Avian Pathology

QUIZ
HISTOPATHOLOGY: Answers

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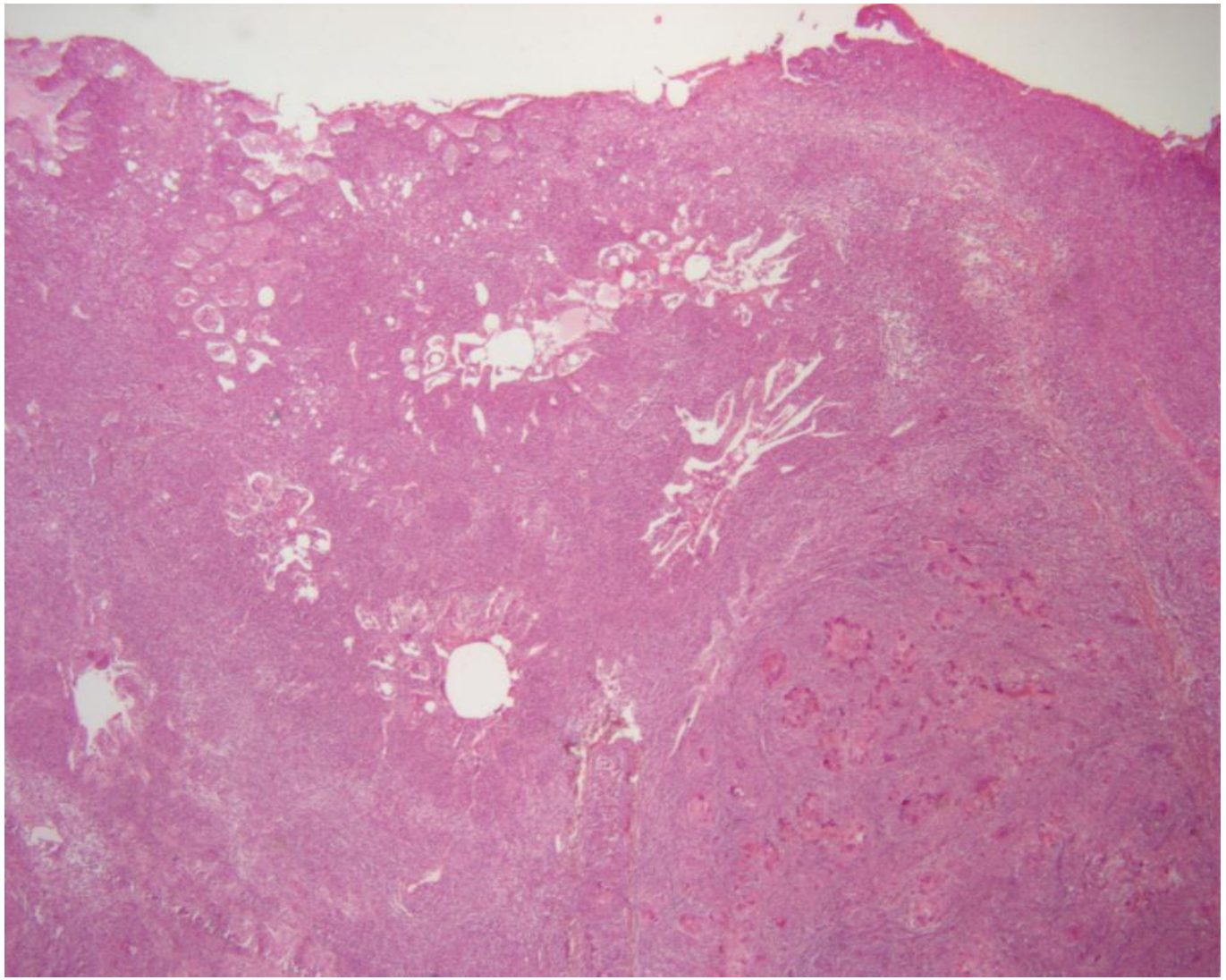
Q1

Tissue from a Hen

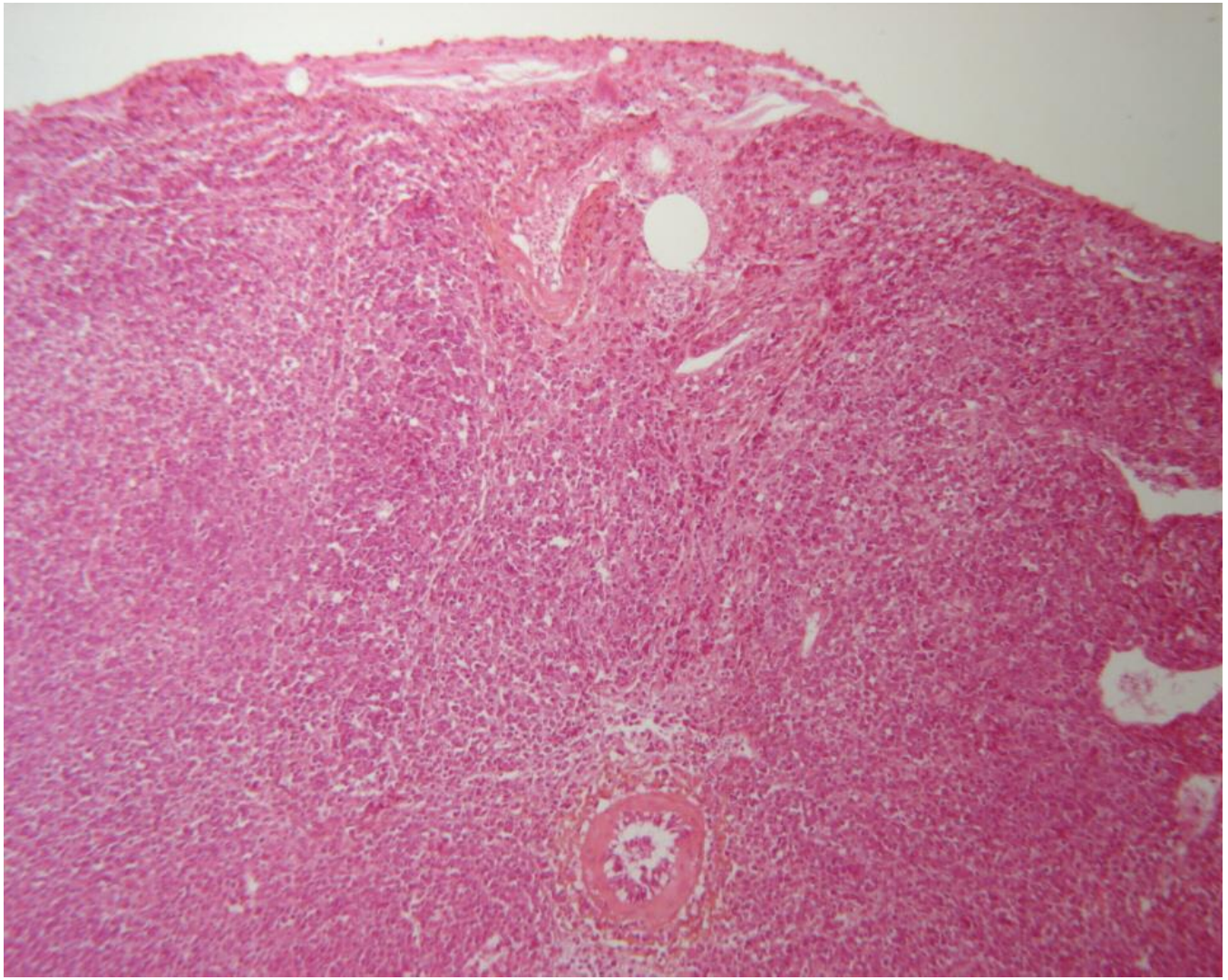
Q1. Hen



Lung.

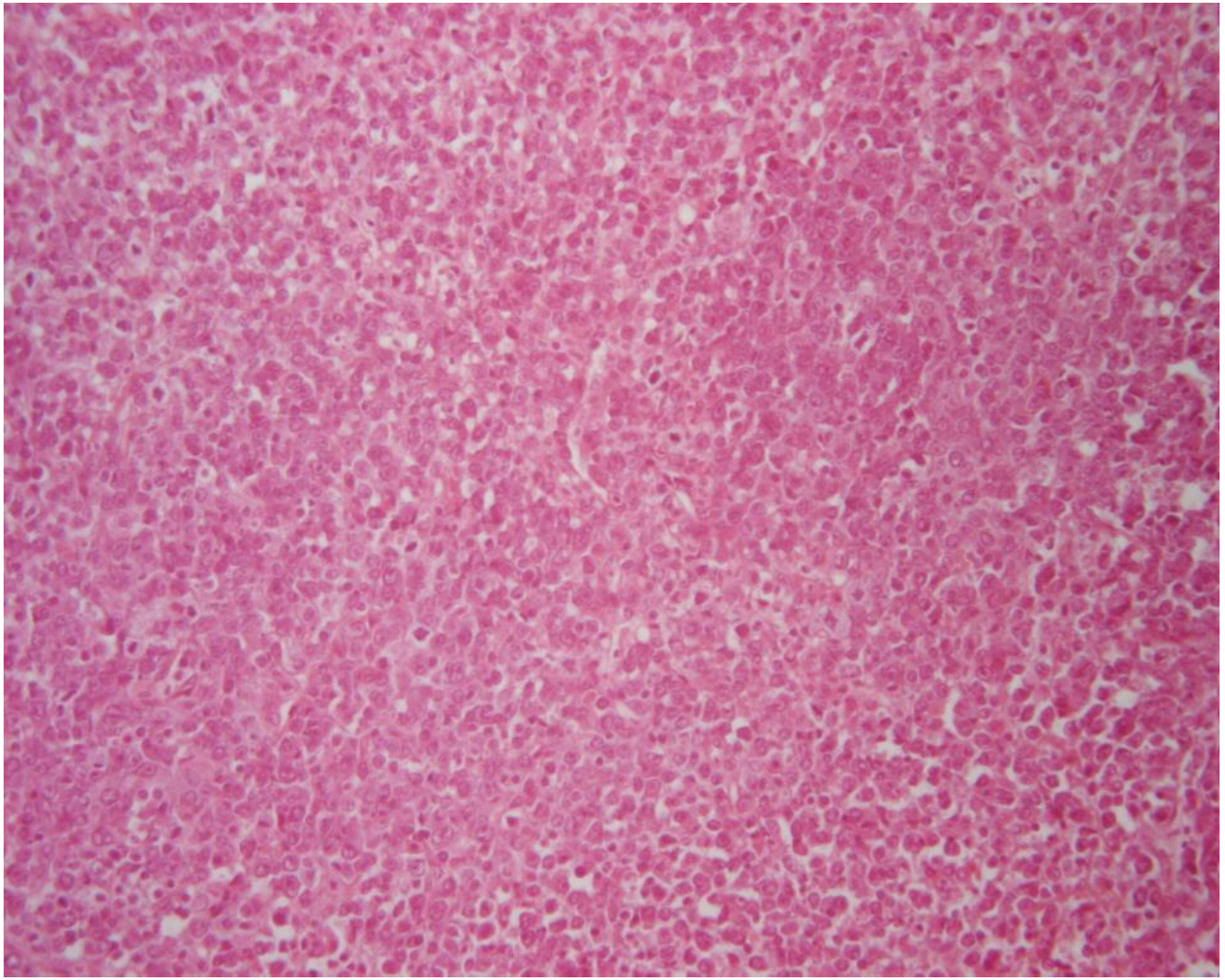
Infiltrating and effacing nearly 60% of the pulmonary parenchyma,

Q1. Hen



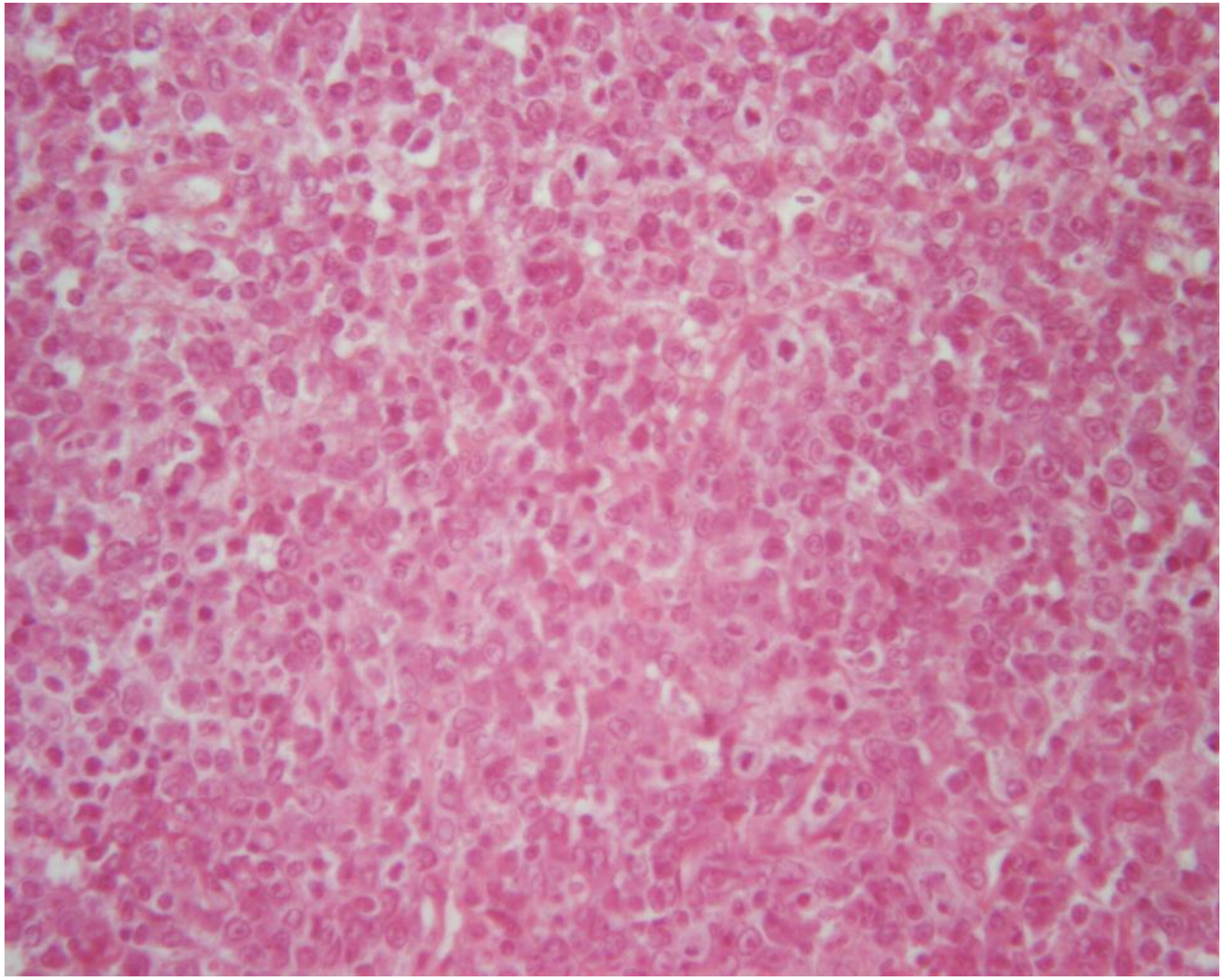
is observed a densely cellular, poorly demarcated, unencapsulated tumor, that invades the interstitial spaces (septa of respiratory atria, parabronchial walls, connective tissue of parabronchial lobules and pleura).

Q1. Hen



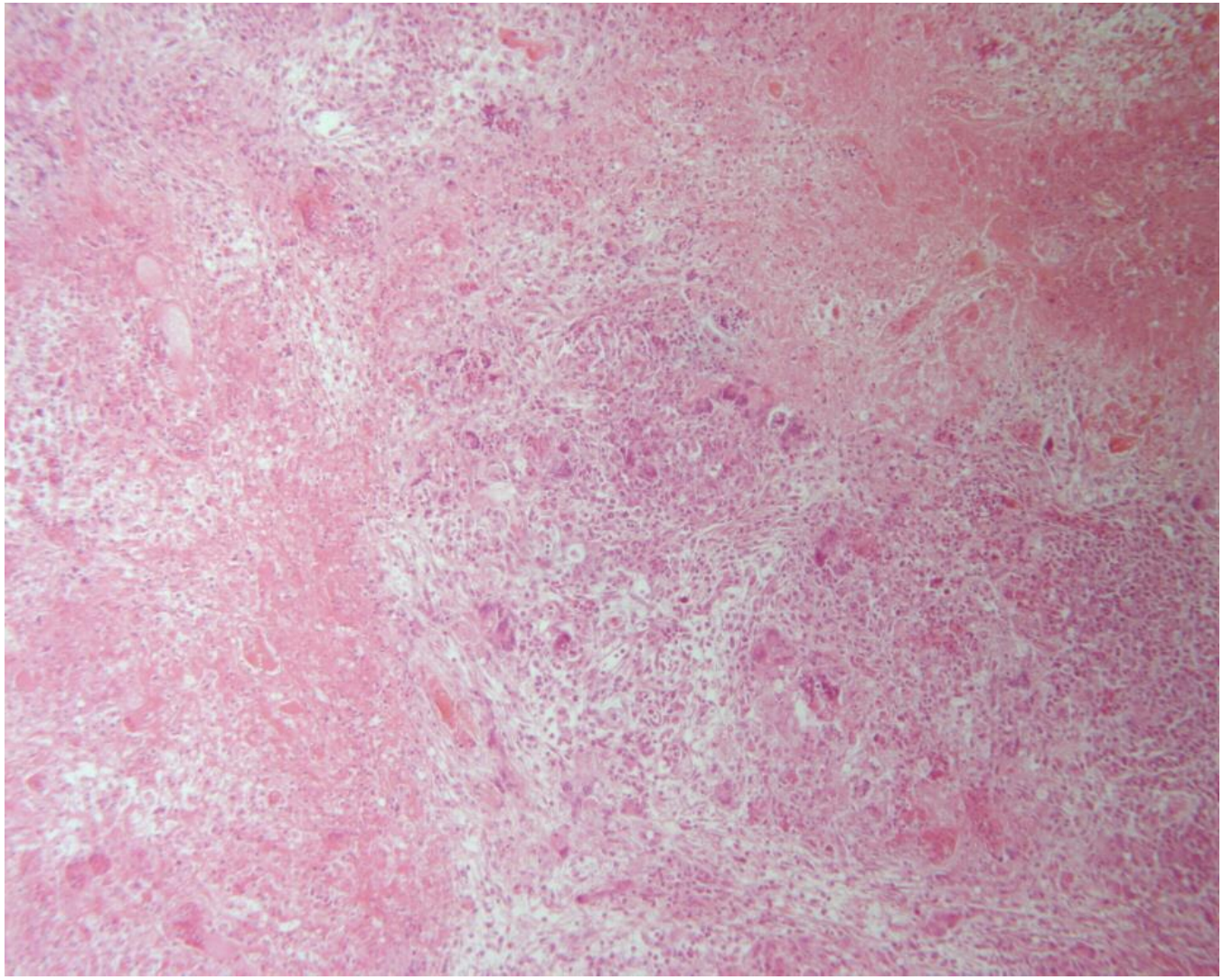
The tumor consists of sheets of malignant round cells supported by a sparse pre-existing collagenous stroma. Neoplastic cells have a centrally-located, hypochromatic irregularly round to oval nucleus, medium-sized nucleoli, and a small to moderate amount of slightly basophilic cytoplasm with indistinct cell margins

Q1. Hen



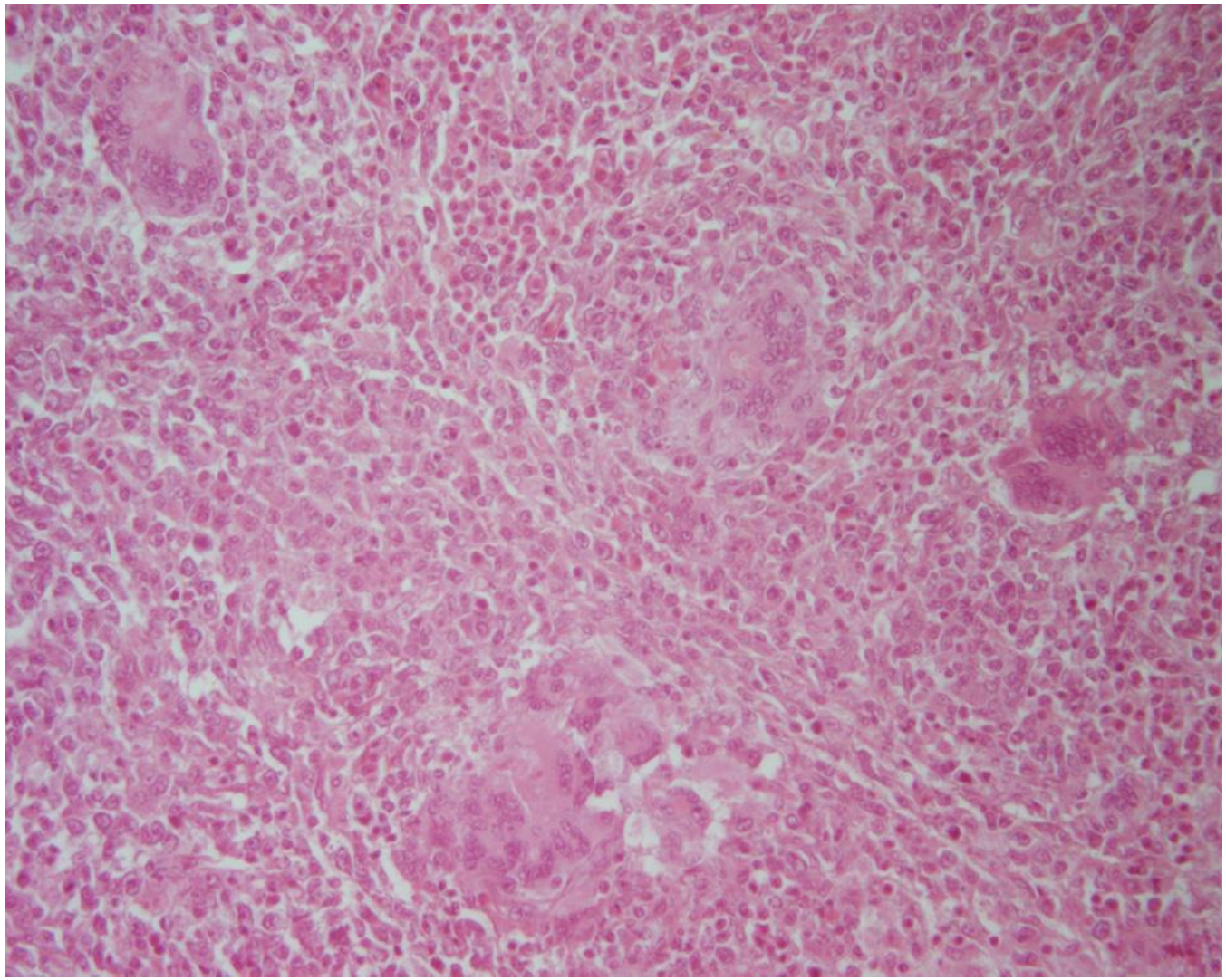
Anisokaryosis and anisocytosis are marked. The mitotic index is moderate (2 mitoses per High Power Field).

Q1. Hen



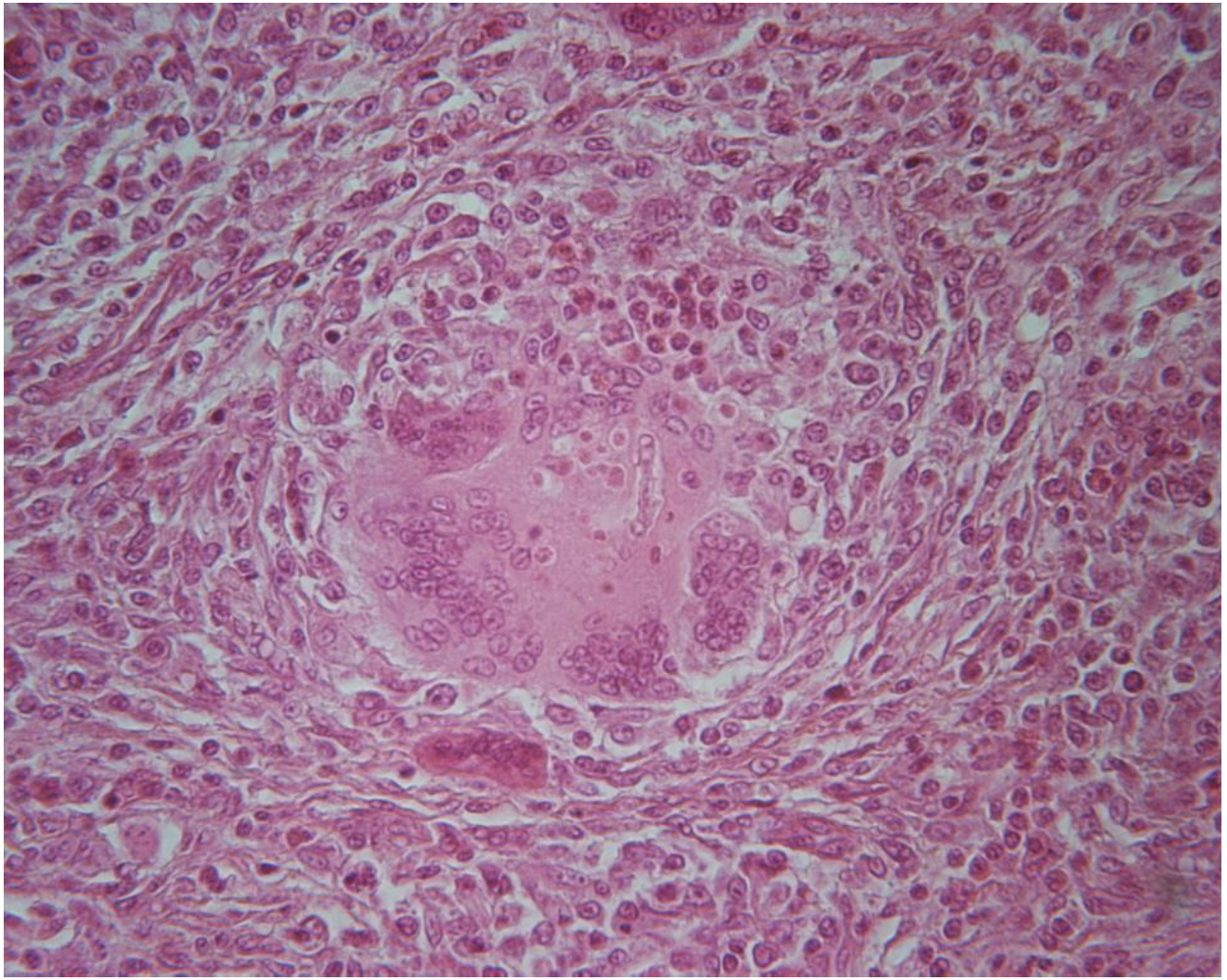
Furthermore, a voluminous (up to 5 mm in diameter) focus of brightly eosinophilic granular material, containing fibrin, erythrocytes (hemorrhage) and cytoplasmic and karyorrhectic debris (necrosis),

Q1. Hen



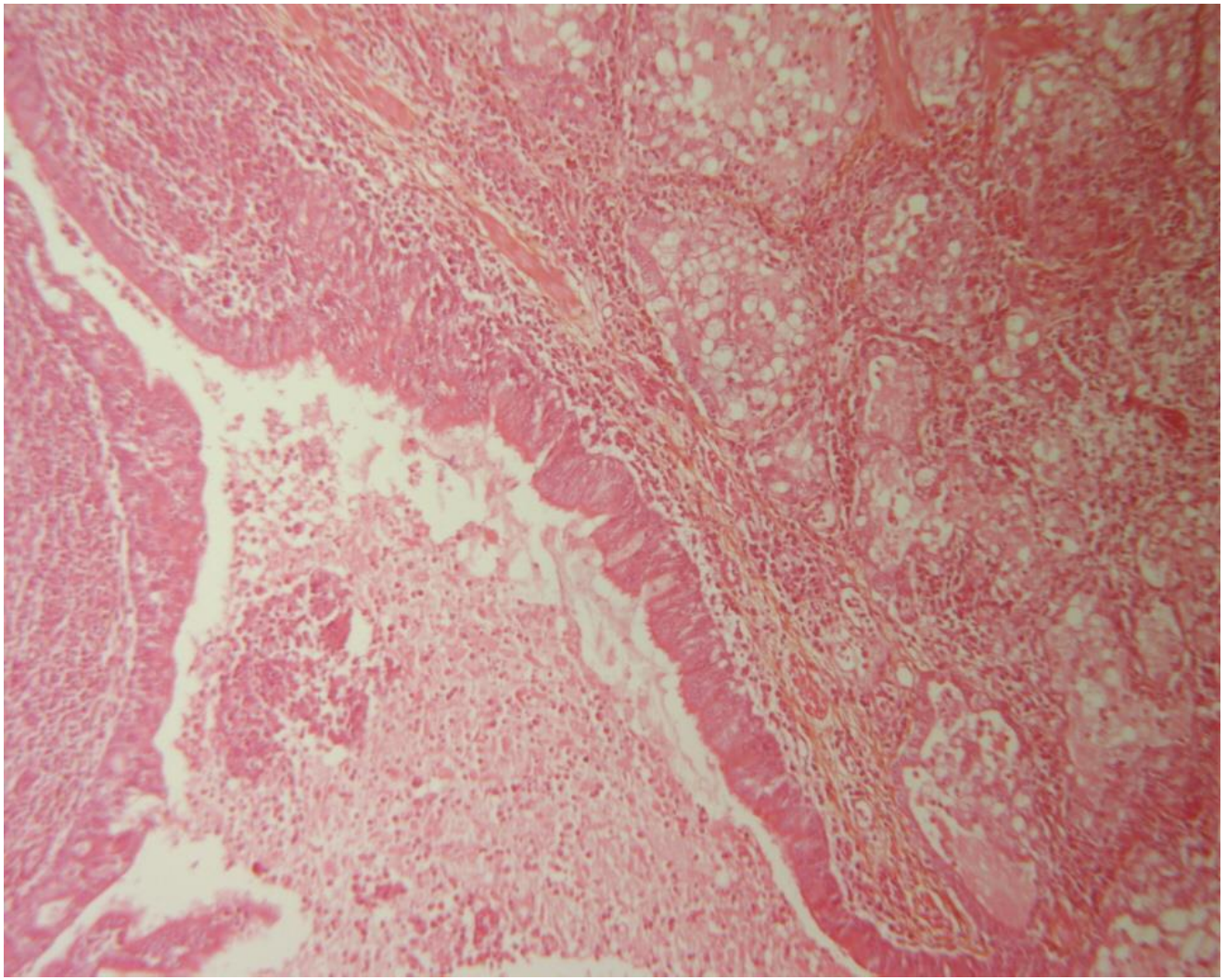
is surrounded by a rim of voluminous macrophages and multinucleated giant cells (granuloma). Several small granulomas are observed in the vicinity of the voluminous one.

Q1. Hen



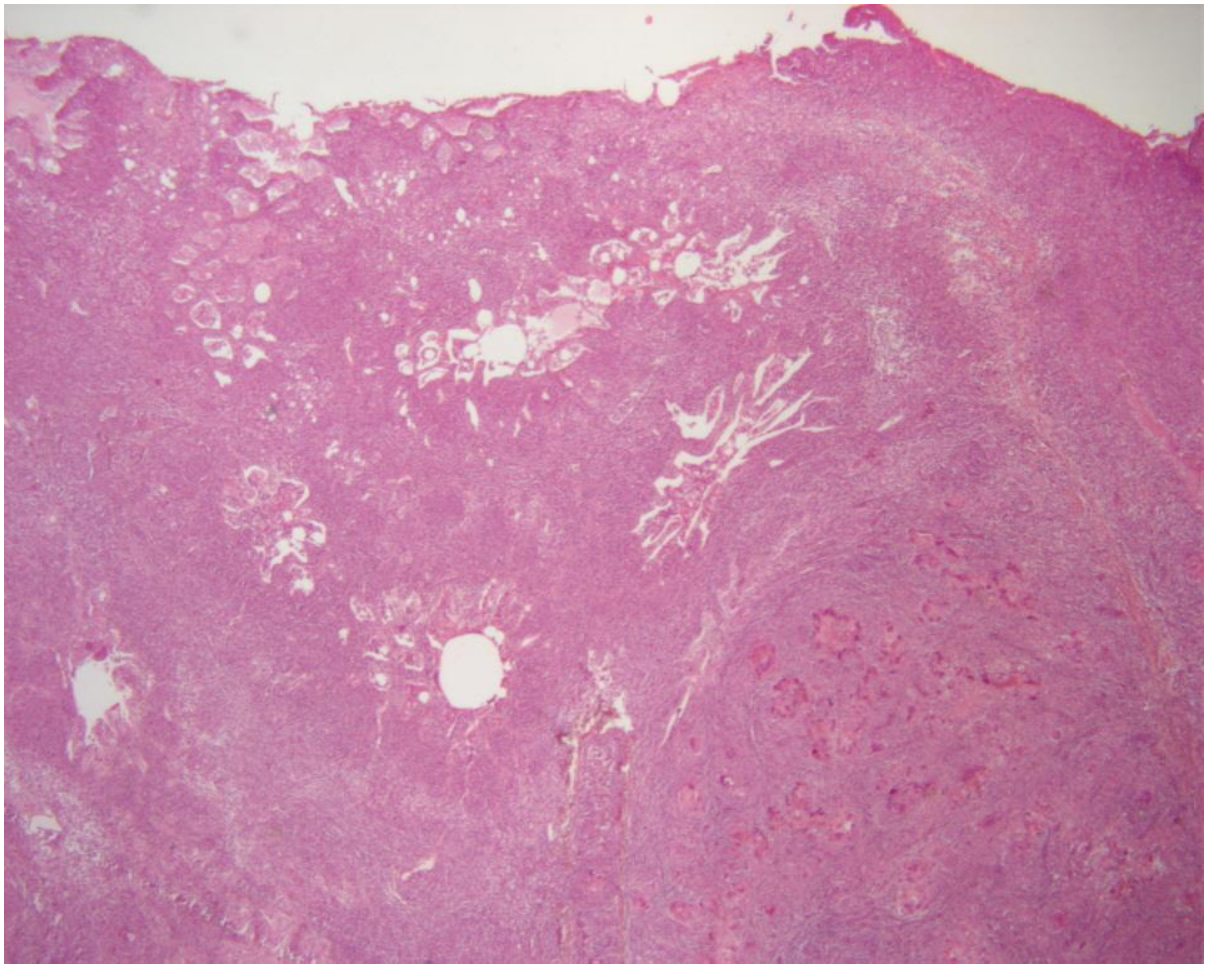
In the centrally-located necrotic material and in the cytoplasm of multinucleated giant cells are present sparse transversal and longitudinal sections of 5 μm in diameter branched and septate fungal hyphae.

Q1. Hen



The parabronchial lumina are filled with seroproteinaceous fluid (edema) containing sparse cell debris and erythrocytes.

Q1. Hen



Morphologic diagnoses

- **Lung, diffuse malignant lymphoma**
- **Lung, multifocal, chronic granulomatous pneumonia with central necrosis and intralesional branched and septate fungal hyphae**

Etiologies: **Marek's Disease Virus ; *Aspergillus fumigatus***

Q1. Hen

Lung	**1**
Design	**2**
Description: **13 points**	
Diffuse neoplastic infiltration	**1**
High cell density	**1**
Sheets of neoplastic cells	**1**
Neoplastic cell description (size, shape, cytoplasm, nucleus)	**2**
Cellular atypia	**1**
Mitoses	**1**
Foci of necrosis	**1**
Granulomas	**1**
Multinucleated giant cells	**1**
Branched and septate fungal hyphae	**2**
Edema fluid in parabronchi	**1**
Morphologic diagnoses	**2**
Etiologies	**2**

Q2

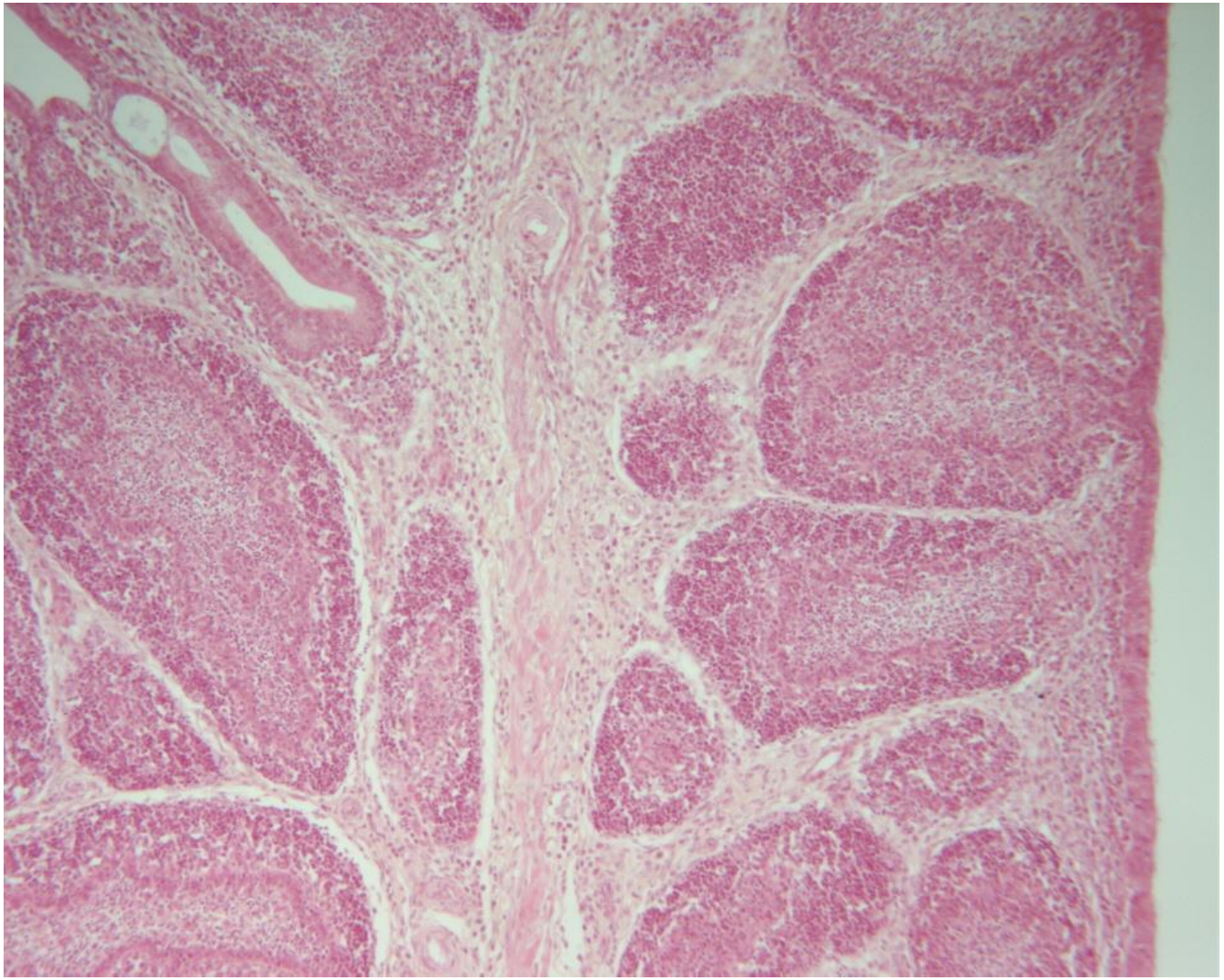
Tissue from a Chicken

Q2. Chicken

Bursa of Fabricius.

Two sections of bursae of Fabricius are observed showing diffuse atrophy (moderate for one section to marked for the second) due to generalized follicular atrophy

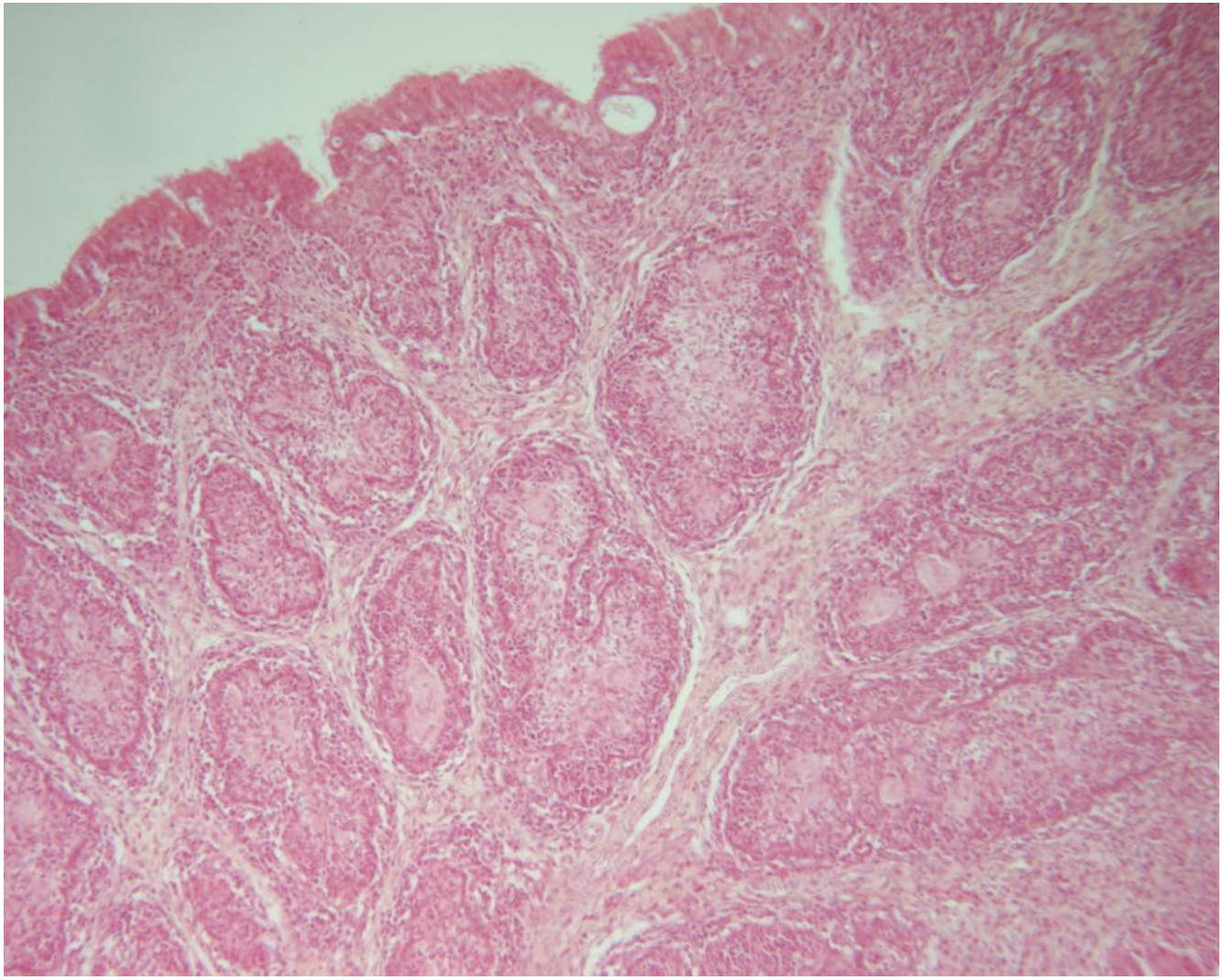
Q2. Chicken



Bursal follicles display lymphocytic depletion.

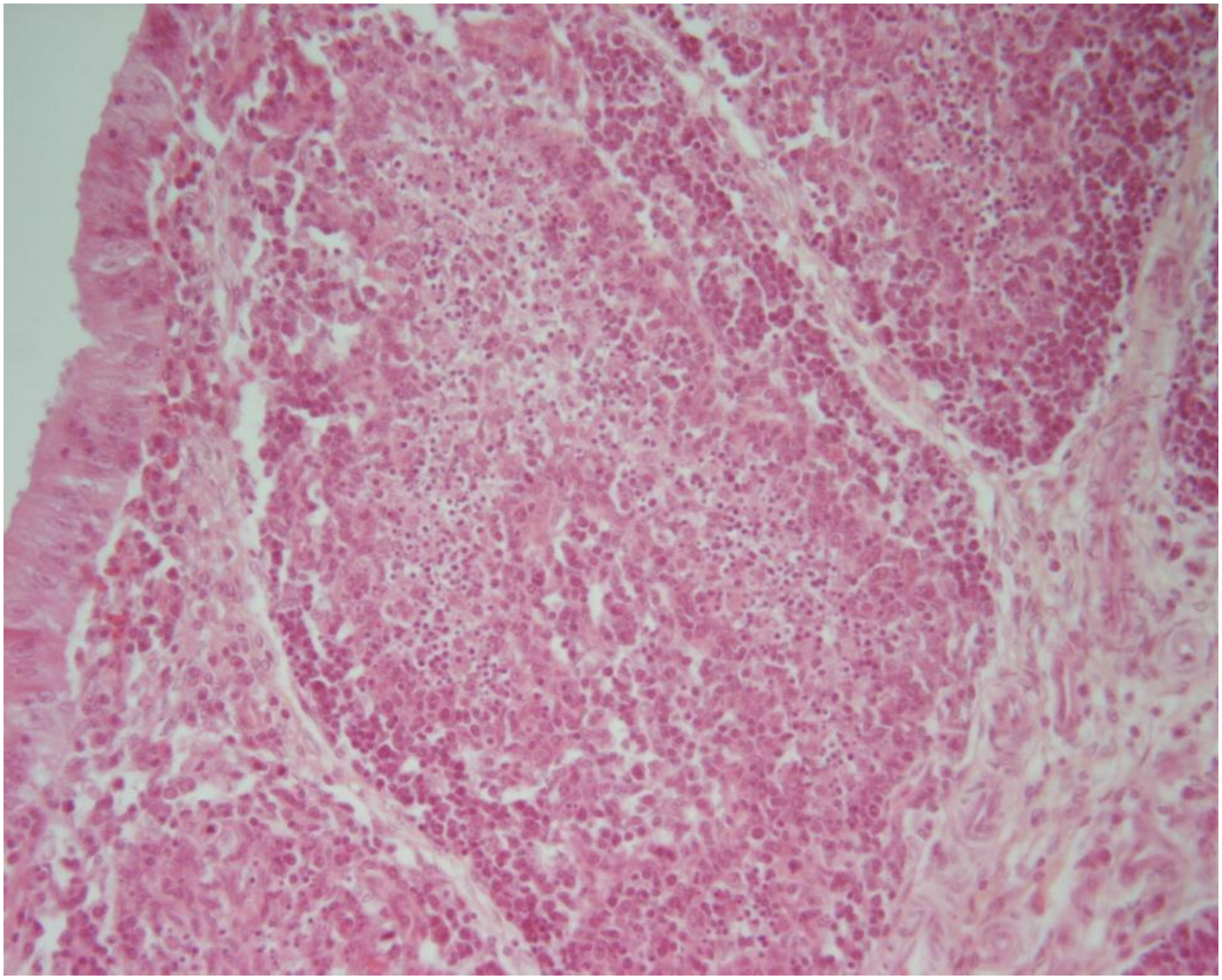
The interstitium is prominent due to lymphocytic and histiocytic infiltration and increase in connective tissue (fibroplasia and fibrosis).

Q2. Chicken



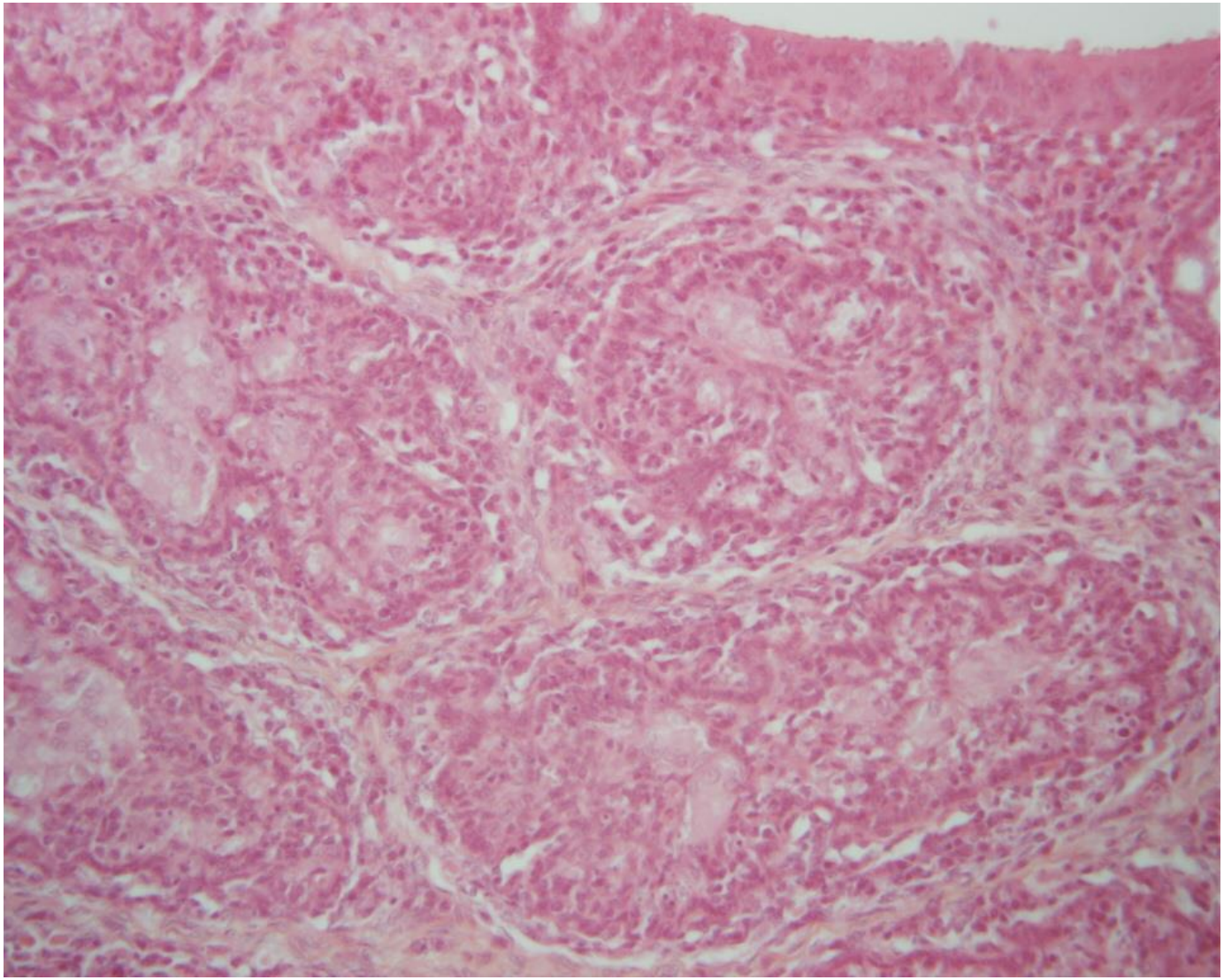
Follicular atrophy is associated with prominence of corticomedullary epithelium and follicular stroma cells and presence of intraepithelial cysts.

Q2. Chicken



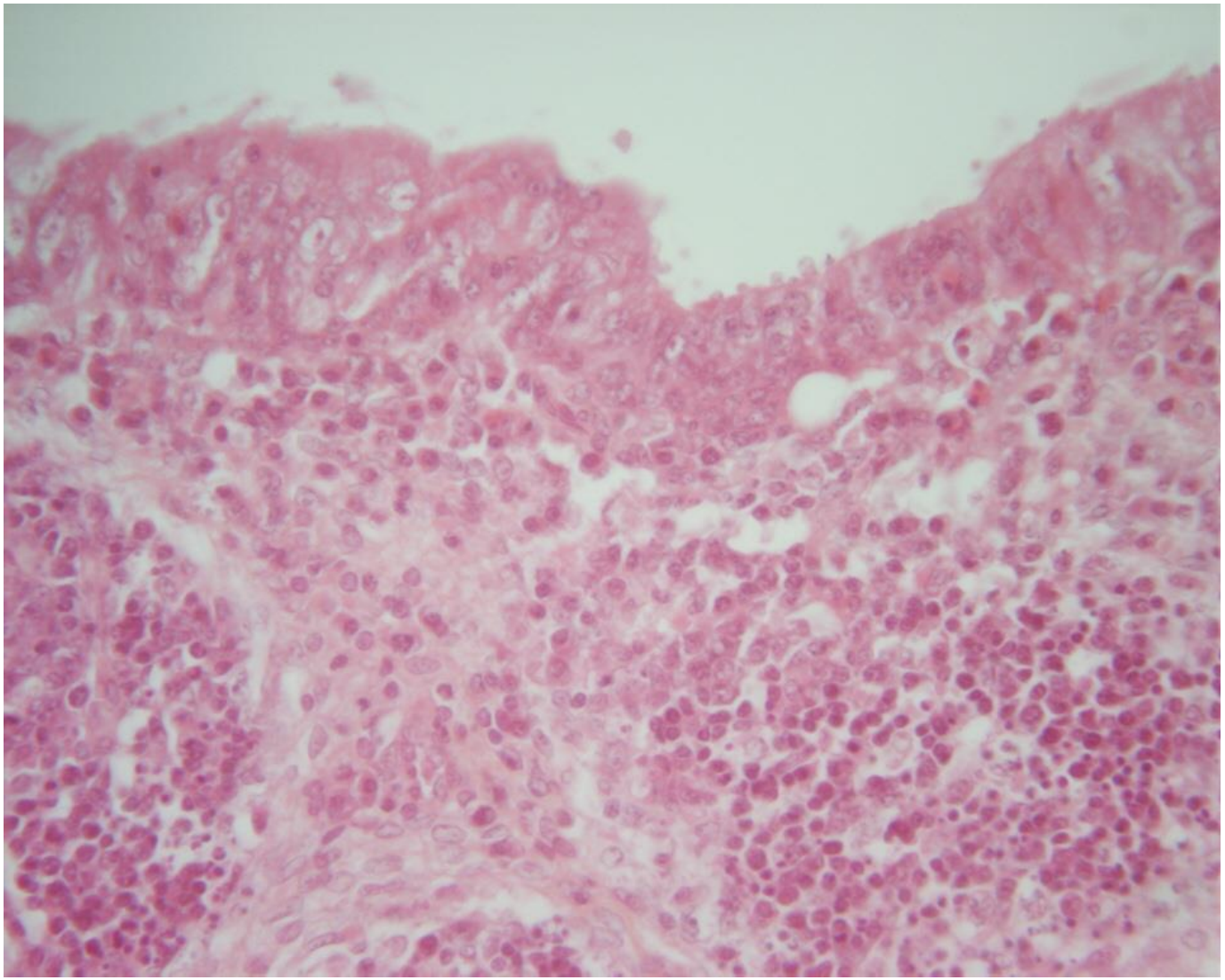
Bursal follicles display lymphocytic depletion, associated either with multifocal to diffuse pyknosis of lymphoid cells predominantly in the medulla for one section.

Q2. Chicken



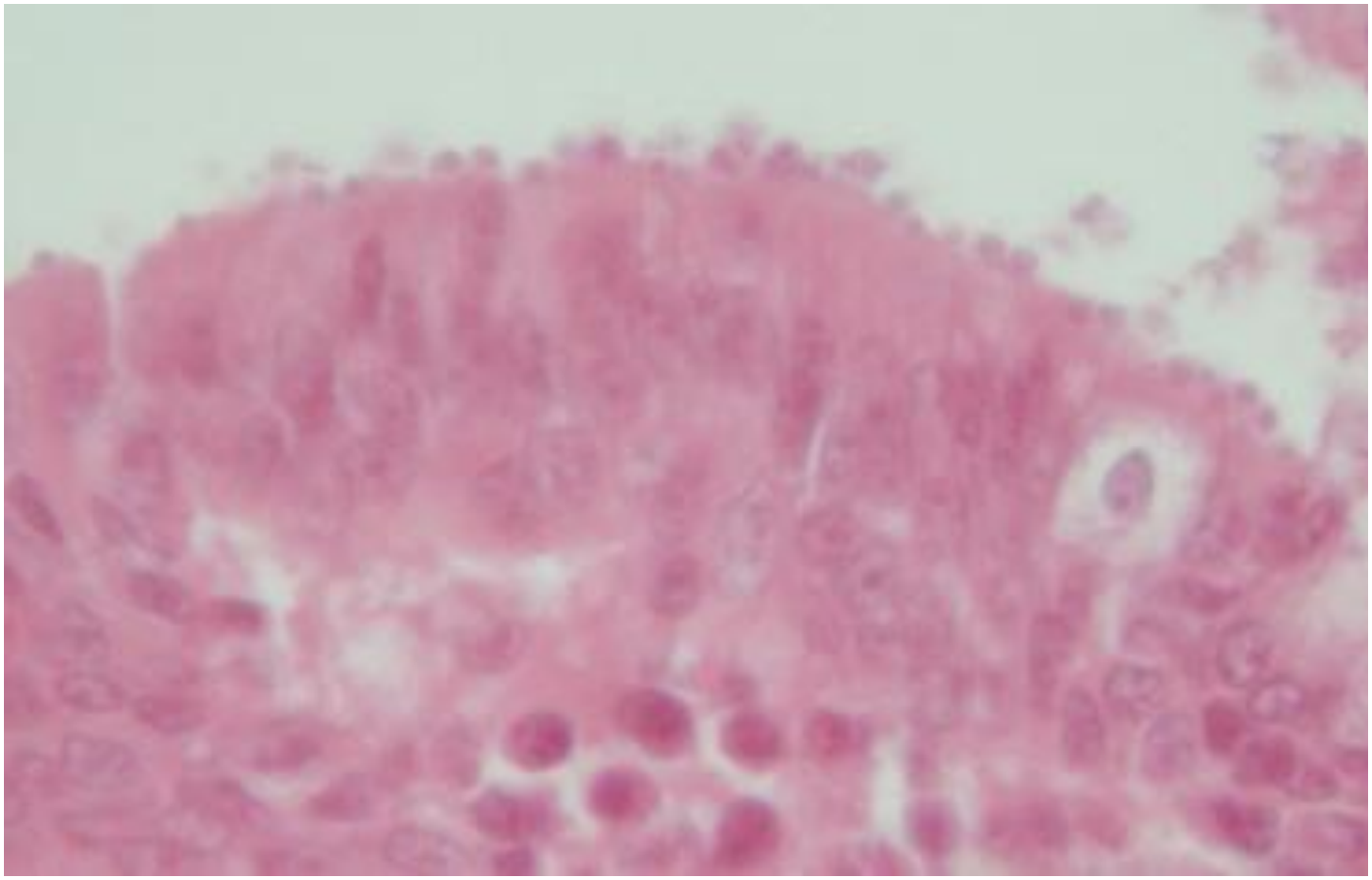
or total medullary lymphoid aplasia for the other.

Q2. Chicken



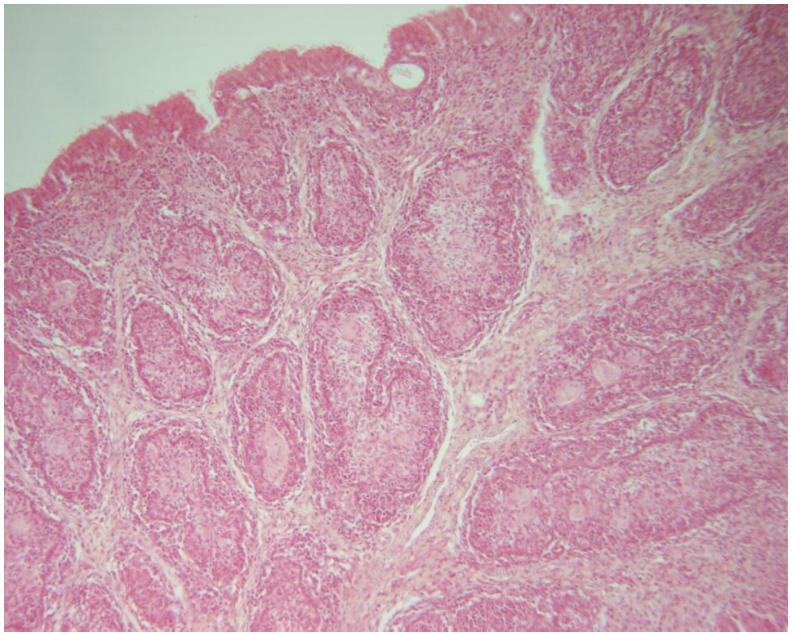
Furthermore the superficial epithelium displays multifocal to diffuse epithelial hyperplasia with stratification associated with granulocytic exocytosis. There is also a moderate multifocal to diffuse infiltration by heterophils admixed with lymphocytes, plasma cells and histiocytes in the sub-epithelial connective tissue

Q2. Chicken



Associated with the apical membrane of the superficial epithelium are observed myriads of small (2 to 4 μm), round in shape, micro-organisms, morphology consistent with cryptosporidial trophozoites and oocysts.

Q2. Chicken



Morphologic diagnoses

Bursae of Fabricius, diffuse (subacute) lymphohistiocytic bursitis with follicular atrophy, lymphocyte depletion by pyknosis, and fibroplasia.

Bursae of Fabricius, diffuse (subacute) (mild) superficial heterophilic and lymphocytic bursitis with apical colonisation of bursal epithelium by protozoa, morphology consistent with zoites and oocysts of *Cryptosporidium* sp.

Etiologic diagnosis/diagnoses: Birnaviral bursitis and bursal cryptosporidiosis

Etiologies: Infectious Bursal Disease Virus and *Cryptosporidium baileyi*

Q2. Chicken

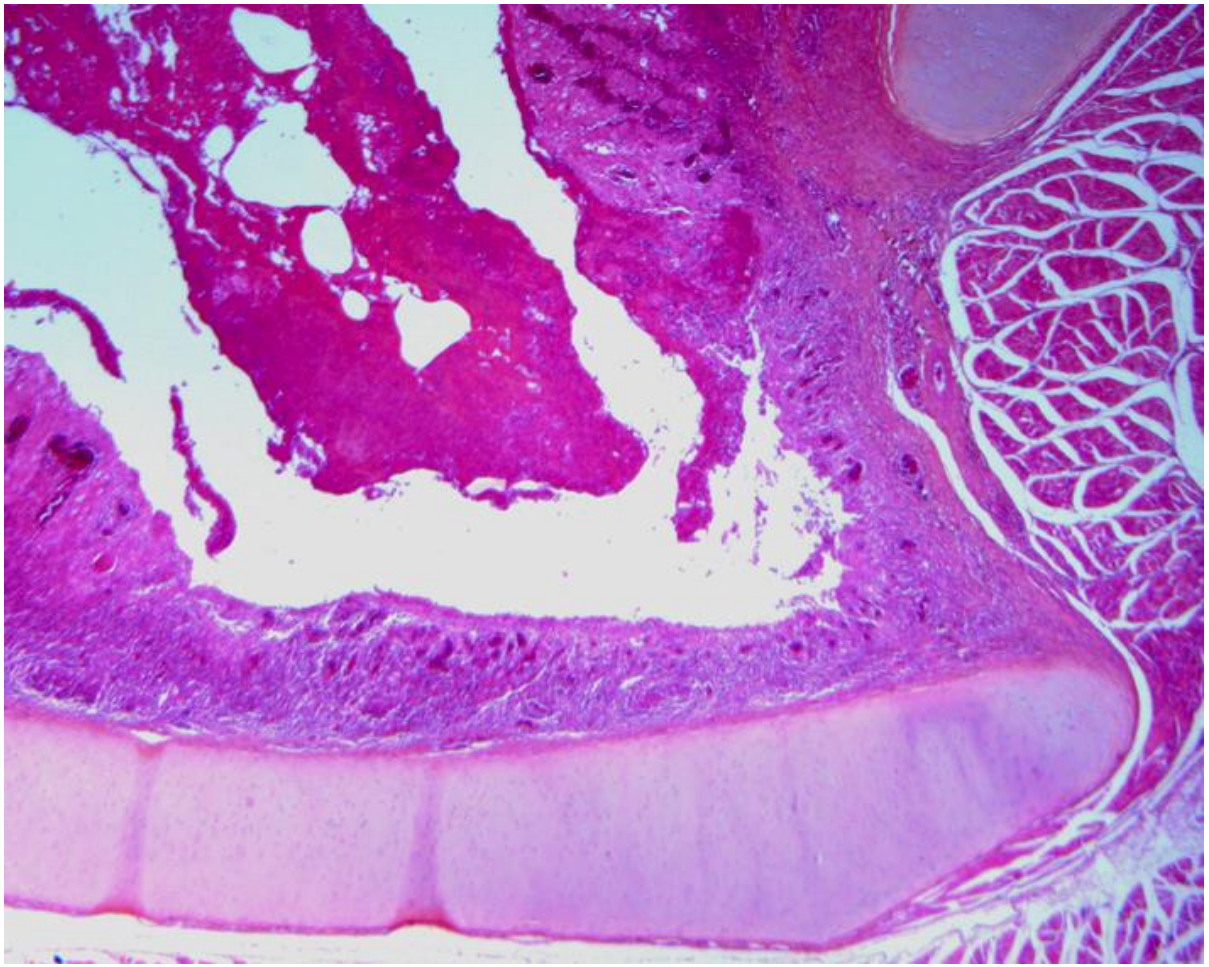
Bursa of Fabricius	**1**
Design	**2**
Description: **12 points**	
Follicular/lobular atrophy	**1**
Follicular/lobular lymphoid depletion	**1**
Lymphocytic pyknosis	**1**
Fibroplasia/fibrosis of interstitium	**1**
Epithelial cysts	**1**
Superficial epithelial hyperplasia	**1**
Heterophilic intraepithelial exocytosis	**1**
Interstitial leukocytic (heterophils/lymphocytes/plasma cells) infiltration	**1**
Epithelial apical colonisation	**1**
Protozoa	**1**
Description of protozoa: 2 to 4 μm in size (0.5), round in shape (0.5)	**1**
Trophozoites (0.5) and oocysts (0.5)	**1**
Morphologic diagnoses	**4**
Etiologies	**1**

Q3

Tissue from a Turkey

Q3: Tissue: Larynx

Open interrupted annular cartilage lined by a deeply modified (respiratory?) epithelium



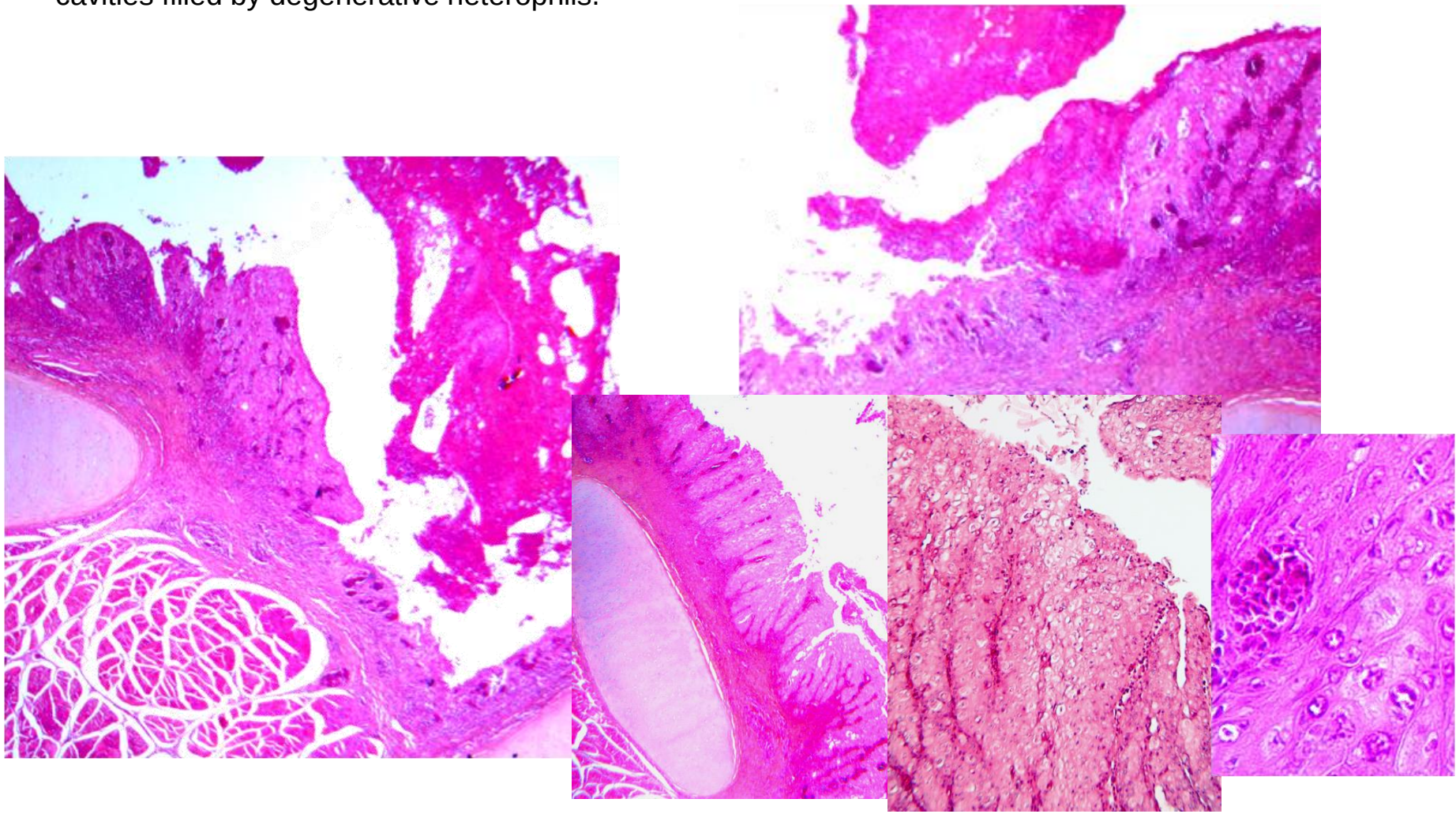
- **Q3: Morphological description**

Multifocal to coalescing, severe, papillary proliferation of the respiratory epithelium.

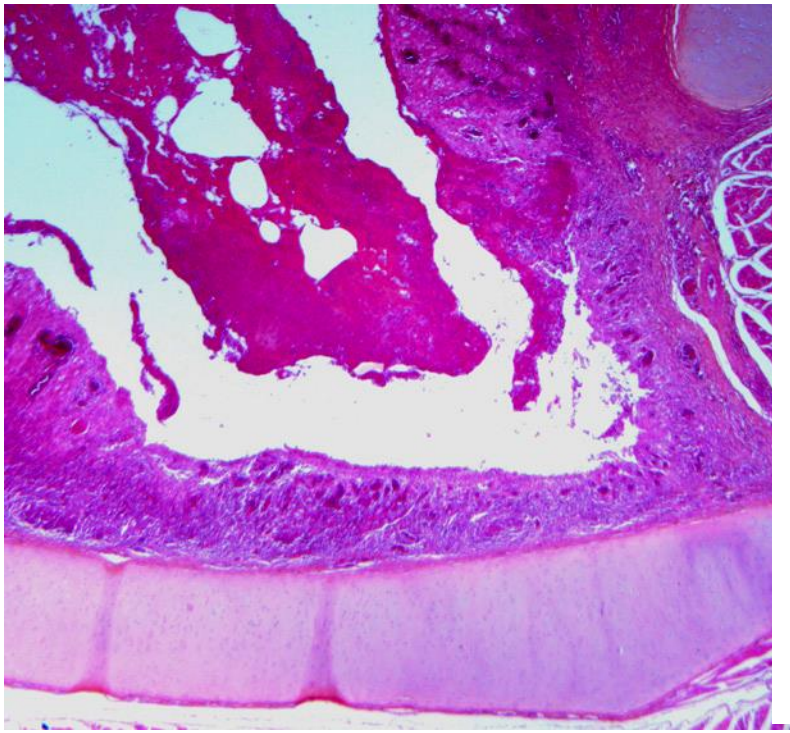
Hyperplasia and squamous metaplasia of the affected epithelium

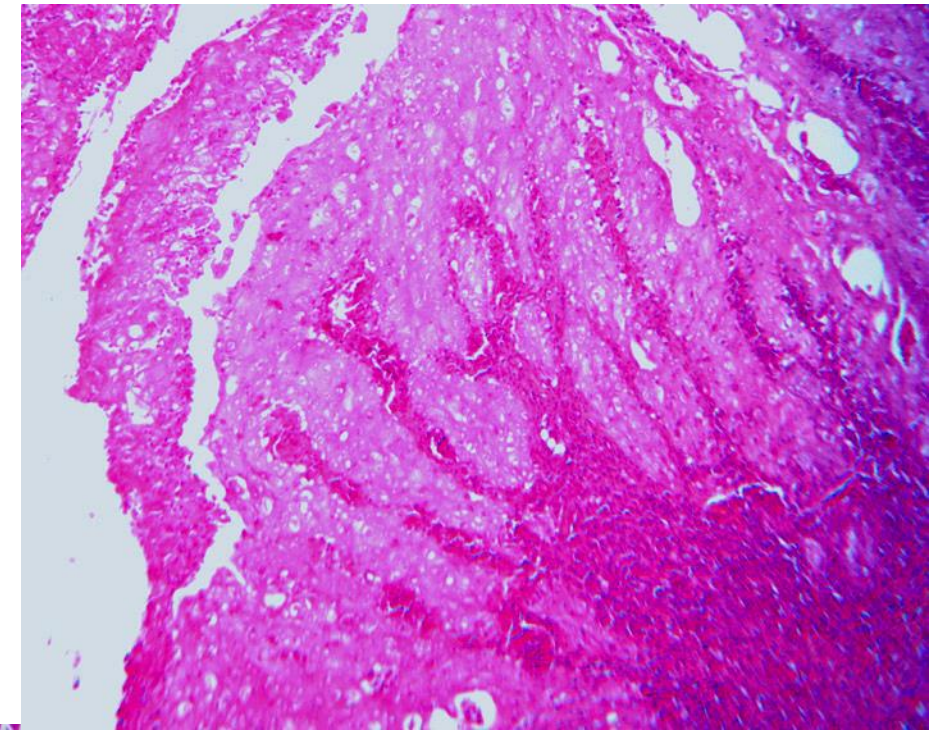
Remaining non hyperplastic and metaplastic respiratory epithelium severely necrotized with sub-total elimination.

Multifocal superficial necrosis and presence of fibrinonecrotic scabs. Presence of few intraepithelial cavities filled by degenerative heterophils.

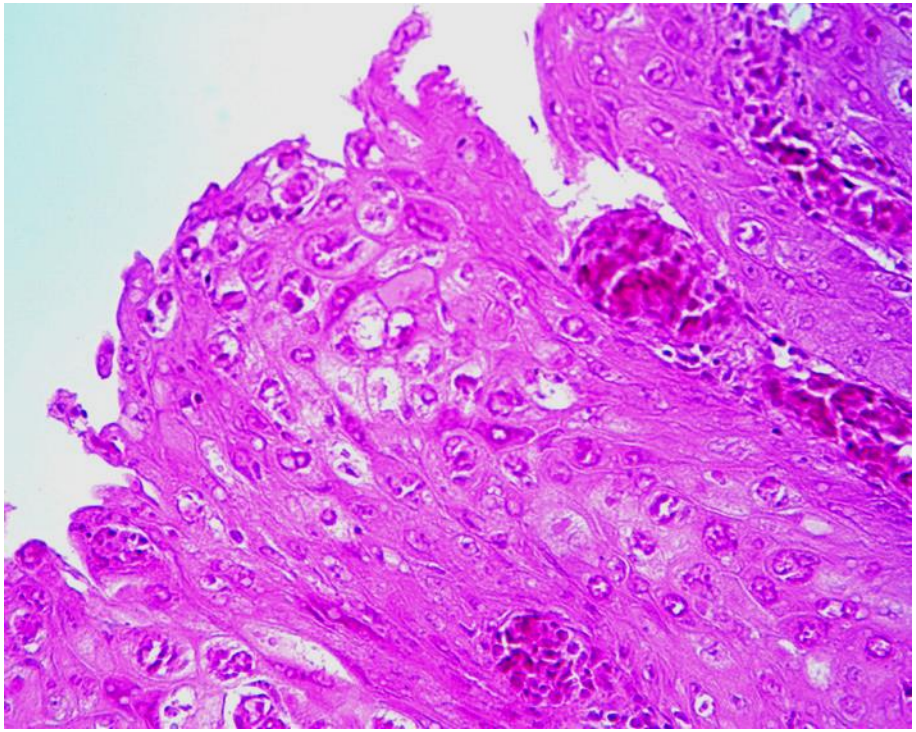


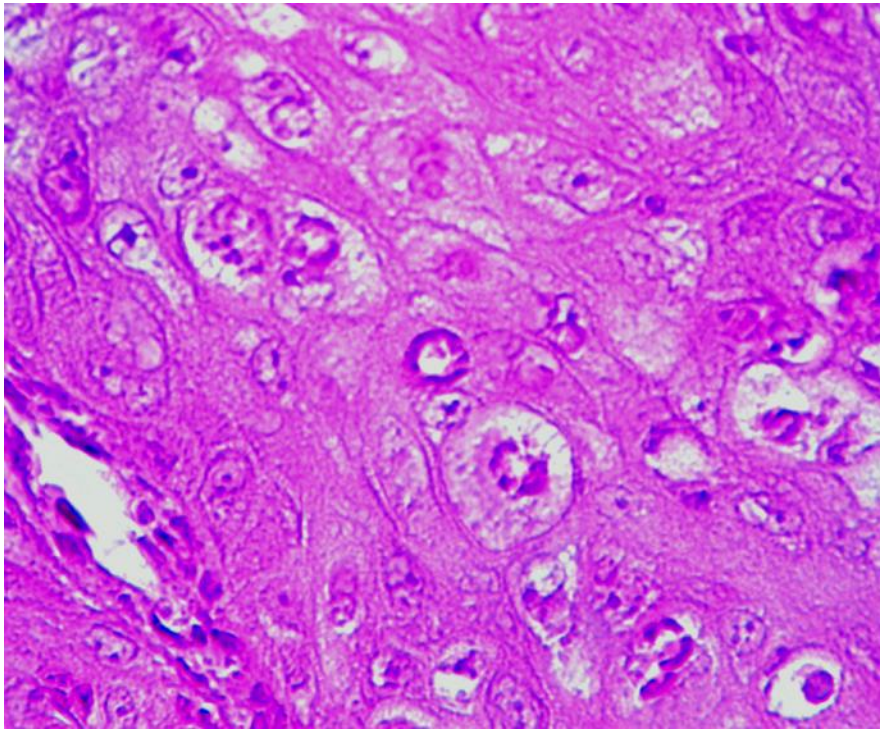
- **Q3: Morphological description**
  - Presence of an abundant fibrinonecrotic and suppurative exudate in the larynx lumen with numerous degenerative heterophils, eosinophilic fibrinous deposits and many bacterial foci.
  - Severe diffuse inflammatory infiltration of the lamina propria constituted mainly by mononuclear cells (lymphocytes and plasma cells) and few heterophils.





- **Q3: Morphological description**
  - In metaplastic squamous epithelium, mainly in superficial areas, many cells appear ballonized with clear vacuolated nucleus and pale unstained cytoplasm.
  - Some ballooning cells contain voluminous, round, acidophilic, irregularly stained, intracytoplasmic, viral inclusion bodies identified as viral inclusion bodies of Poxvirus type (Bollinger's Bodies)





- **Q3: Morphological diagnosis**

  Subacute, hyperplastic, and metaplastic, fibrinonecrotic and suppurative laryngitis associated with epithelial viral intracytoplasmic inclusion bodies of Poxvirus type (Bollinger's bodies).

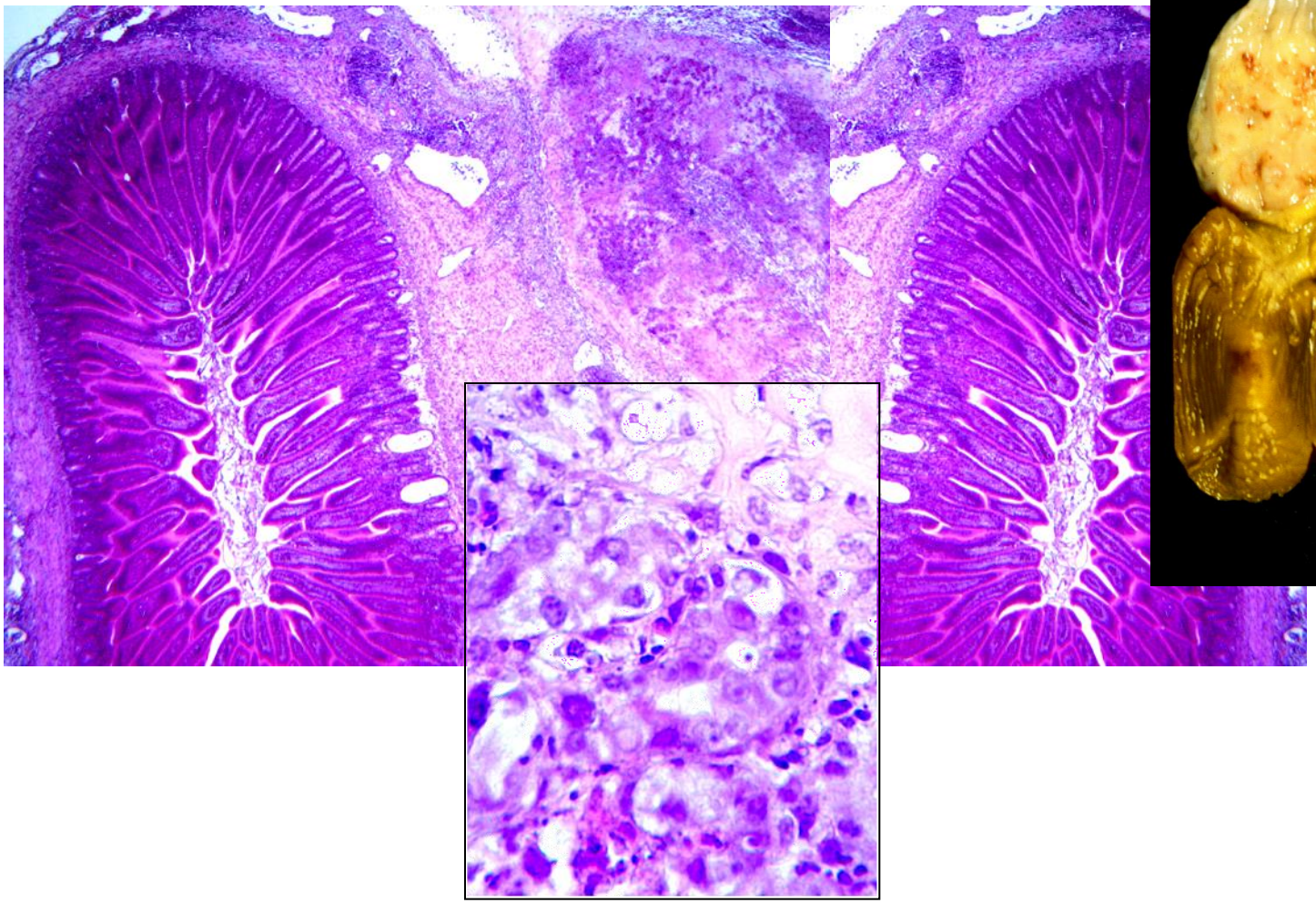
- **Q3: Name the disease:** Avian Poxvirosis (Avian or Fowl Pox)

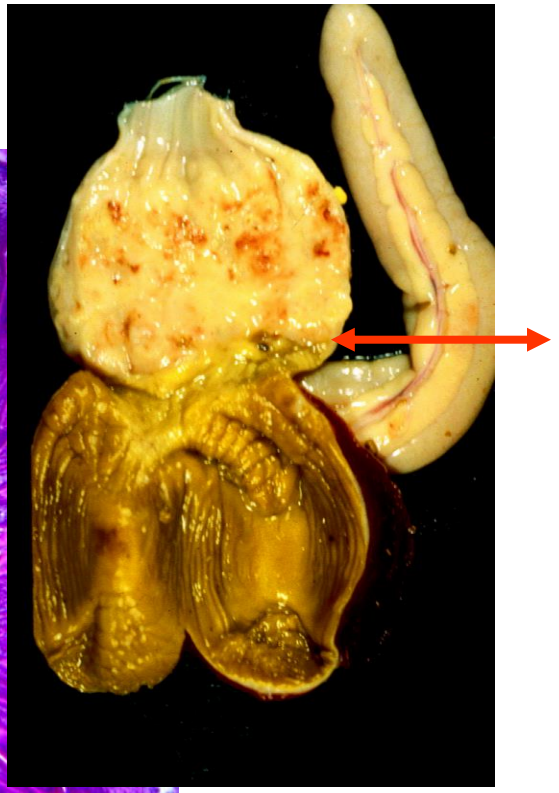
Larynx	**1**
Design	**2**
Description: **12 points**	
Papillary proliferation of respiratory epithelium	**1**
Hyperplasia and squamous metaplasia	**2**
Epithelial necrosis	**1**
Scabs and/or ulcers	**1**
Fibrinonecrotic / suppurative exudate	**1**
Bacterial colonies	**1**
Lamina propria: inflammation	**2**
Degenerative changes in epithelial cells	**1**
Inclusion bodies with description	**2**
Morphologic diagnosis	**4**
Name the disease	**1**

Q4

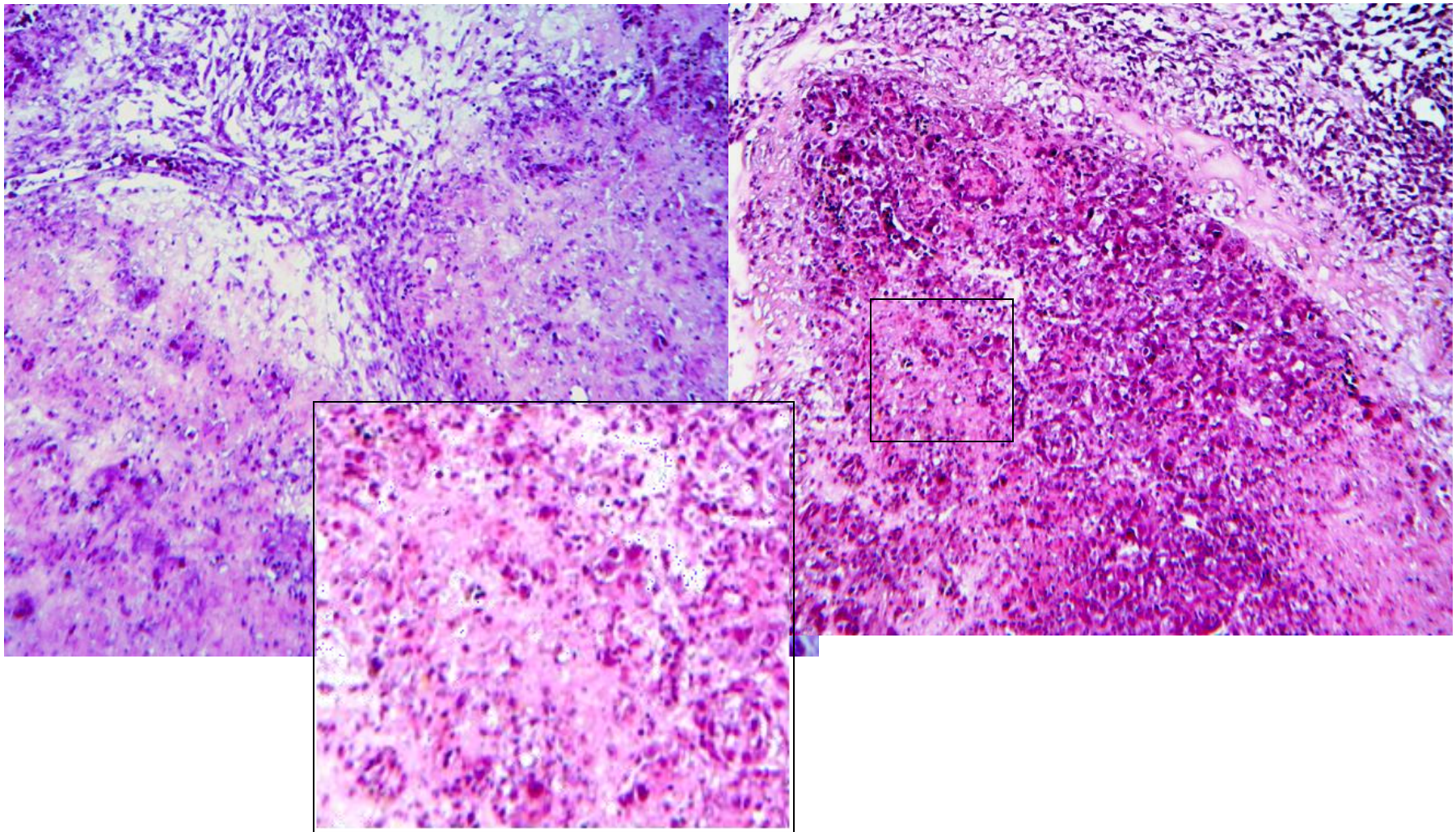
Tissue from a Guinea Fowl

- **Q4: Tissue?**
  - Lobules of necrotized parenchyma located between 2 symmetrical sections of small intestine
  - Remnants of acinar structures
  - Pancreas + Duodenum (Only Pancreas also accepted)



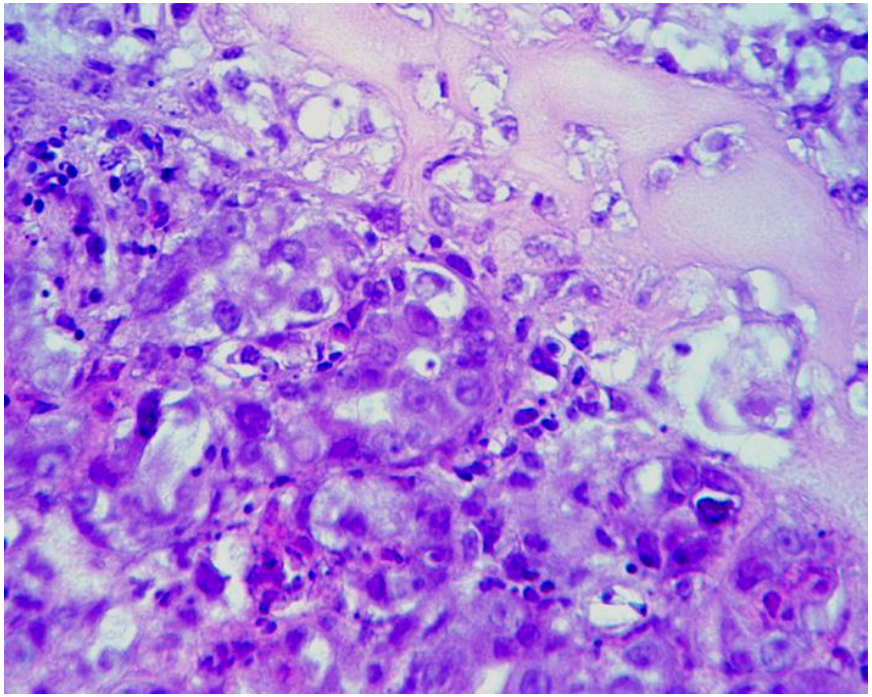


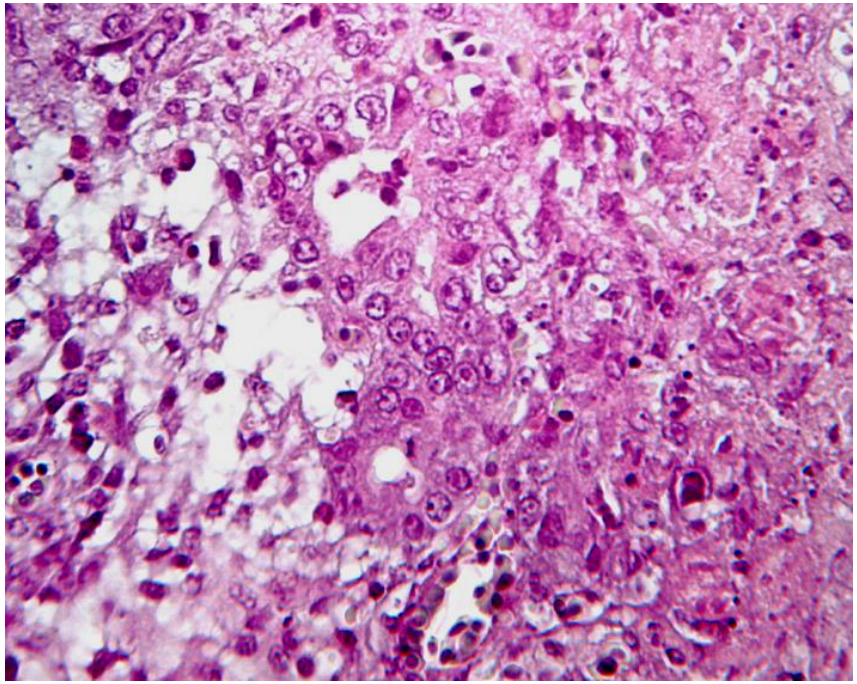
- **Q4: Morphological description**
  - (No change on duodenum)
  - Acute, severe, diffuse, subtotal necrosis (or multifocal to coalescing, severe, extensive, lytic necrosis) extended to all the lobules of the pancreatic parenchyma.
  - Massive destruction of the parenchyma which appears as irregular acidophilic areas without structures with accumulation of cytoplasmic and nuclear fragmented debris throughout necrotizing areas.



- **Q4: Morphological description**

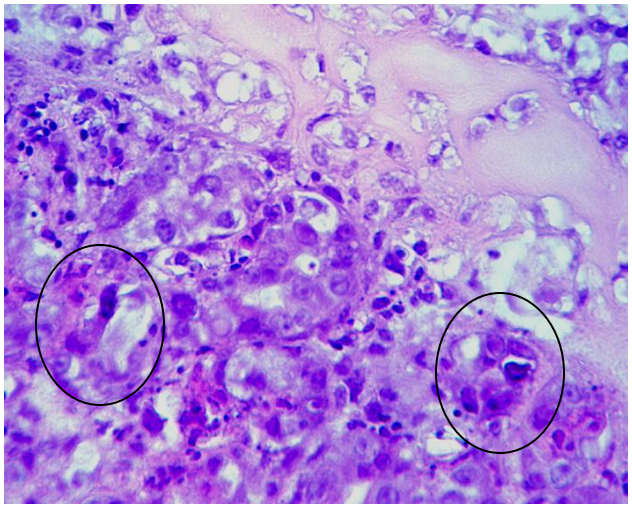
  - Persistence of few identifiable pancreatic structures in the lobular periphery surrounding the necrotic areas.
  - The remaining pancreatic parenchyma exhibits severe degenerative changes with lost of acinar organisation and glandular cells with vacuolated cytoplasm, hyperchromatic dense nuclei and area of dedifferentiation.

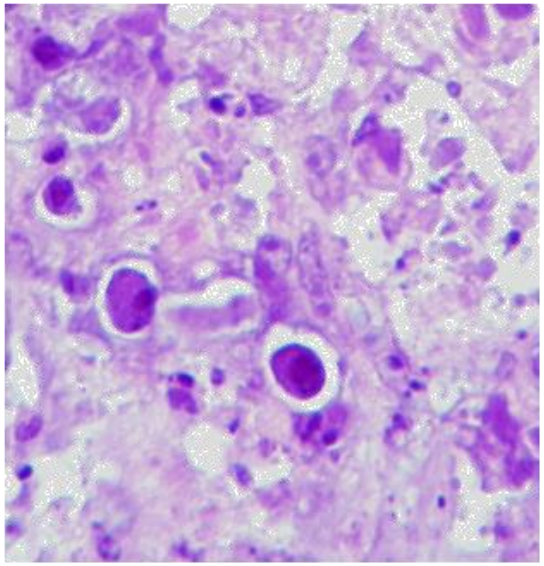


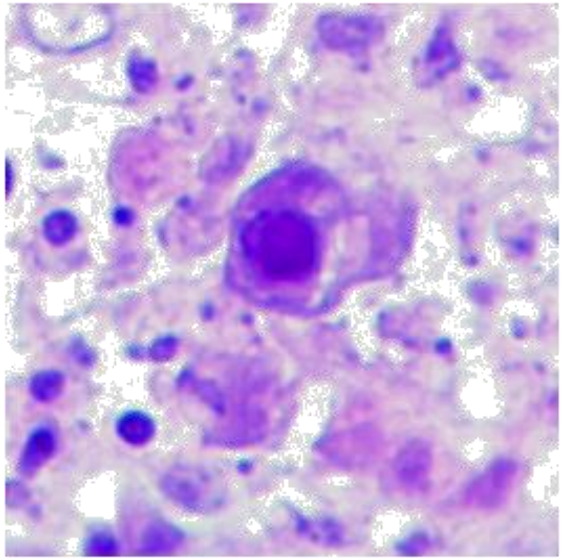


• Q4: Morphological description

- Few intranuclear, basophilic to amphophilic, poorly defined, viral inclusion bodies are seen in epithelial cells (Avian Adenovirus group I type)

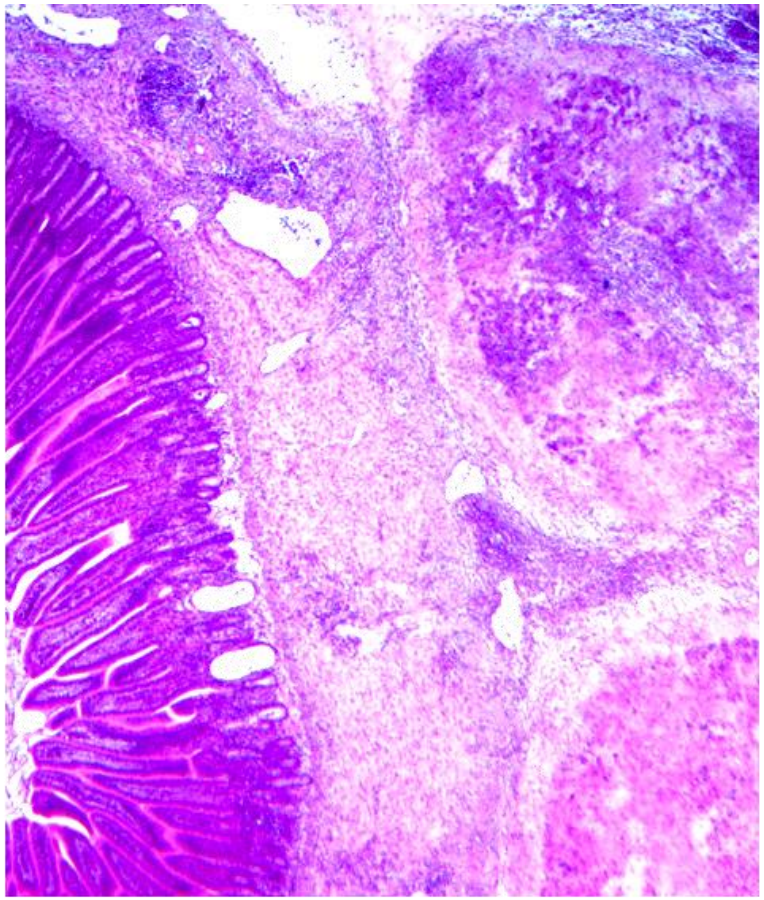


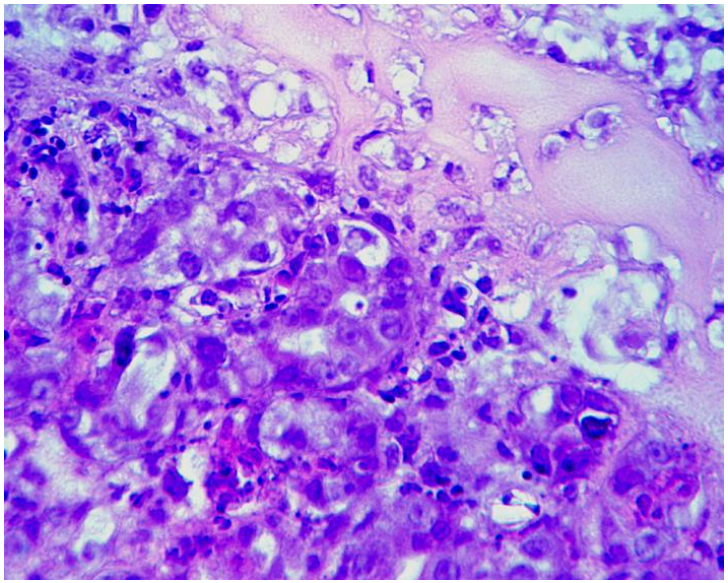


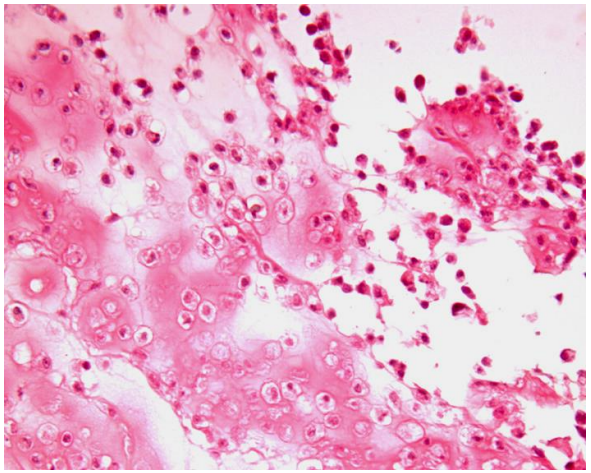


Inclusion bodies sometimes difficult to identify because of the severity of necrosis

- **Q4: Morphological description**
  - A severe and extensive edema with few inflammatory cells is present in the perilobular connective tissue, peripancreatic serosa and surrounding extralobular excretory pancreatic ducts.

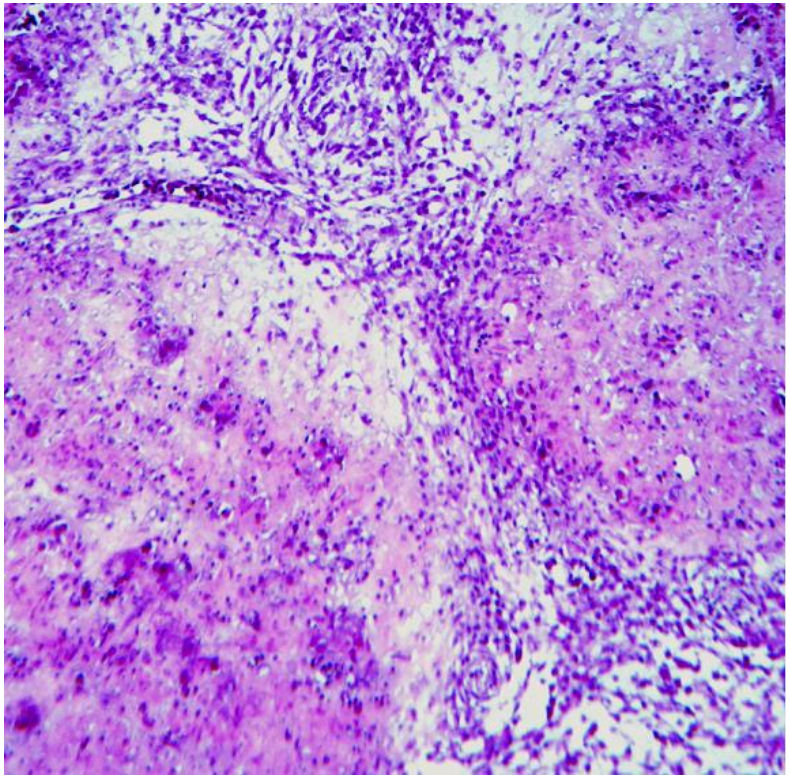


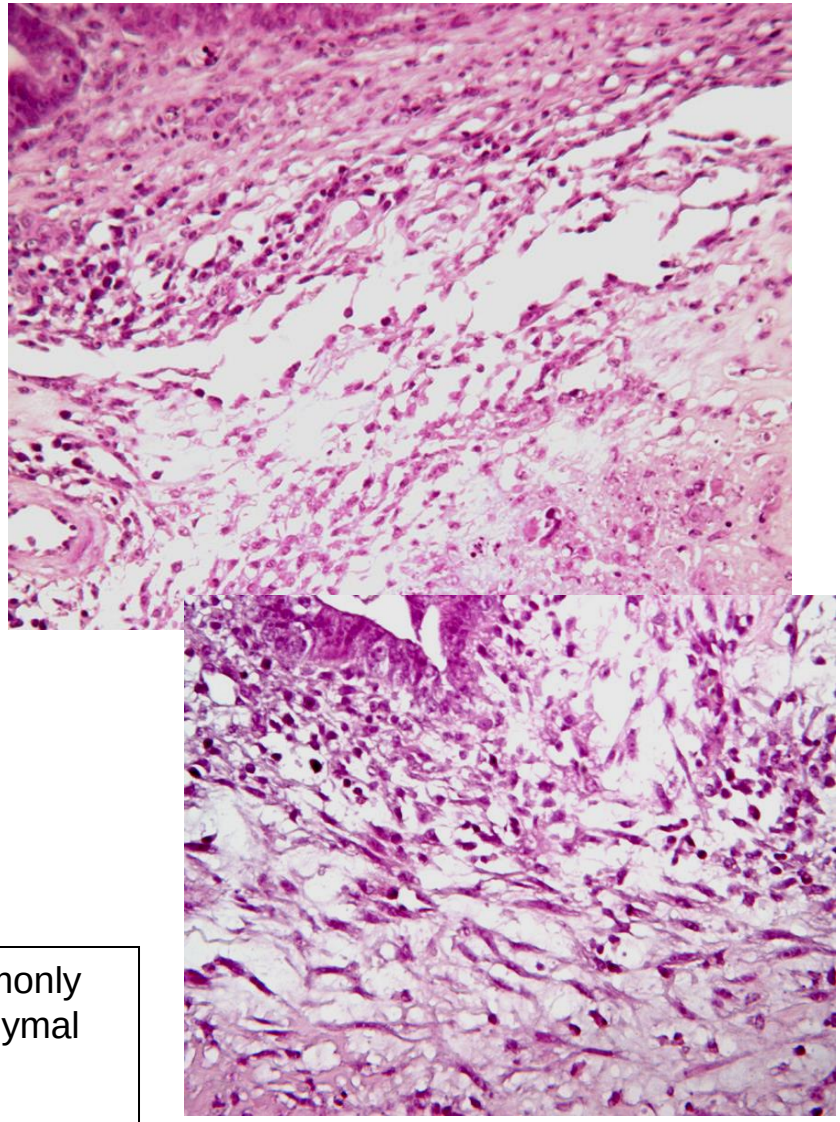




- **Q4: Morphological description**

  - Early repair by healing is observed in perivascular and perilobular spaces with proliferation of activated fibroblasts (fibroplasia)





NB: Early healing with abundant fibroplasia is commonly observed in birds following severe subtotal parenchymal necrosis
(ie: Infectious Bursal Disease lesions)

- **Q4: Morphological diagnosis**

  Severe, acute, necrotizing pancreatitis with intranuclear viral inclusion bodies of avian Adenovirus group I type in epithelial cells

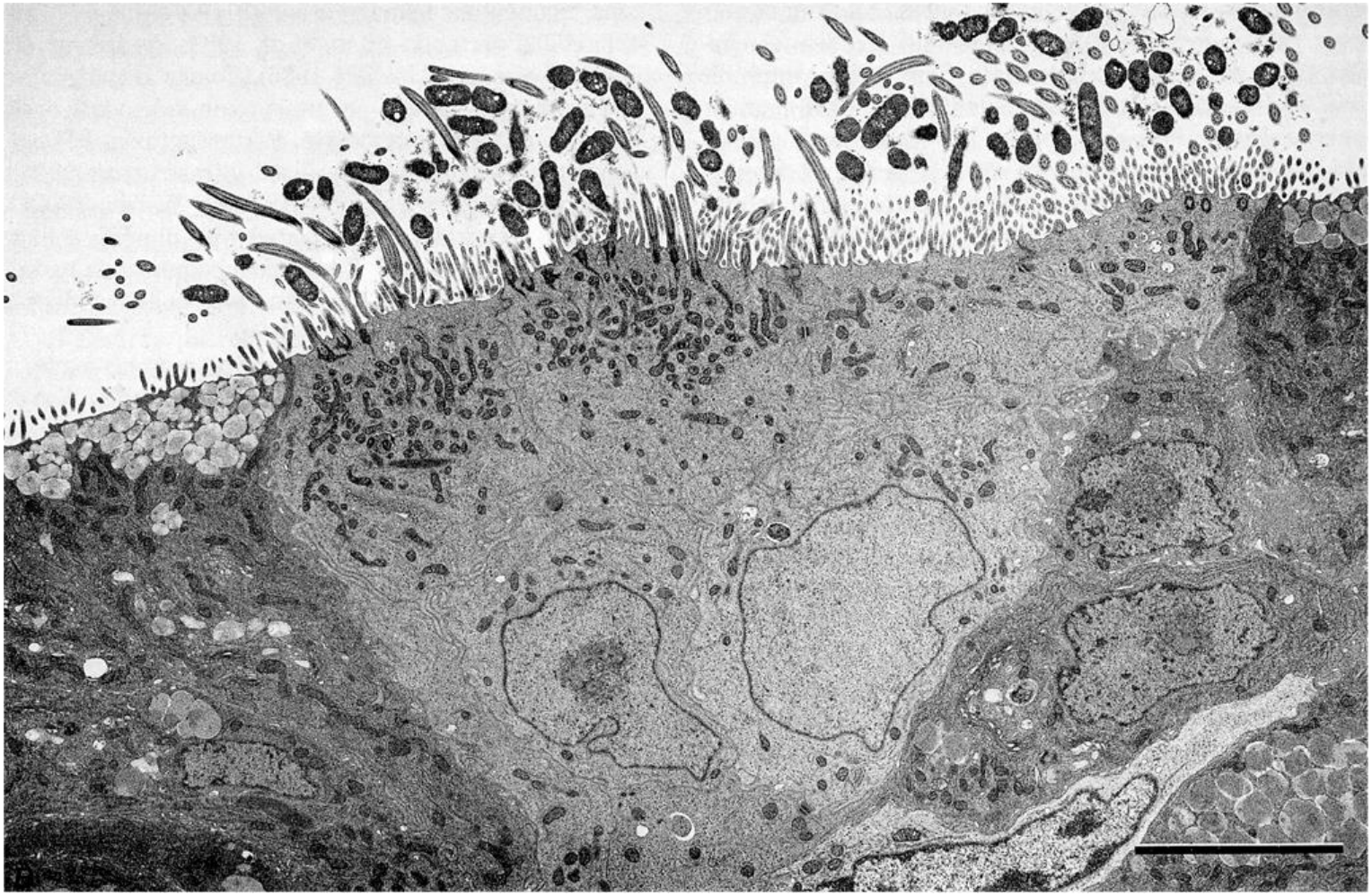
- **Q4: Etiologic diagnosis**

  adenoviral pancreatitis

Pancreas	**1**
Design	**2**
Description: **11 points**	
Acute severe necrosis	**2**
Description of necrosis	**1**
Degenerative changes in pancreatic acinar cells (description)	**1**
Intranuclear VIBs	**1**
Avian Adenovirus group I type	**1**
Description of inclusion bodies	**2**
Intralobular and serosal edema	**2**
Fibroplasia	**1**
Morphologic diagnosis	**4**
Etiologic diagnosis	**2**

Q5
(electron microscopy)
Tissue from a Turkey

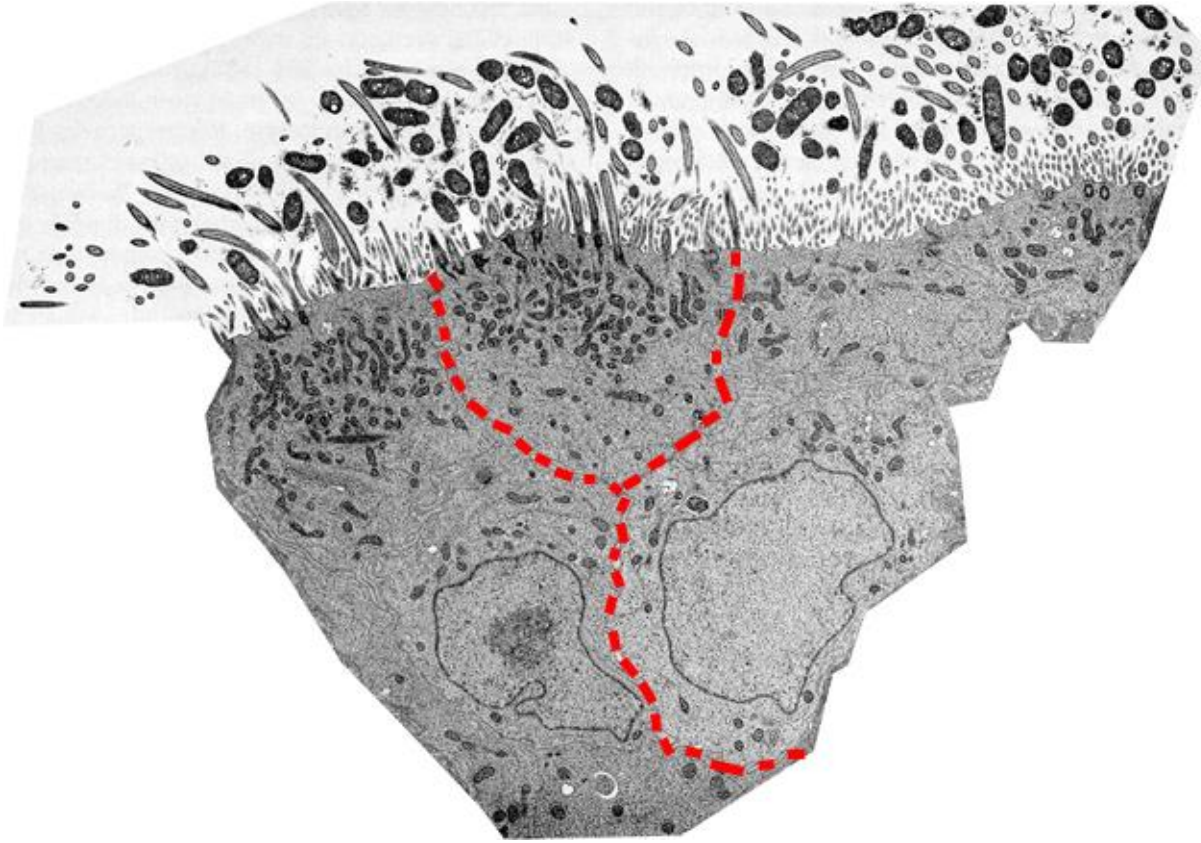
Q5 (TEM). Turkey

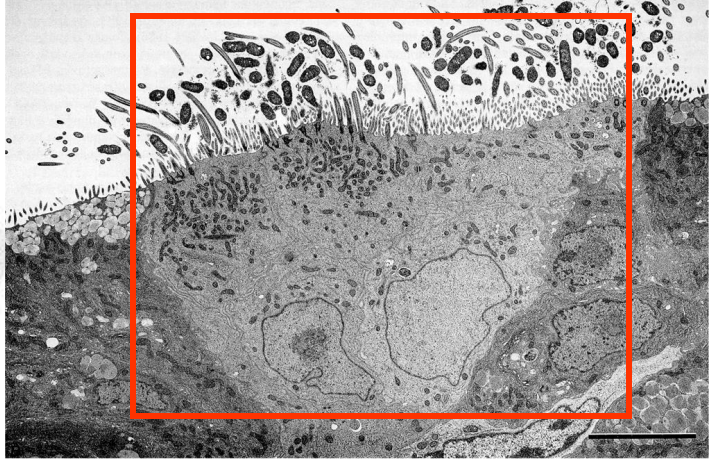


Full thickness of a **columnar pseudostratified epithelium**

Composed of **3 different cell types**.

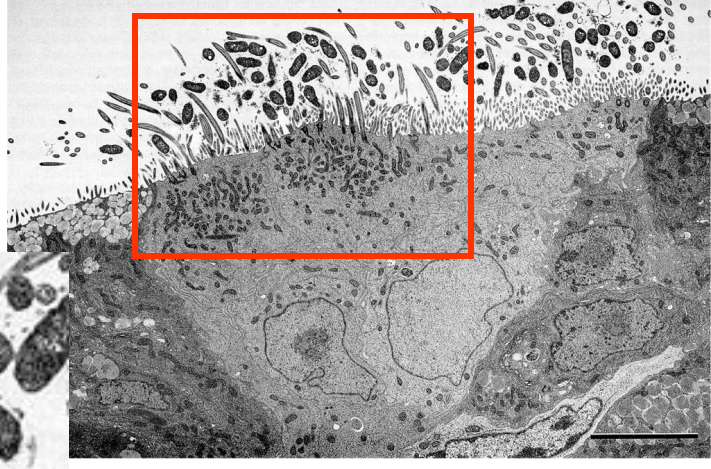
Q5 (TEM). Turkey

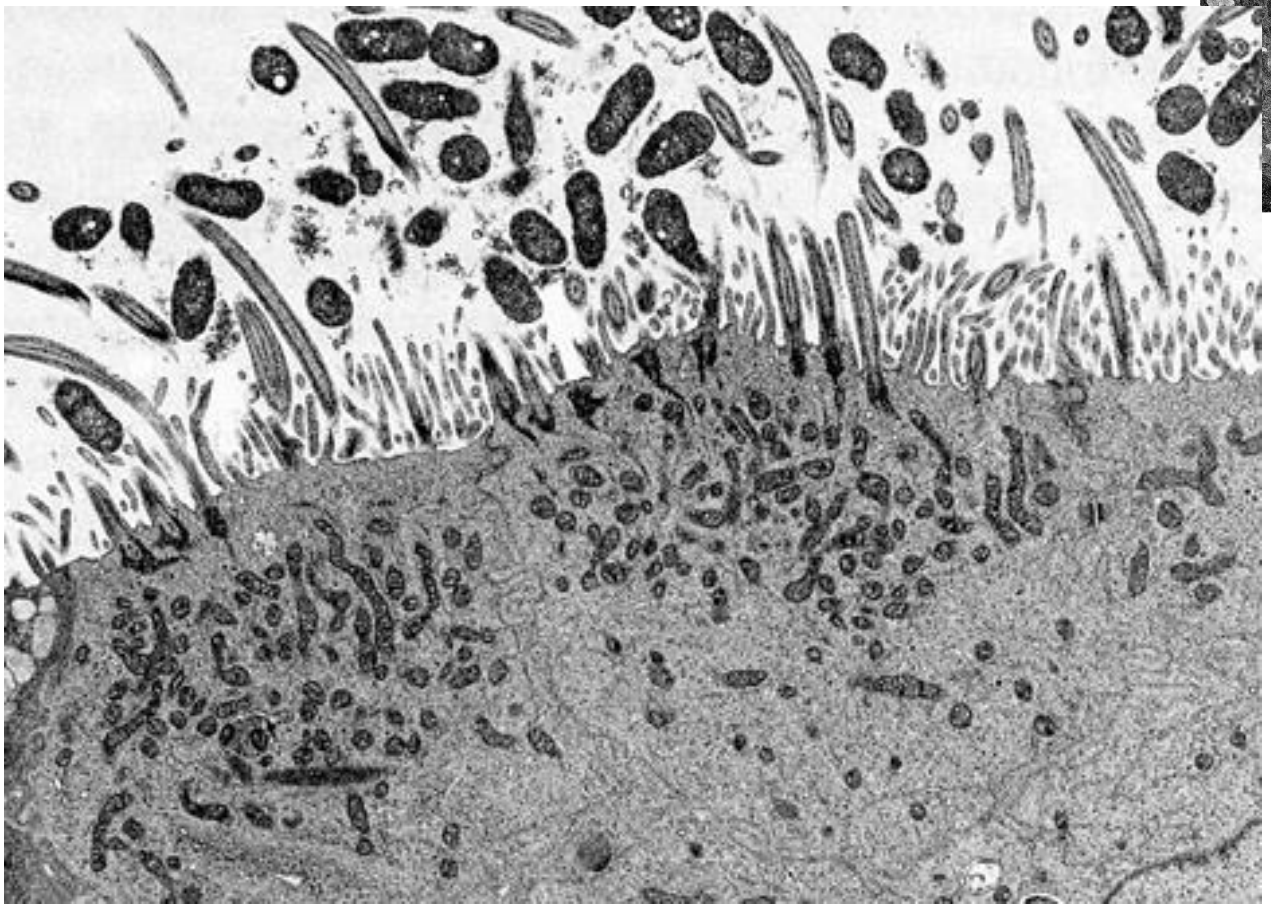




In the centre of the picture, 3 similar adjacent columnar epithelial cells are present (with **only two of their nuclei** present on the picture). These cells contain oval basally-located euchromatic nuclei, with a central nucleolus.

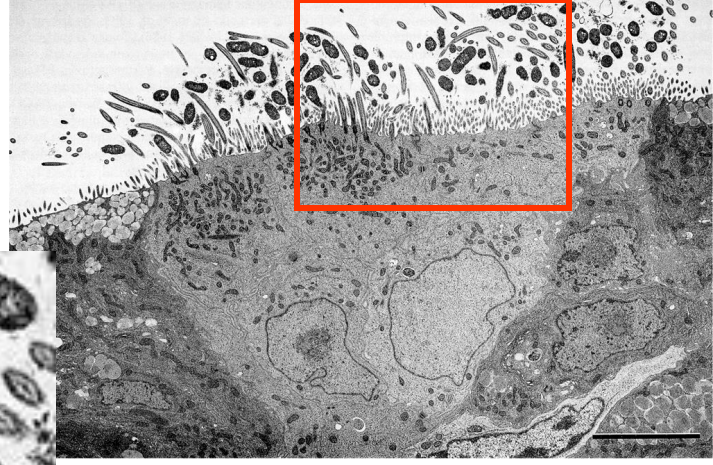
Q5 (TEM). Turkey

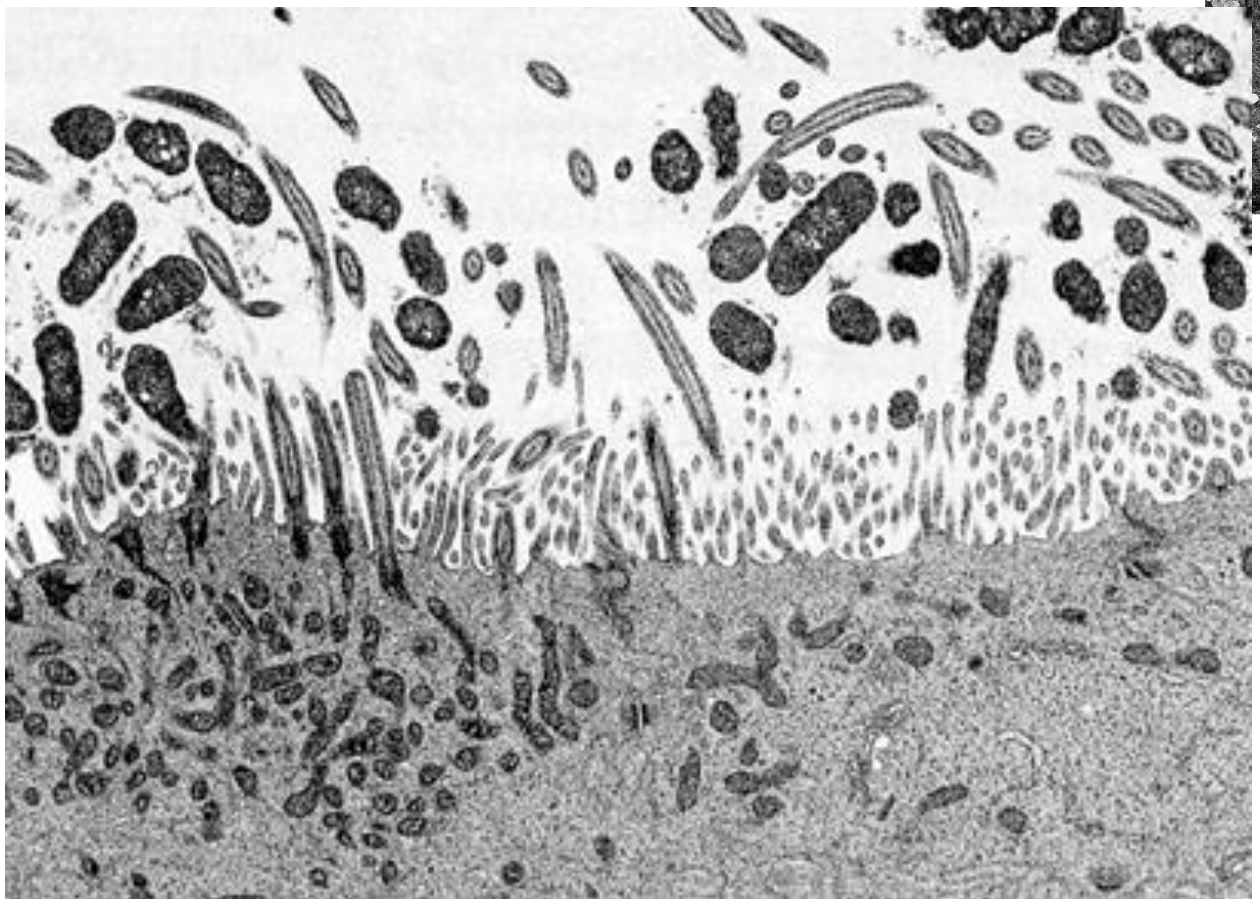




… These cells possess **apical cilia**, basal bodies, apical **desmosomes** and numerous **mitochondria**, which are concentrated subjacent to the basal bodies (**ciliated cells**) + a moderate amount of endoplasmic reticulum.

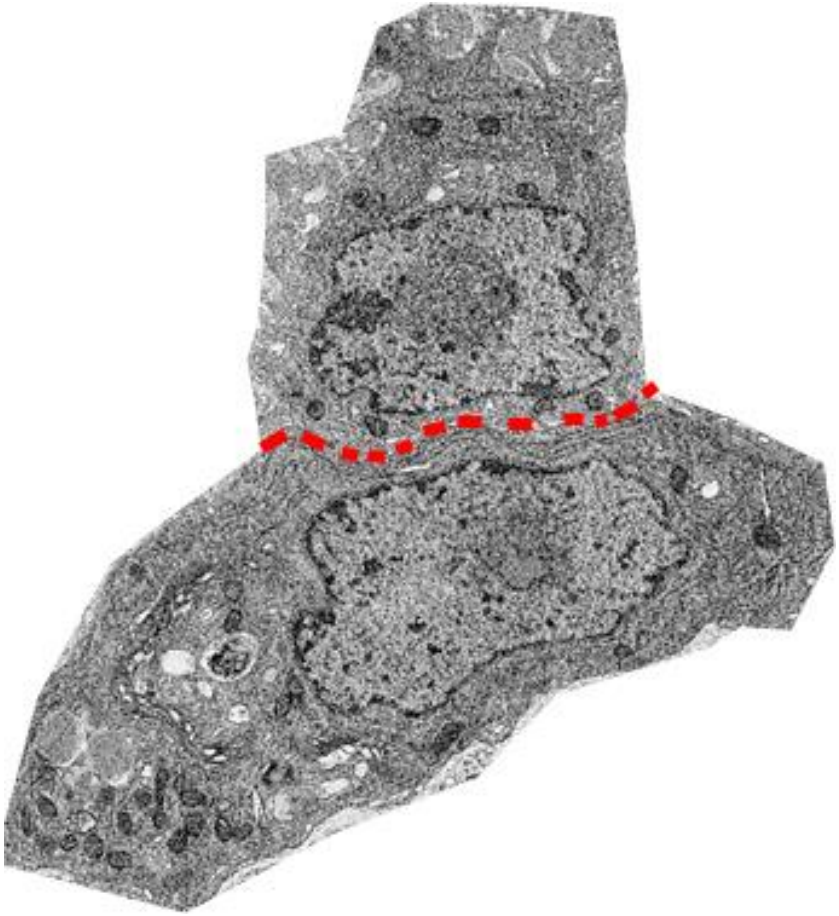
Q5 (TEM). Turkey

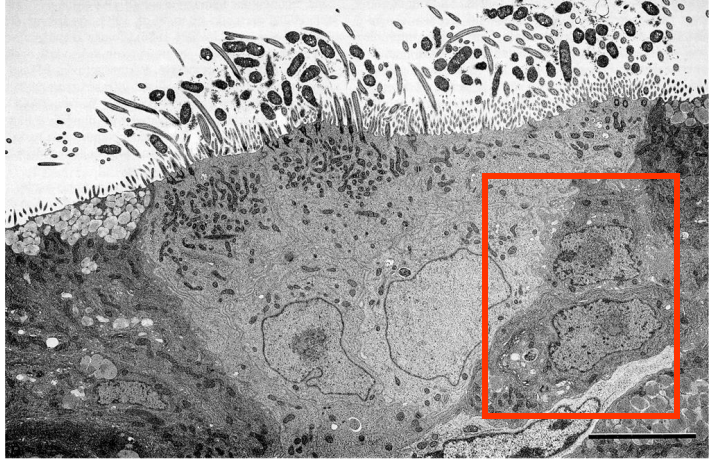




… These epithelial cells **have lost most of their cilia**.

Q5 (TEM). Turkey

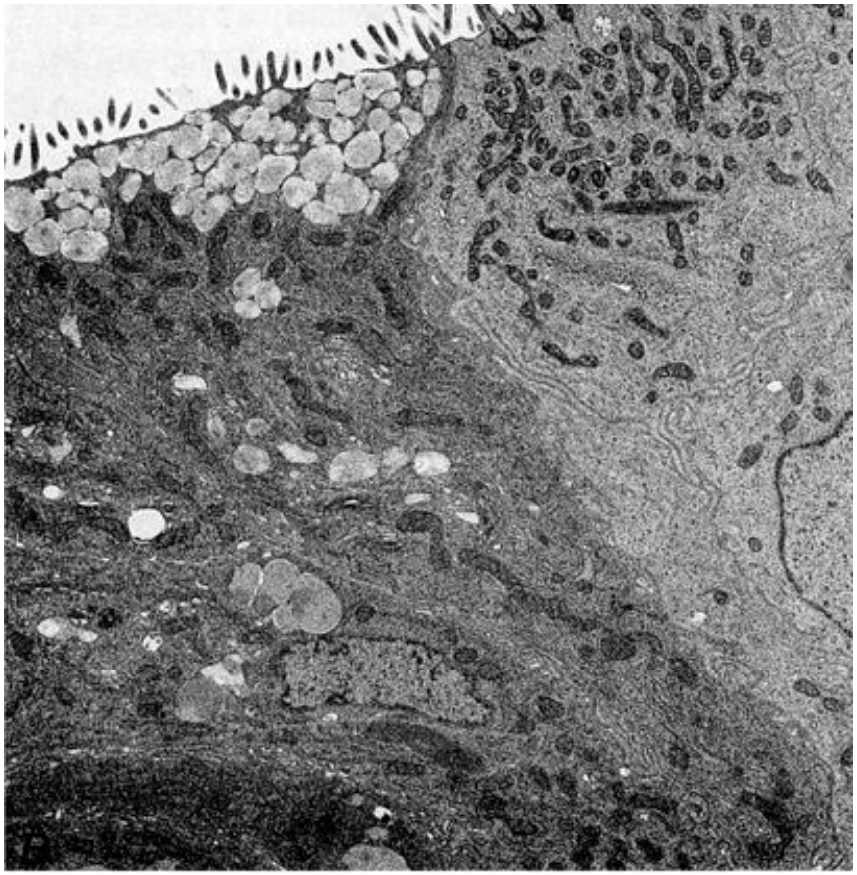


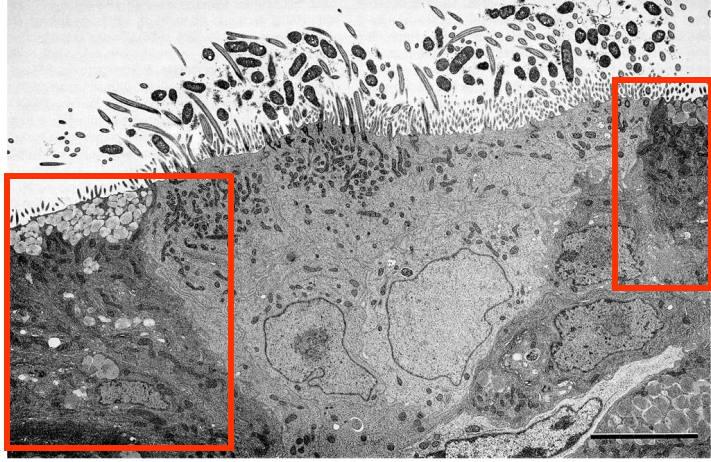


On the bottom right of the picture are 2 smaller cells, with a more electron-dense cytoplasm and a higher nucleoplasmic ratio. These cells do not reach the apical surface of the epithelium (**basal cells**).

They contain an oval **nucleus**, with peripheral heterochromatin and a voluminous **centrally located nucleolus**. Moderate amount of endoplasmic reticulum, some mitochondria and sparse electron-dense mucous granules are scattered in their cytoplasm.

Q5 (TEM). Turkey

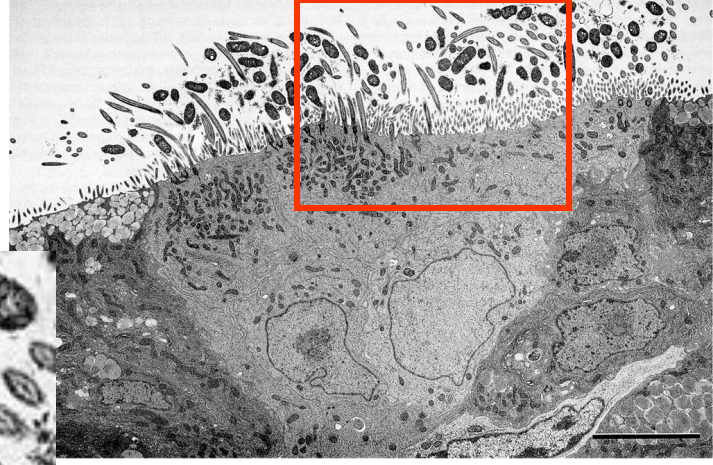


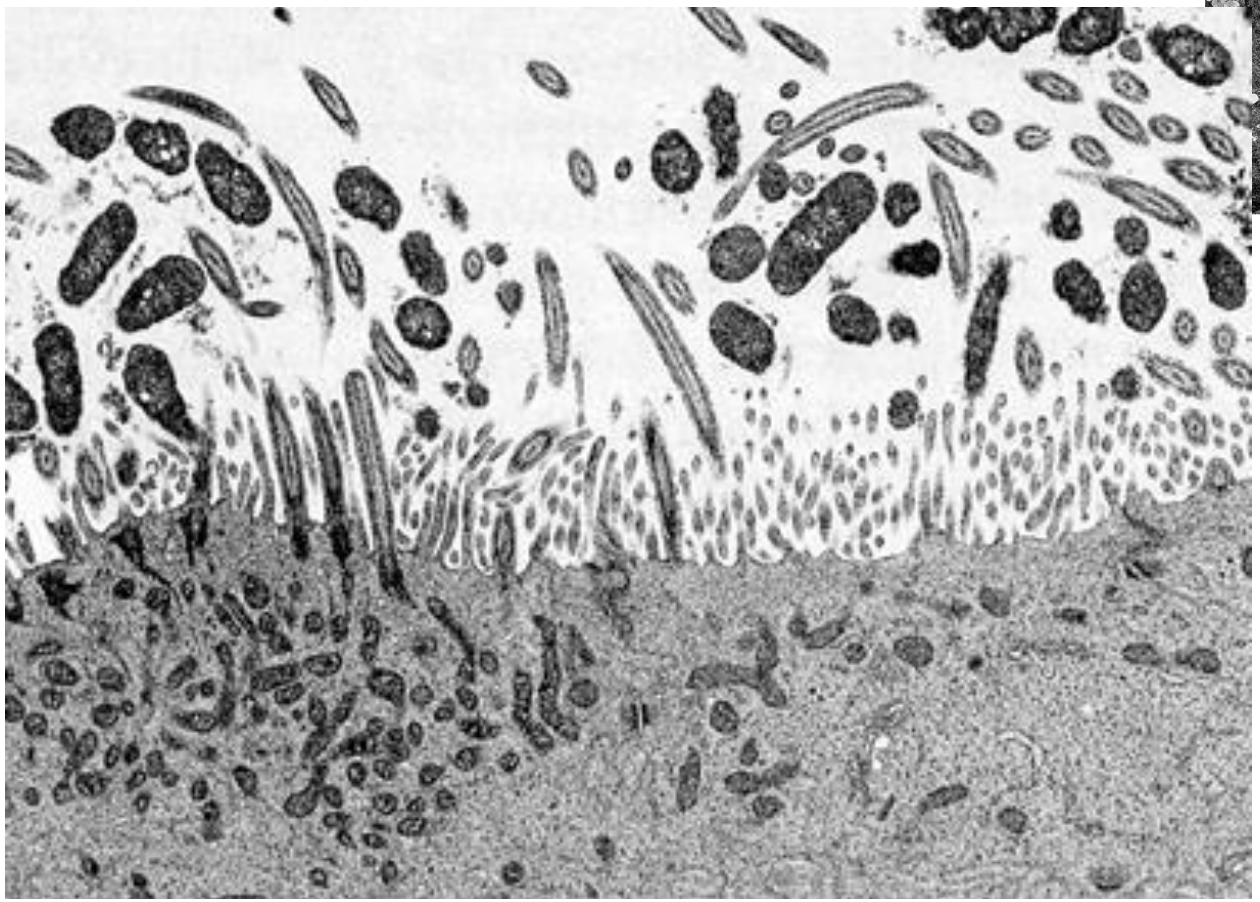


At the extreme right and left of the picture, there are columnar non-ciliated cells, with apical short **microvilli** and apically concentrated small to medium-sized **mucous granules** (**goblet cells**).

Their electron-dense cytoplasm contain numerous mitochondria, uniformly distributed among large amounts of rough endoplasmic reticulum.

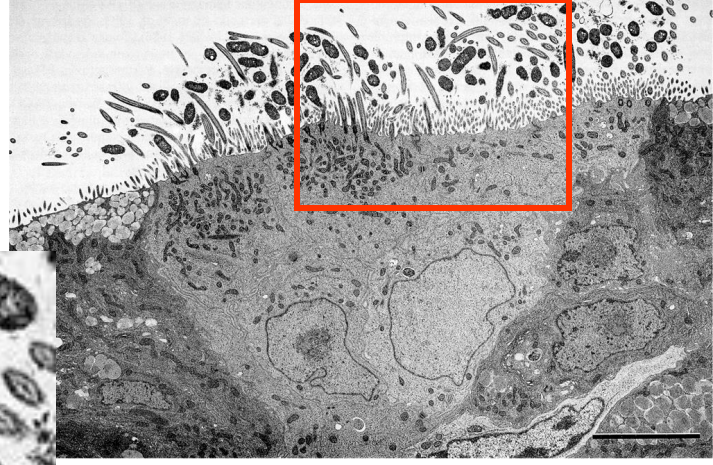
Q5 (TEM). Turkey

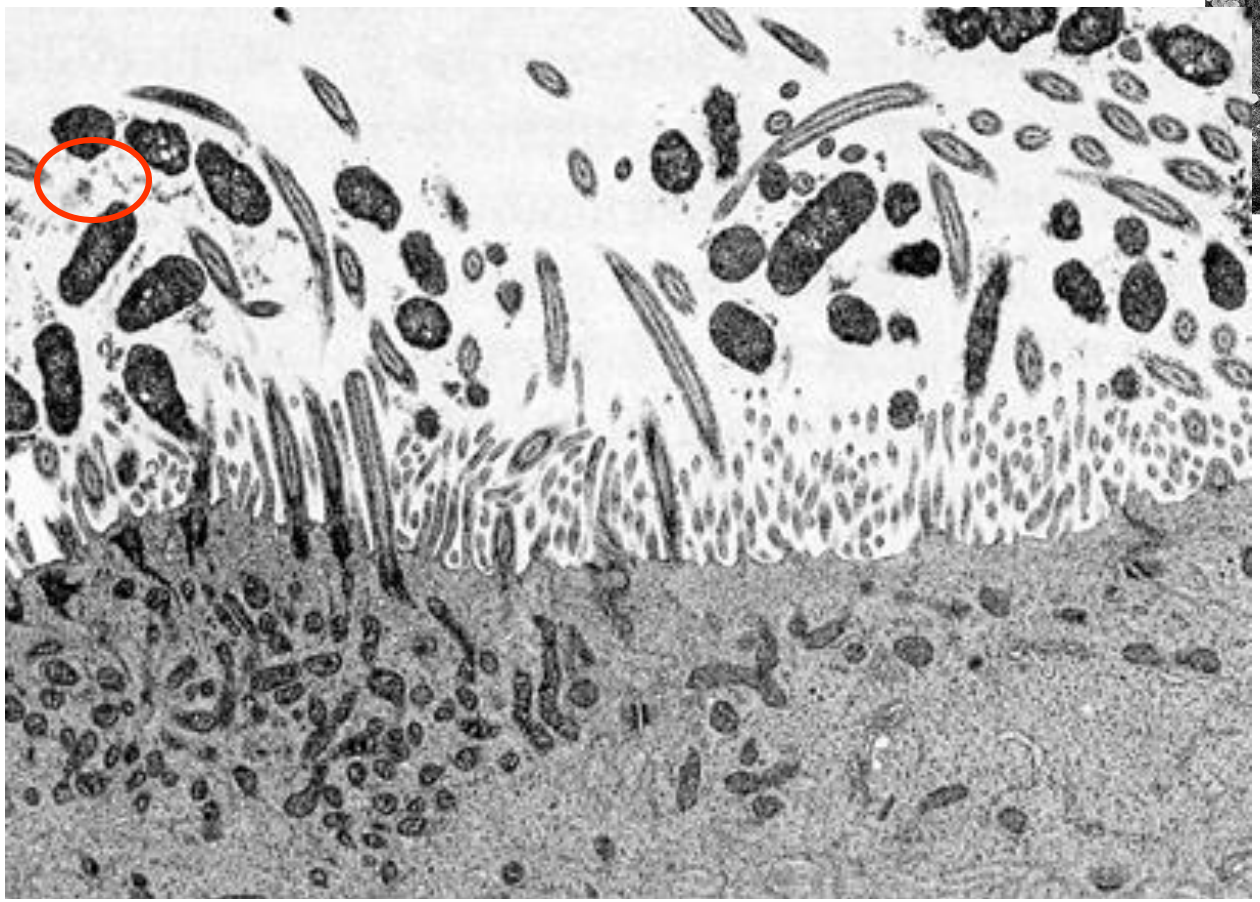




Restricted to the area of ciliated cells, there are numerous **bacilli** interposed **among the cilia**, that are electron dense with a lucent core. The bacteria are two-fold larger in diameter than the cilia.

Q5 (TEM). Turkey

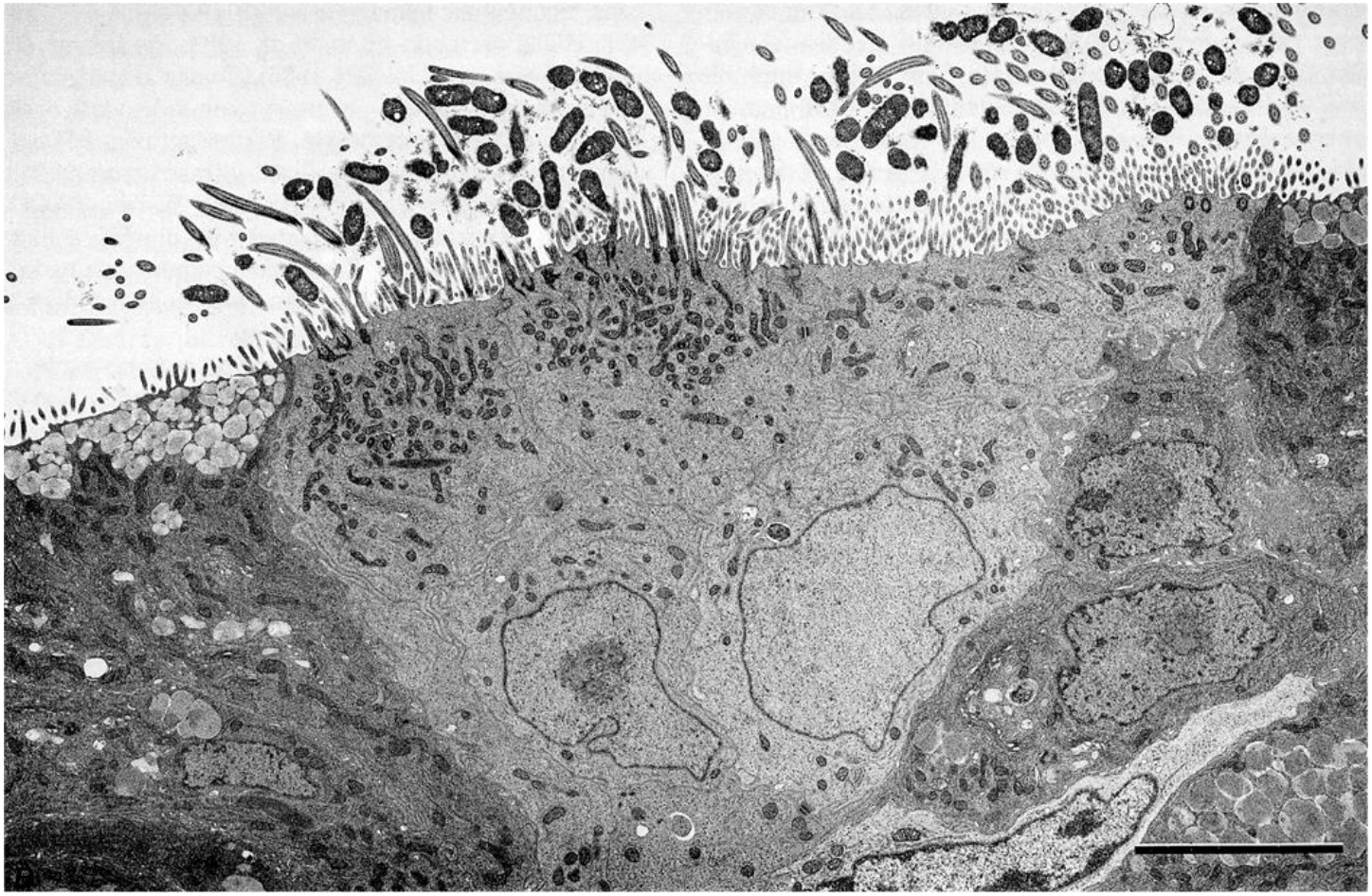




Clumps of amorphous, **electron-dense material** are found among bacteria and cilia of colonised cells.

Adjacent non-ciliated cells are not colonised.

Q5 (TEM). Turkey

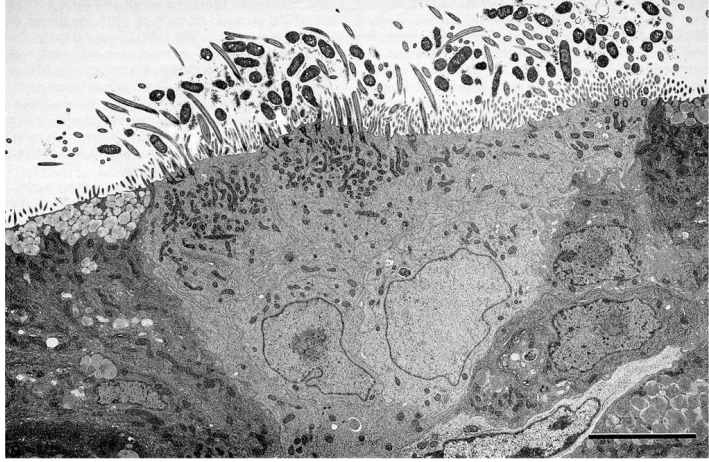


Morphological diagnosis

Trachea, tracheal epithelium: **tracheitis, with cilia shortening and loss, and cilia-associated colonisation by bacilli**

Probable etiology: ***Bordetella avium***

Q5 (TEM). Turkey

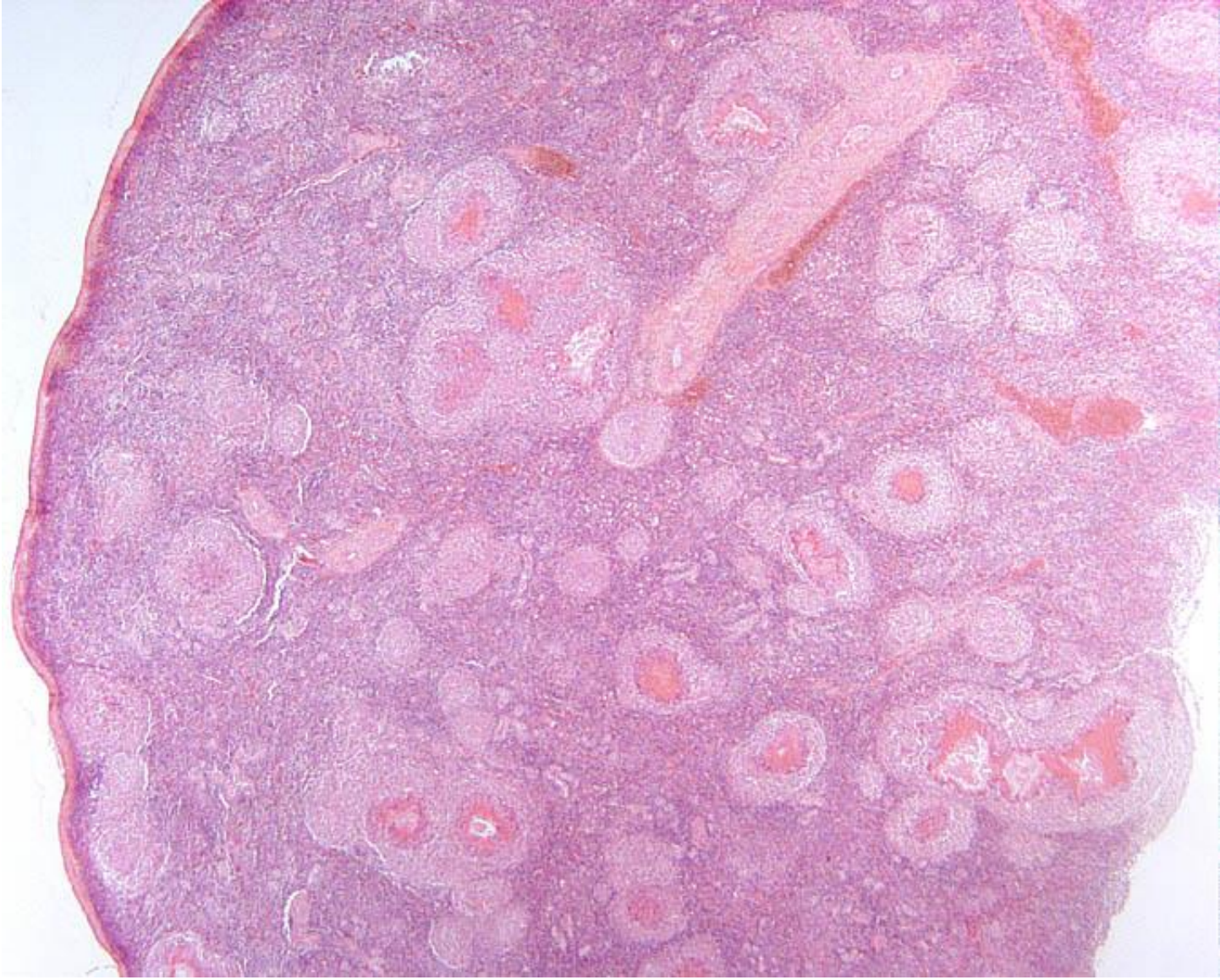


Tissue	**1**
Design	**2**
Description :	
Pseudostratified epithelium	**1**
Columnar epithelial cells	**1**
Apical desmosomes	**1**
Apical cilia	**1**
Numerous mitochondria	**1**
Basally-located euchromatic nuclei	**1**
Loss of ciliature	**1**
Basal cells	**1**
Goblet cells	**1**
Mucous granules	**1**
Bacilli interposed among the cilia	**2**
Absence of colonisation of non-ciliated cells	**1**
Morphological diagnosis	**3**
Etiology	**1**

Q6

Tissue from a Hen

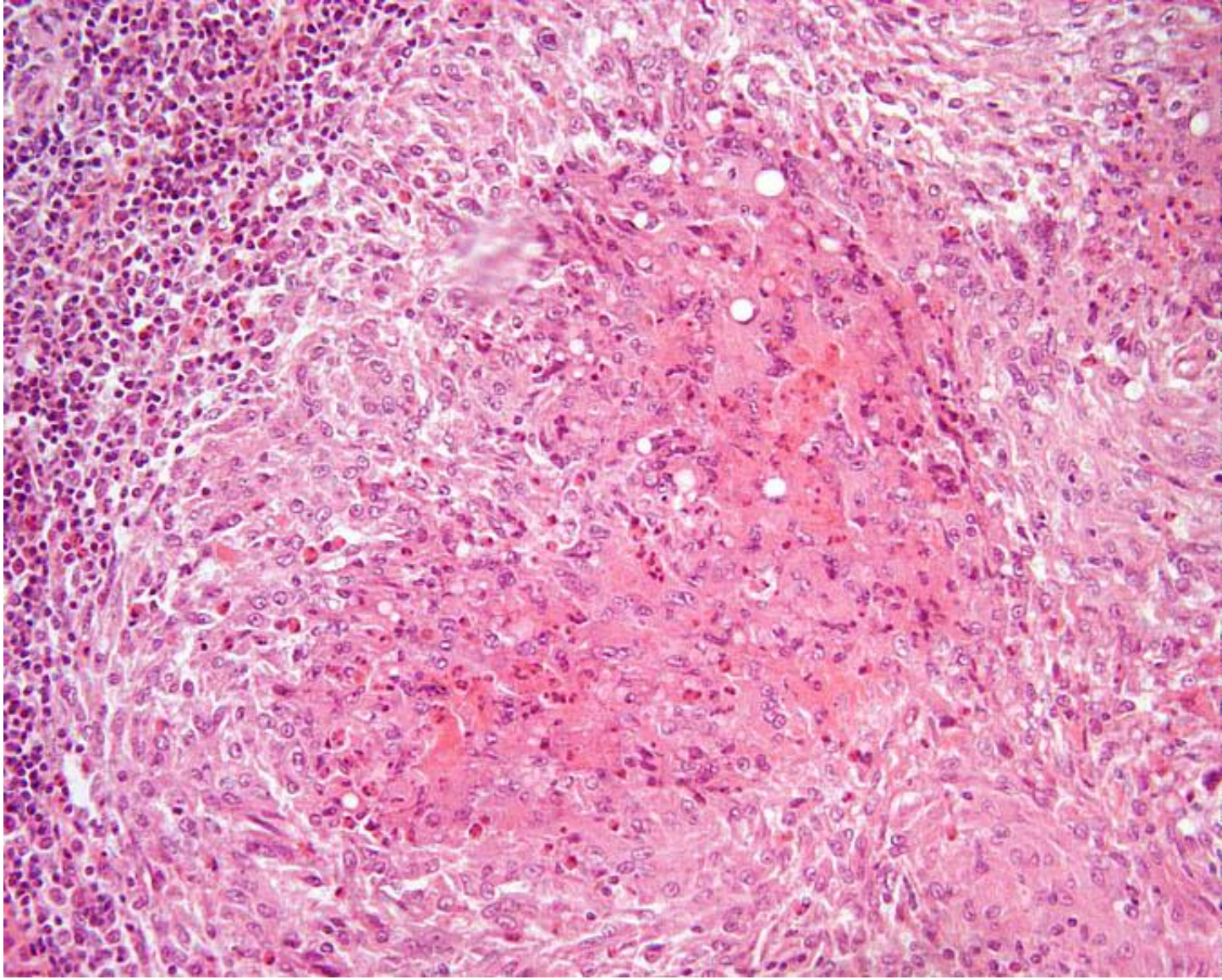
Q6. Hen



Spleen.

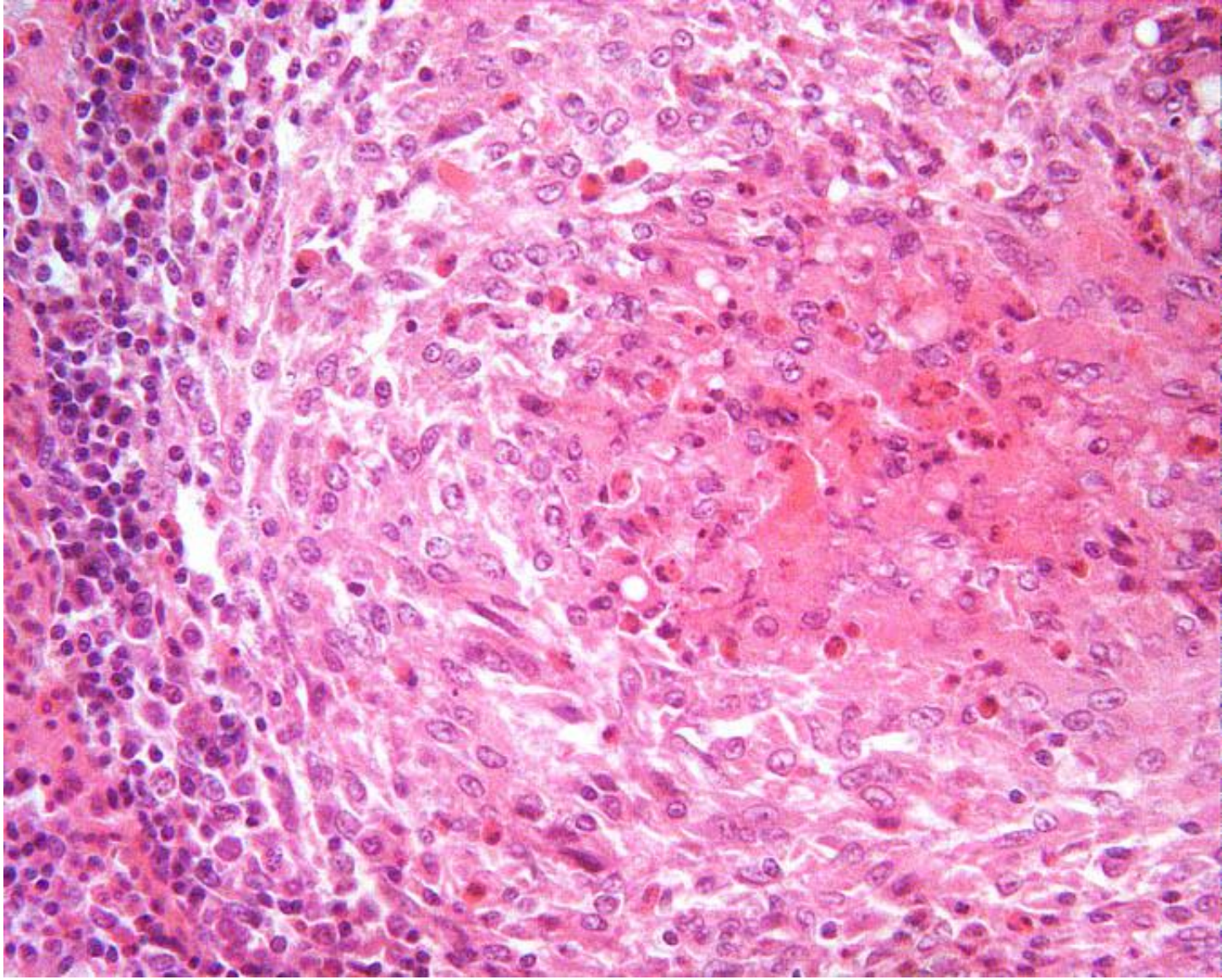
The architecture of the spleen is markedly distorted by random, multifocal to coalescing, up to 1-mm diameter, variably encapsulated, **granulomas**.

Q6. Hen



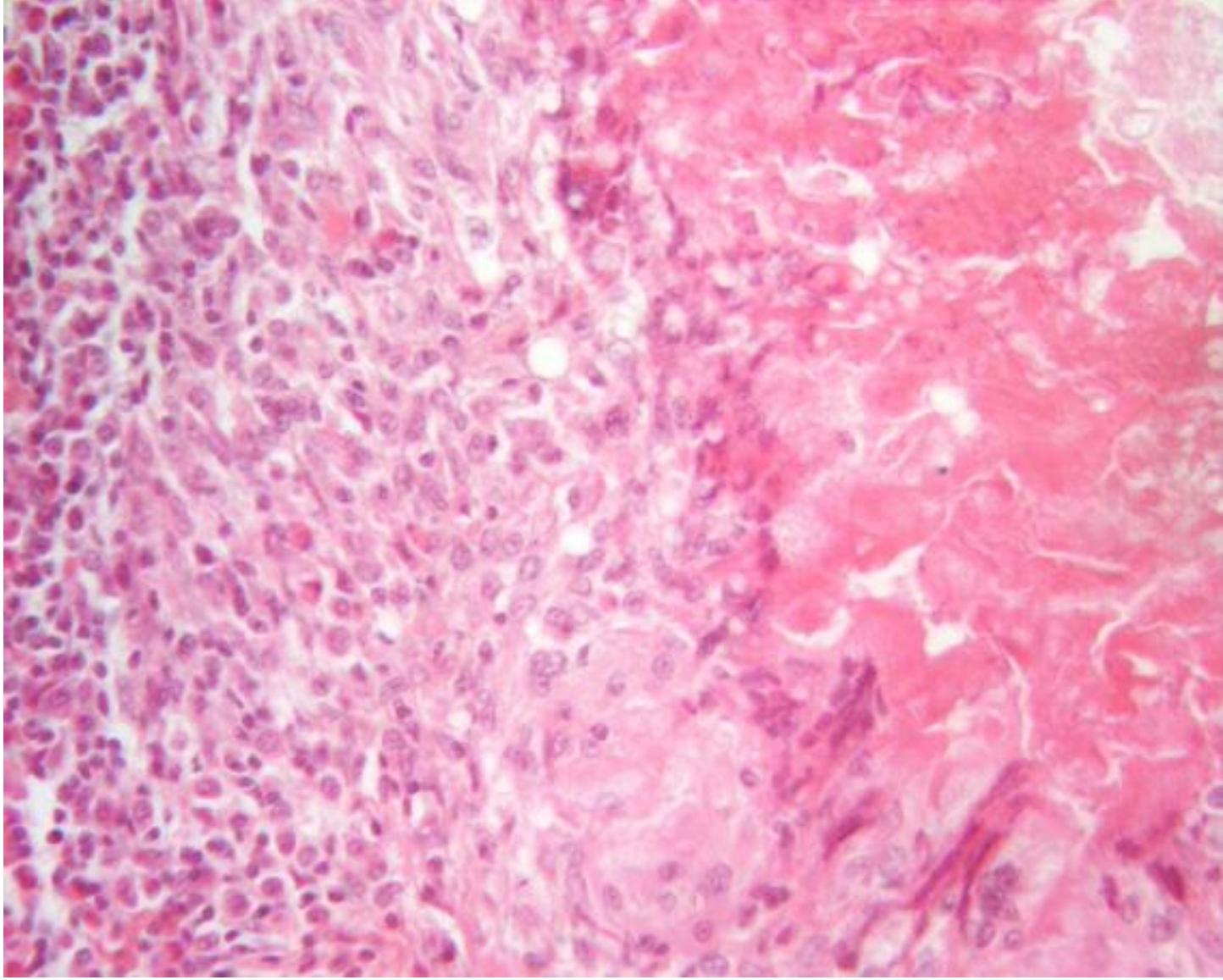
The larger granulomas contain, from the centre to the periphery: a central mass of amorphous hypereosinophilic material with karyorrhectic and pyknotic nuclear debris (**caseous necrosis**)…

Q6. Hen



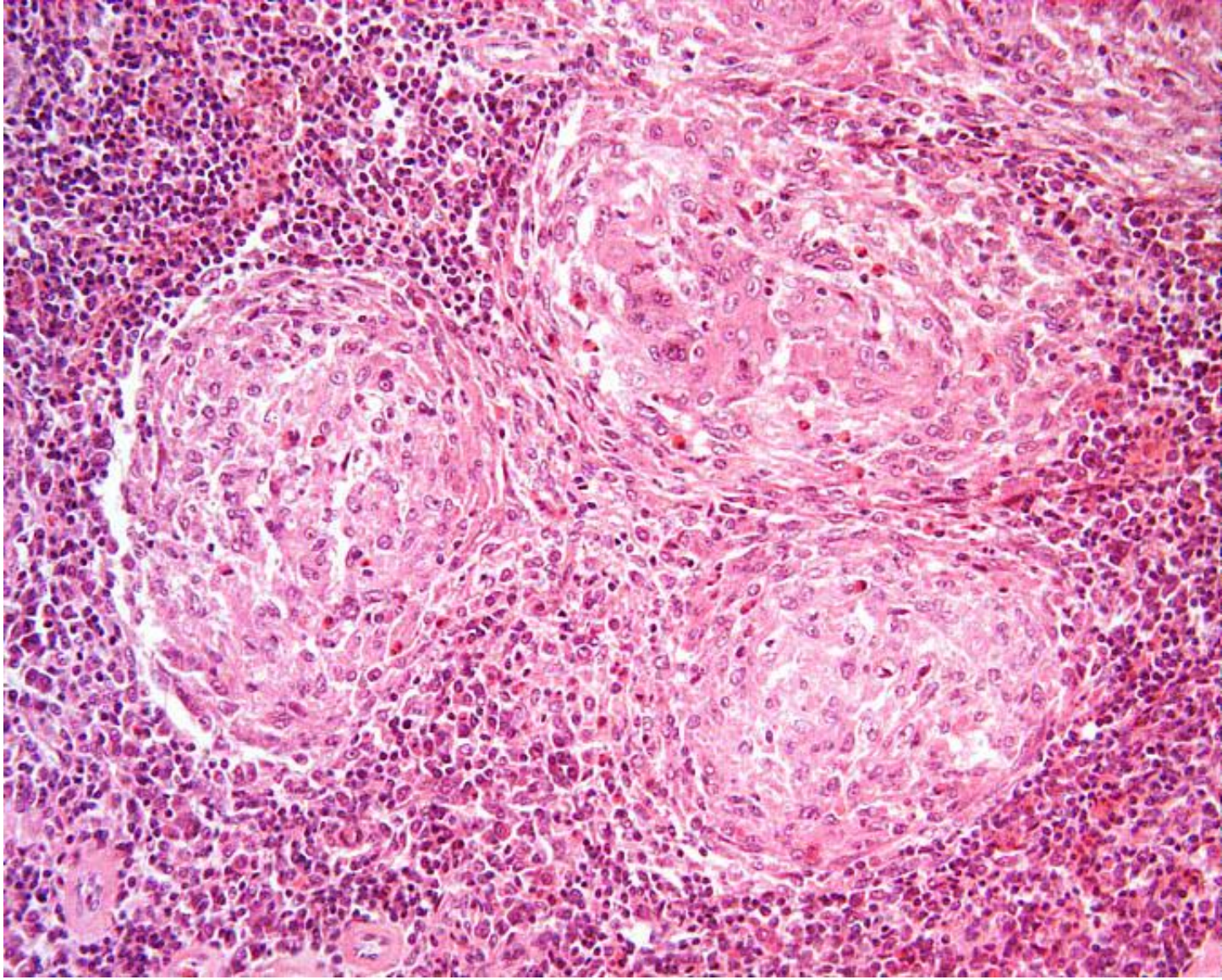
… variably admixed with **cholesterol clefts**; surrounded by a thick rim of large, pale acidophilic cells with indistinct borders and round hypochromatic nucleus (**epithelioid macrophages**); giant multinucleated cells with abundant eosinophilic cytoplasm and either peripheral nuclei (**Langhans-type giant cells**) or haphazardly-placed nuclei (foreign body-type giant cells)…

Q6. Hen



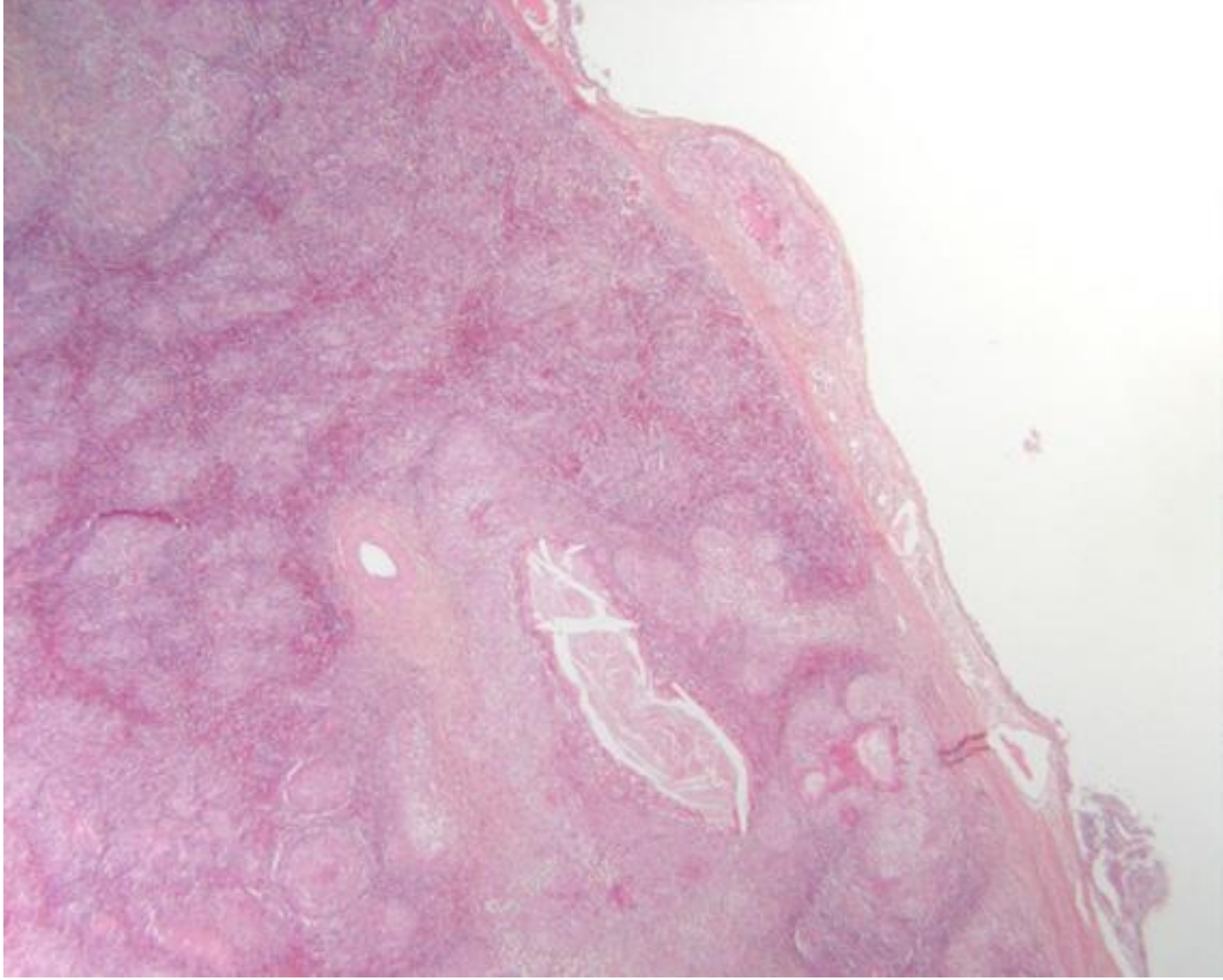
… a thin rim of **fibrosis**. Within granulomas, some macrophages are round, large, and filled with an empty cytoplasmic vacuole (lipid-laden macrophages).

Q6. Hen



Smaller granulomas contain epithelioid macrophages, Langhans giant cells, foreign body giant cells, and do not possess a necrotic centre.

Q6. Hen



The **splenic capsule** is multifocally thickened by fibrosis and multiple granulomas. **Lymphatics** are ectatic and filled with serofibrinous exudate.

Q6. Hen

In the white pulp, there is minimal multifocal fibrin exudate with hemorrhage and lymphoid depletion.

In the red pulp there are heterophil myeloblasts and myelocytes (extramedullary heterophil myelopoiesis).

Morphologic diagnosis

Multifocal to coalescing (chronic) (marked) **granulomatous splenitis and perisplenitis with caseous necrosis.**

Etiology: *Mycobacterium avium* subsp. *avium*

Q6. Hen

Spleen	**1**
Design	**2**
Description: **13 points**	
Multifocal to coalescing distribution	**1**
Capsule affected	**1**
Epithelioid macrophages + description	**2**
Giant cells + description	**2**
Central necrosis	**1**
Lymphocytes	**1**
Fibrosis	**1**
Cholesterol clefts	**1**
Lipid-laden macrophages	**1**
Fibrin exudate or lymphangiectasia	**1**
Heterophilic myelopoiesis	**1**
Morphologic diagnosis	**3**
Etiology	**1**