

## HISTOCHEMICAL STRUCTURE OF THE LENS IN CHUKAR PARTRIDGE (*Alectoris chukar*)

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**Abstract.** In this study, it was aimed to investigate the chukar partridge (*Alectoris chukar*) lens at the light microscopic level. 6 chukar partridge eye lenses were used as study material. Histochemically, in the PAS (Periodic Acid Schiff) staining method, it was observed that the lens capsule gave a positive reaction on the anterior and posterior surfaces of the lens. Similarly, in AB (Alcian Blue) pH:2,5 staining method, it was seen that the lens capsule gave a positive reaction on the anterior and posterior surfaces of the lens. In PAS/AB (Periodic Acid Schiff/ Alcian Blue) pH:2.5 staining method, it was determined that the apical part of the lens capsule showed AB positive reaction and the basal part showed PAS positive reaction. Histochemical staining revealed that the lens capsule contains acidic and neutral mucins. The presence of acidic and neutral mucins suggests that the lens capsule may be effective in protecting the eye against pathogens.

**Keywords:** Lens, histochemistry, partridge, *Alectoris chukar*.

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**Received:** 10 August 2022;

**Accepted:** 11 November 2022;

**Published:** 8 December 2022.

### 1. Introduction

The lens consists of the lens capsule, subcapsular epithelium, and lens body. The lens does not contain blood vessels and nerve fibers (Tekelioğlu, 2002). The lens capsule is a slightly thickened basal membrane on the anterior surface. Subcapsular epithelial cells (anterior cells of the lens) show high mitotic activity. These cells cover only the anterior "hemisphere" of the lens in adults. Subcapsular epithelial cells change shape in the equatorial part of the lens, elongate and turn into lens fibrils. The lens body consists mainly of lens fibers. Lens fibers are very long (up to 12 mm) hexagonal cells. They lie just below the subcapsular epithelial cells. Aged lens fibers lose their nuclei. The lens fibers are tightly interconnected. They contain crystalline proteins in their cytoplasm. These proteins enable the lens to acquire properties such as transparency and refraction of light (Junqueira *et al.*, 1995). In the literature review, no study was found on the histochemistry of the chukar partridge (*Alectoris chukar*) lens. In this study, it was aimed to determine the histochemical properties of the chukar partridge lens.

### 2. Material and method

In this study, 6 chukar partridge (*Alectoris chukar*) lenses were used. Samples taken from partridges were fixed in 10% formaldehyde and then washed in tap water

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#### How to cite (APA):

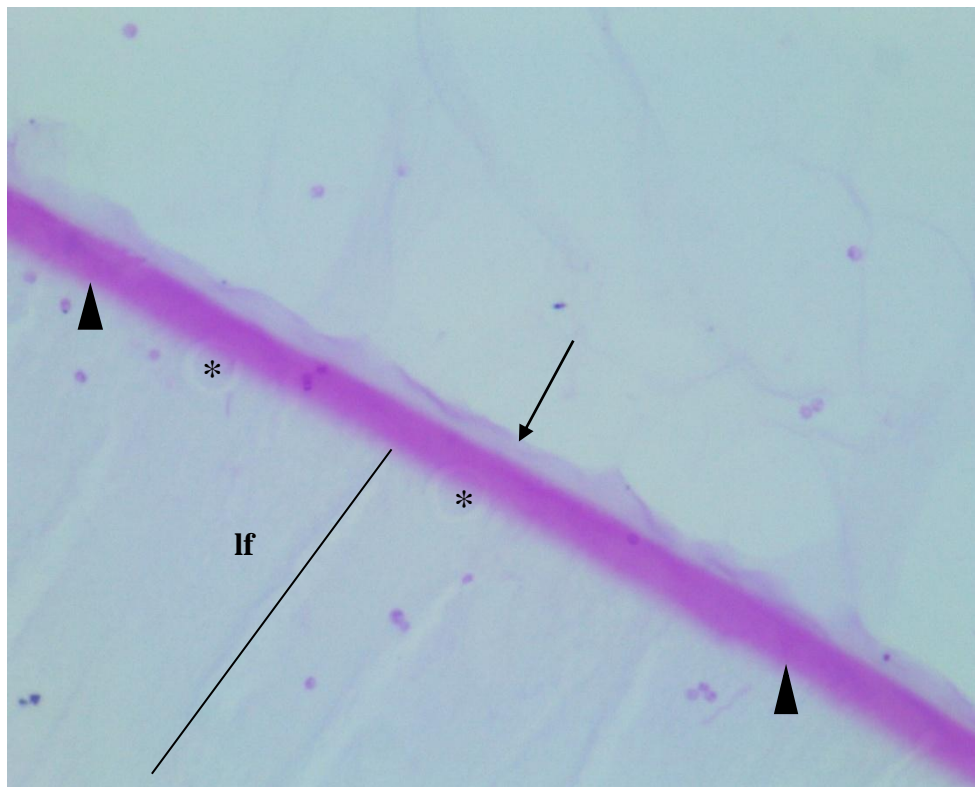
Yaren Kuloglu, H. (2022). Histochemical structure of the lens in chukar partridge (*Alectoris chukar*). *Advances in Biology & Earth Sciences*, 7(3), 205-208.

overnight. Afterwards, the samples, which underwent routine histological tissue follow-up, were blocked in paraffin. Sections of 5  $\mu\text{m}$  thickness were taken from the prepared paraffin blocks. PAS (Periodic Acid Schiff), AB (Alcian Blue) pH:2.5 and PAS/AB Ph:2.5 staining methods were used to determine the histochemical structure of the lens. The preparates were examined under a Leica DM2500 model light microscope and the relevant parts were photographed.

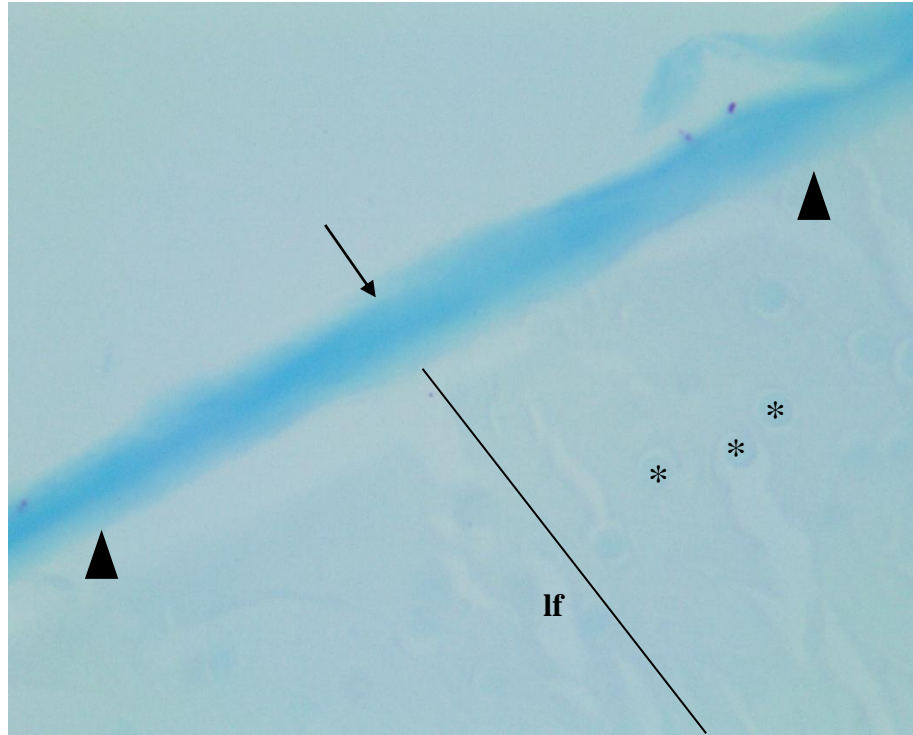
### 3. Result

It was observed that the anatomical structure of the chukar partridge (*Alectoris chukar*) lens was slightly curved on the posterior surface and transparent and biconvex on the anterior surface.

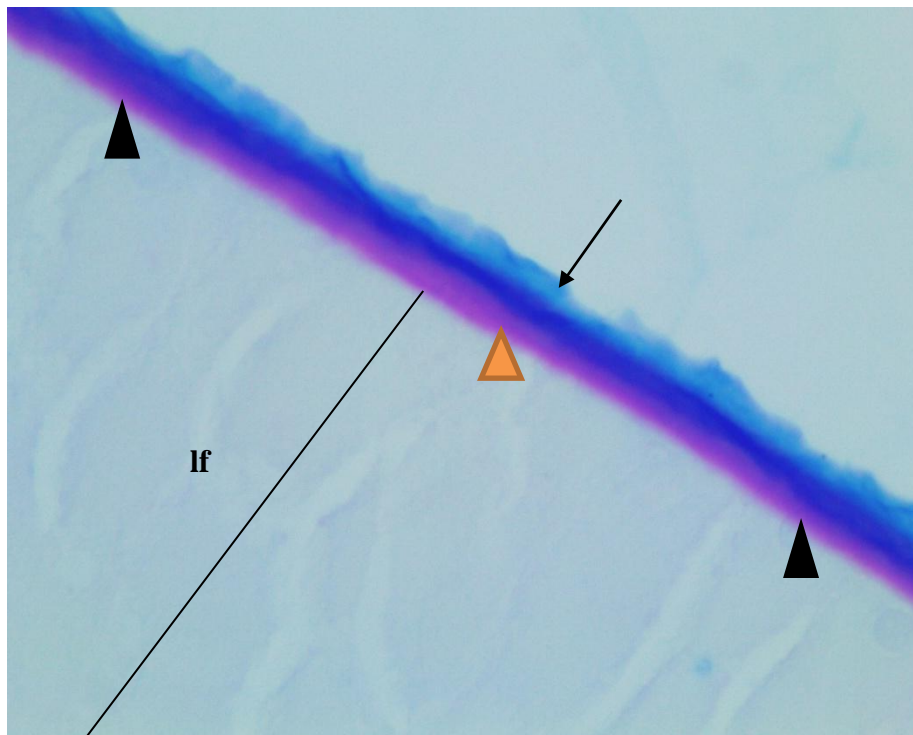
In the PAS (Periodic Acid Schiff) staining method, it was observed that the lens capsule gave a positive reaction on the anterior and posterior surfaces of the lens (Figure 1). Similarly, in AB (Alcian Blue) pH:2,5 staining method, it was observed that the lens capsule gave a positive reaction on the anterior and posterior surfaces of the lens (Figure 2). In PAS/AB (Periodic Acid Schiff/ Alcian Blue) pH:2.5 staining method, it was determined that the apical part of the lens capsule showed AB positive reaction and the basal part showed PAS positive reaction (Figure 1).



**Fig. 1.** Positive reaction in the lens capsule (arrow), subcapsular epithelium (arrowheads), lens fibrils (lf), lens cell nucleus (\*) in chukar partridge (*Alectoris chukar*). Periodic Acid Schiff (PAS) staining method



**Fig. 2.** Positive reaction in the lens capsule (arrows), subcapsular epithelium (arrowheads), lens fibrils (lf), lens cell nucleus (\*) in chukar partridge (*Alectoris chukar*). Alcian Blue (AB) pH:2,5 staining method



**Fig. 3.** AB positive (arrow) reaction in the apical part and PAS positive reaction in the basal part (yellow arrowhead) of the lens capsule, subcapsular epithelium (arrowheads), lens fibrils (lf), lens cell nucleus (\*) in chukar partridge (*Alectoris chukar*). Periodic Acid Schiff/ Alcian Blue (PAS/AB) pH:2,5 staining method

#### 4. Discussion and comment

The lenses of poultry are histologically distinguished from mammals by a circular pad around the center of the lens (Jones *et al.*, 2007). This equatorial circular pad of modified lens fibers can be very important. There is a gap between the lens center and the circular pad and is filled with fluid (Kern, 2007; Ross & Pawlina, 2006).

The posterior surface of the lens is flat or less curved, while the anterior surface is soft, flexible, transparent and biconvex (Kern, 2007). It was observed that the anatomical structure of the chukar partridge (*Alectoris chukar*) lens was similarly slightly curved on the posterior surface, and transparent and biconvex on the anterior surface. The main function of the lens of poultry is to send light onto the retina, where the image is formed together with the cornea (Jones *et al.*, 2007; Samuelson, 2007).

The water content in the lens is 65% and the protein content is 35%. Dehydration and sodium-potassium transitions in the lens are carried out in subcapsular epithelial cells by an active sodium-potassium adenosine triphosphate pump (Jones *et al.*, 2007; Wheeler *et al.*, 1987).

Day-feeding bird species have a flatter lens surface compared to aquatic and night-feeding species. The lens capsule of poultry contains type IV collagen threads (Jones *et al.*, 2007).

#### 5. Conclusion

In conclusion, in this study, it was observed that the chukar partridge (*Alectoris chukar*) lens is surrounded by a capsule from the outside, subcapsular epithelial cells are just below this capsule and lens fibrils are under the epithelial cells. Histochemical staining revealed that the lens capsule contains acidic and neutral mucins. The presence of acidic and neutral mucins suggests that the lens capsule may be effective in protecting the eye against pathogens.

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