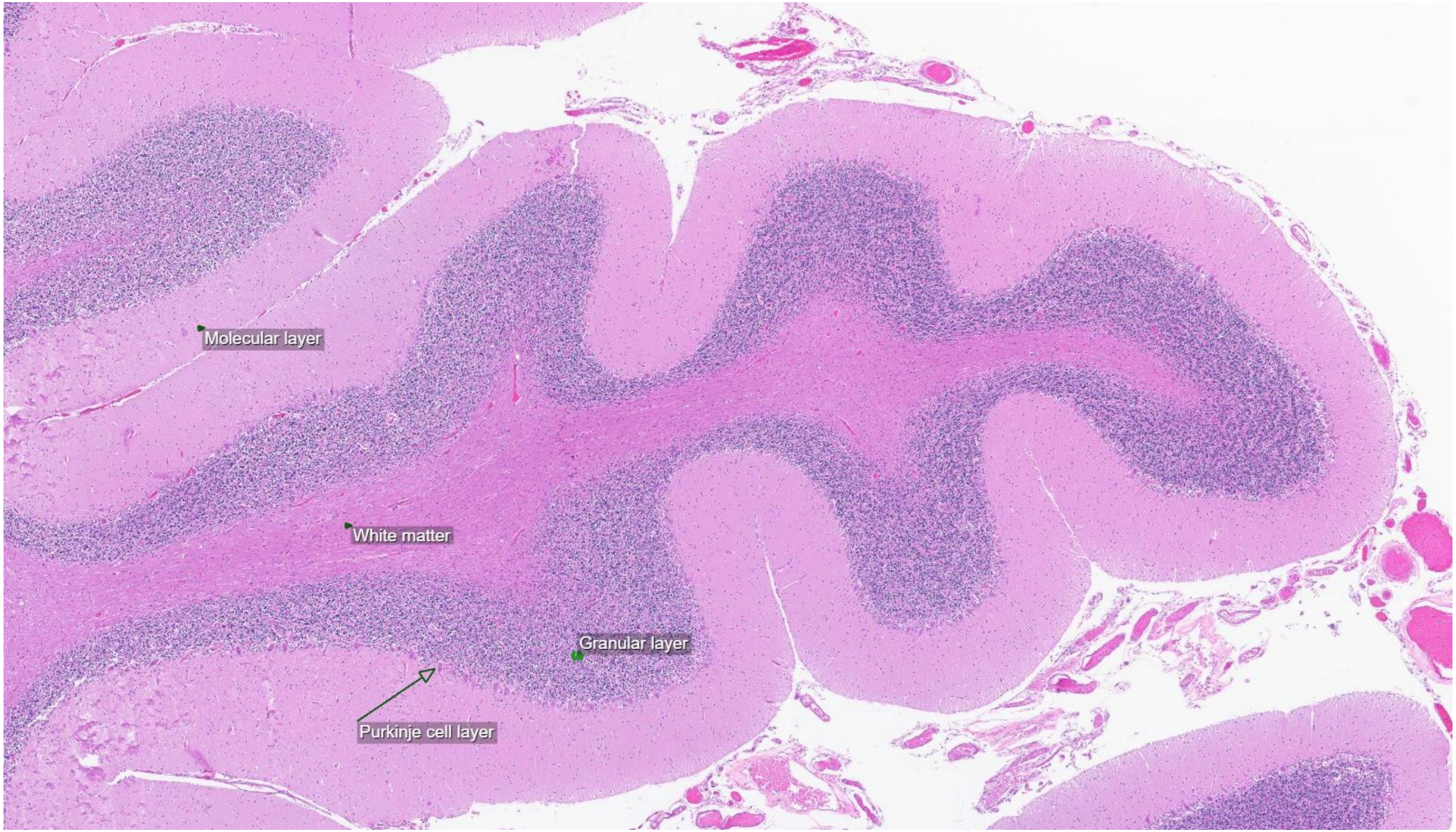
- ◯ Ischemic infarct from a superior cerebellar artery occlusion
- ◯ Postmortem freezing (cryofixation)
- ◯ An infectious process causing liquefactive necrosis
- ◯ Autolysis due to a delay in fixation

Answer...

D. Autolysis due to a delay in fixation (CORRECT ANSWER, 30.00% of responses)

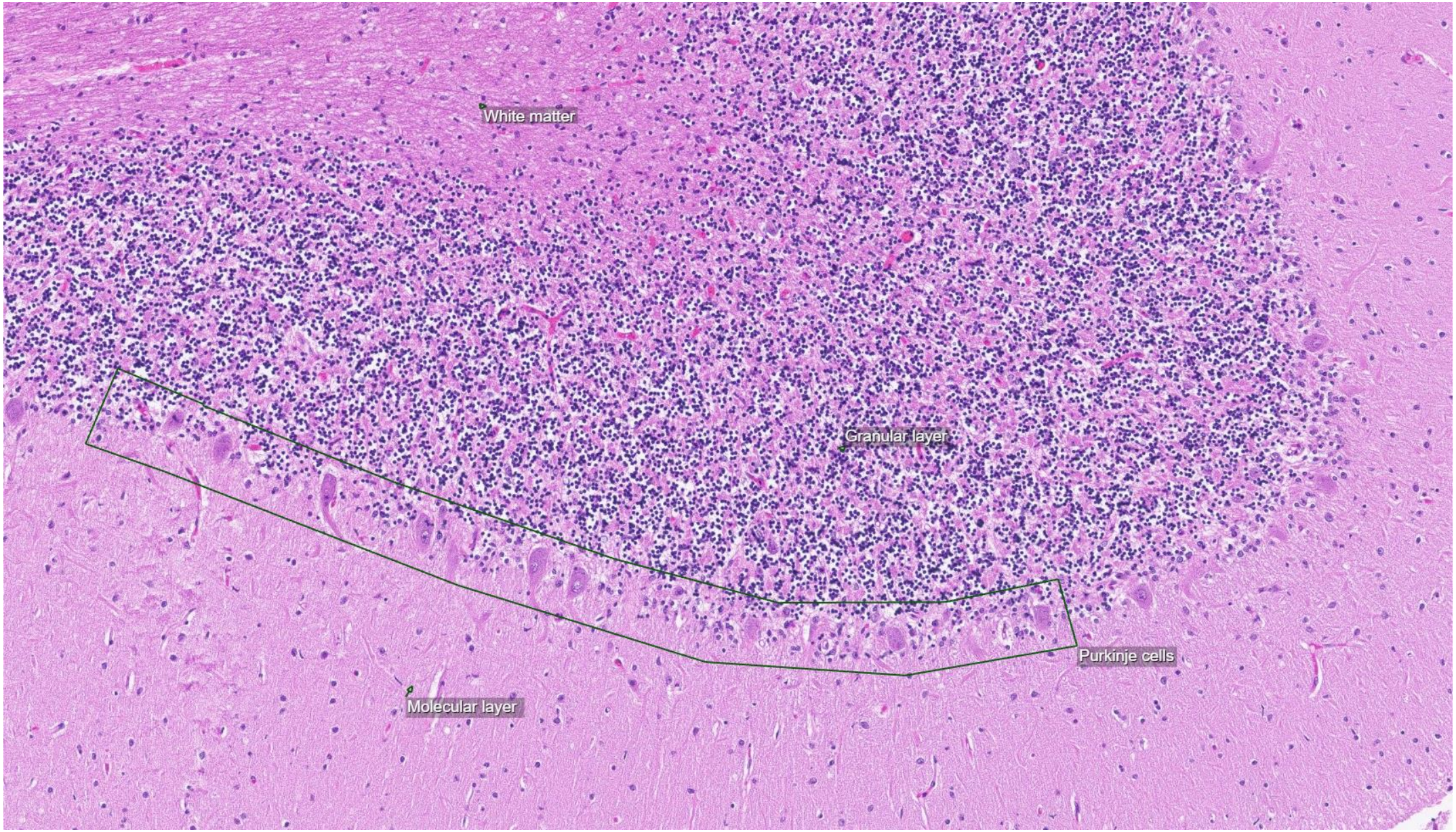
Cerebellar granular cell layer autolysis (état glacé) is a common postmortem finding in which selective autolysis of the granular cell layer is seen. The cerebellar folia in the gross photo has a gray-white appearance and the histology shows relative preservation of the surrounding parenchyma with dissolution of the granular layer. The finding is attributed to enzymatic alterations in the granular cell layer and has been associated with delayed fixation, prolonged elevated body temperature postmortem, and low tissue pH levels. Evidence of a protective effect of antemortem alkalosis in preventing the development of granular cell layer autolysis has been described in the literature.

In this case, the decedent had a history of type I diabetes mellitus and vitreous fluid analysis was positive for acetone and elevated glucose (719 mg/dL), indicative of diabetic ketoacidosis.



Normal Cerebellum Histology (for comparison)

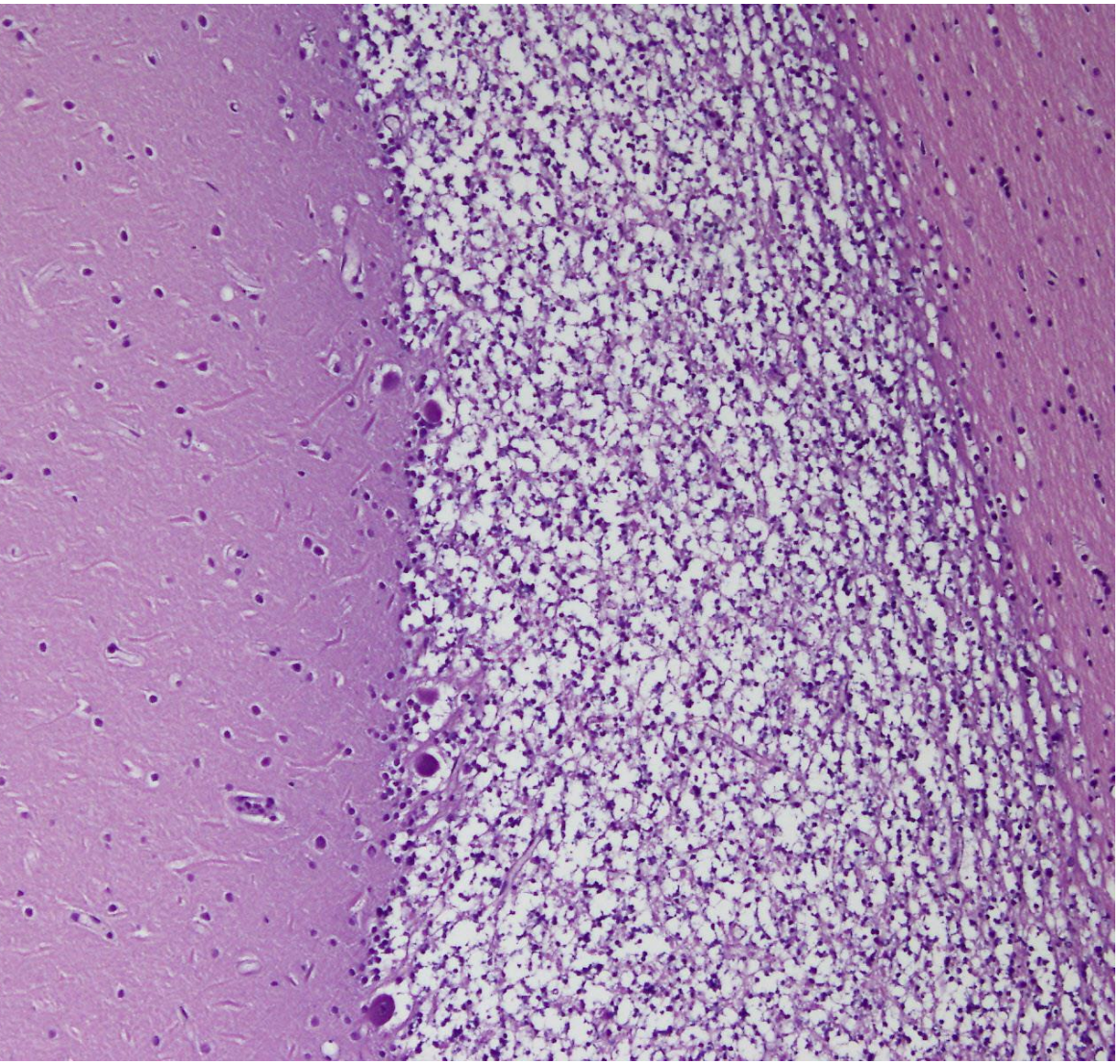
Image credit to Dr. Sam Engrav (PGY1, Mayo Clinic)



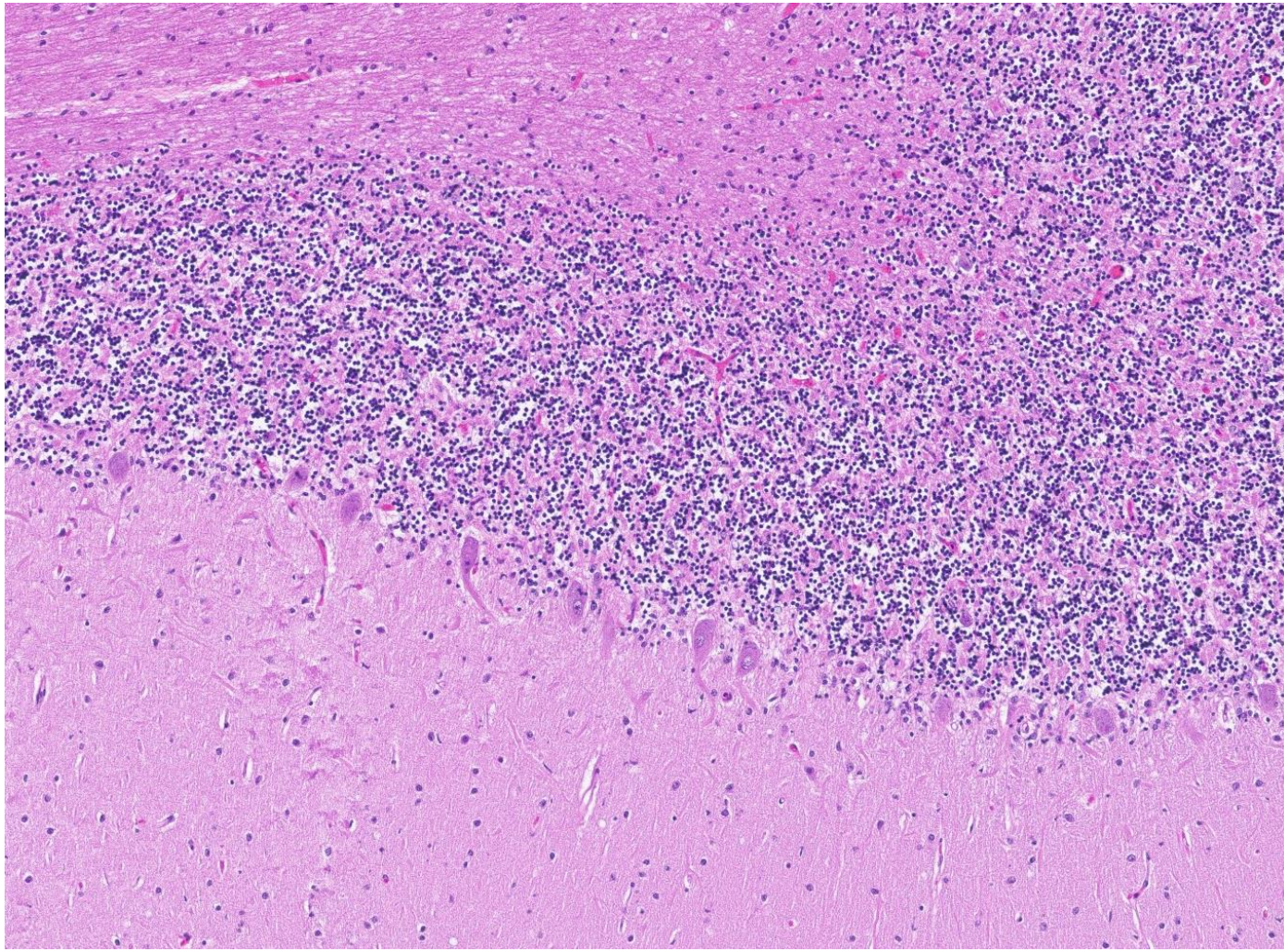
Normal Cerebellum Histology (for comparison)

Image credit to Dr. Sam Engrav (PGY1, Mayo Clinic)

Side-by-side comparison



Granular cell layer autolysis



Normal Cerebellum Histology

Other responses…

A. Ischemic infarct from a superior cerebellar artery occlusion (28.24% of responses)

The Purkinje cells of the cerebellum, which appear unaffected in this case, are more vulnerable to hypoxic-ischemic injury than those of the granular cell layer. Furthermore, the distribution of changes seen in the images are not associated with an arterial territory.

B. Postmortem freezing (cryofixation) (15.88% of responses)

Brain tissue is vulnerable to various forms of damage during the cryopreservation process, in particular due to the phase transition of water from a liquid to a solid state with the formation of ice crystals, which can disrupt cellular morphology. The formation of ice crystals would give the tissue a vacuolated, “Swiss cheese” appearance microscopically.

C. An infectious process causing liquefactive necrosis (25.88% of responses)

Postmortem findings of an infectious process causing liquefactive necrosis in the cerebellum would include evidence of a neutrophilic infiltrate (e.g., abscess) and microorganisms (e.g., bacteria, fungi, or parasites).

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