

## **The Histological Changes in Bursa of Fabricius on Chickens Vaccinated with Intermediate and Hot Strains of Vaccines against Gambaro Disease.**

**Nicolae STARCIUC, Natalia OSADCI, Ion SCUTARU, Tudor SPATARU, Rita GOLBAN, Ruslan ANTOCI**

Agrarian State University of Moldova, Faculty of Veterinary Medicine

**Abstract.** The study material represent histological modifications in bursa of Fabricius on vaccinated chickens with intermediary and hot vaccines strains. Was established that intermediary vaccine strains against infectious bursitis make the changes in bursa tissue which is observed at 10, 20 and 30 days after vaccination and expressed with hypertrophy of lymphoid follicles, partial destruction of lymphocytes, plasma cells, accumulation of serous or sero-bloody exudates in the interfollicles space and return to normal structure over 30, 40 days after vaccination. Hot vaccines strains causing a deep tissue destructive processes that are expressed with cover epithelium detachment, mass destruction of lymphoid follicle lymphocytes, and accumulation of sero- sangvinolen exudates in interfollicles and follicles regions. Hot vaccine strains caused destructive lesions in tissue of bursa of Fabricius leading to further immunosuppressant state and low post vaccination response against anther infectious diseases.

**Keywords:** bursa of Fabricius, lymphocytes, follicle, plasmocytes, macrophages, vaccine, intermediate strain, hot strain, exudate, vacuoles.

### INTRODUCTION

It is known that bursa of Fabricius is one of the central organs of immune system, specific to birds, which has the "limphochitopatic" function. In bursa of Fabricius occurs the cell differentiation of lymphocytes.

Usually the lymphocytes come from mezenhimales cells which then migrate into lymphoid follicles. Lymphoid follicles in turn develop the structures and are formatted in special from lymphocytes with different stages of development.

Interior structure of bursa of Fabricius consists of epithelial folds. Primary folds are usually 11-13. Each of the primary folds containing 6-7 secondary folds. Bursa of Fabricius stock folds and walls them expand to increase the number of lymphoid follicles. In a primary fold is formed around 40-60 lymphoid follicles, which are separated by a connective tissue with small blood vessels and capillaries.

Compared with cortical area in the medullar area there are lymphocytes at different stages of development. Outside of bursa of Fabricius is covered with muscle layer and outer simple columnar epithelium.

Since the stock market is the central organ of Fabricius in birds immune system and infectious bursitis virus grows in cells preferably "target" in bursa of Fabricius, in our investigations was considered a priority to study the normal structure of bursa of Fabricius in chickens vaccinated against infectious bursitis and also to determine the histological tissue

changes under the action hot and intermediate strains of vaccines used to prevent infectious bursitis.

## MATERIALS AND METHODS

Histological investigations were carried out parallel investigations: epizootological, clinical, pathomorphological and immunological. This study aimed at assessing the immunological efficiency vaccine strains of intermediate and hot when he is given once and twice, while analyzing their influence on bursa of Fabricius tissue. Investigations were conducted on chickens race "Adler silver."

At age 10 days were formed 4 groups of 30 chickens in each, which were under the same conditions of maintenance and catering. Groups were formed as follows:

I-group - control group;

II group - were vaccinated 2 times the age of 10 and 22 days with strain "BG";

III group - were vaccinated with strain "BG" only once, at the age of 15 days;

IV group - were vaccinated with strain "Winterfield 2512", 2 times, at the age of 10 and 22 days.

In all groups of chicken vaccine was administered with drinking water, report 1d / 5 ml water for the first vaccination, and of repeated vaccination - 1d / 7.5 ml water.

Before vaccination and at 10, 20, 35 and 50 days after vaccination were slaughtered five chickens from each group which samples were taken for blood (serum) for antibodies detection and bursa of Fabricius for histological examination.

From chickens slaughtered for the investigations mentioned were harvested bursa of Fabricius that were preserved in 10% formof solution for further histological investigations.

The slides with tissue of bursa of Fabricius were stained with hematoxylin and eosin and examined by the method known classical biological microscope, objective - 10x20 and 10x40.

Investigation has been conducted in comparison analysis:

- histological structure of bursa of Fabricius in chicken stock until the vaccination;
- histological structure of bursa of Fabricius in chickens vaccinated with intermediate strain;
- histological structure of bursa of Fabricius in chickens vaccinated with hot strain;

## RESULTS AND DISSCUSIONS

In figure 1. and 2 shows the histological structure of the exchange in bursa of Fabricius in chickens aged 8 days before the administration of vaccines against infectious rsitis.

Figure 1 shows the (nr. 1) position on folds secondary lymphoid follicles of bursa of Fabricius, which are separated by a connective tissue forming interfollicles space (nr. 2). Nr. 3 shows the space separating the folds of bursa of Fabricius.

Figure 2 is currently one of the stages of forming a lymphoid follicle. Figure 1 shows where space is interfolliculs and (nr. 2 and 3) - lymphoid follicles of lymphocytes represent large, medium and small cells plasmacytes.

Interfollicular color space is transparent, non-exudative or macrophage accumulation and lymphocytic cells.

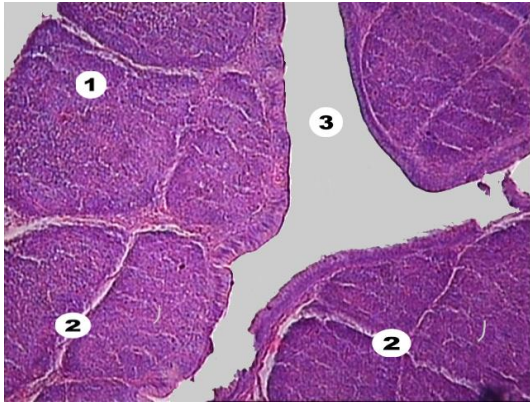


Fig. 1. Histological structure bursa of Fabricius on chicken until vaccination against the BIA.  
1 - lymphoid follicles, 2 - space interfollicular,  
3 - the space between the bursa fold's.

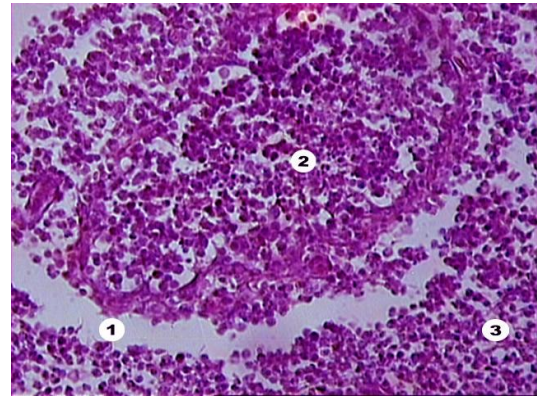


Fig. 2. Histological structure of lymphoid follicle,  
1- space interfollicular, 2,3- lymphoid follicles.

*Histological appearance of bursa of Fabricius in chickens vaccinated against avian infectious bursitis with intermediate strains.*

It is known that the live vaccines used for prophylaxis of infectious bursitis as bursitis virus infectious cause some adverse action on lymphoid tissue of bursa of Fabricius. The study was aimed to assess the degree and nature of strains intermediate vaccines action on bursa tissue structure.

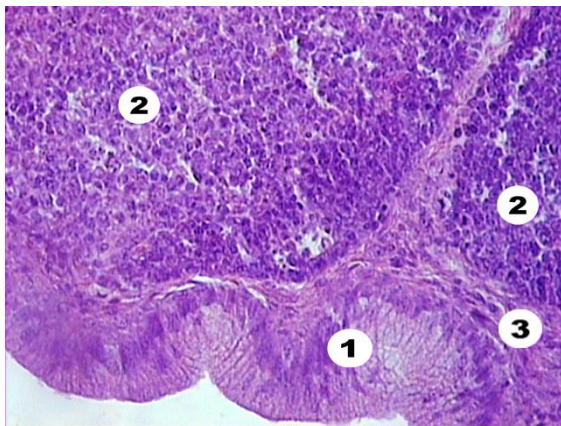


Fig. 3. Structure of bursa of Fabricius on chickens vaccinated with strain "Winterfield 2512" at the 10th day after vaccination, objective x 40  
1 - epithelial tissue, 2 - lymphoid follicles  
3 - interfollicle space.  
3 - interfollicle space.

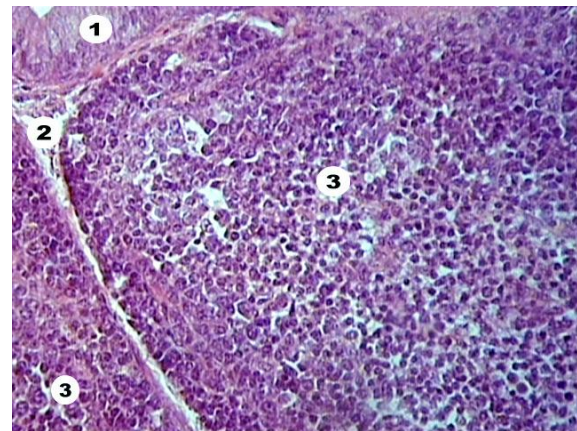


Fig. 4. Histological structure of bursa of on chickens vaccinated with strain Wint .2512 at 20th day after vaccination, objective x 40  
1- bursa folds, 2- lymphoid follicles;  
3 - interfollicle space.

Figure 3 presents the histological structure of bursa of Fabricius in chickens 10 days after administration the vaccine intermediate strain "Winterfield 2512." Lymphoid follicles (nr. 2) are well developed and clearly delimited space interfollicles. Inside their small and medium lymphocytes predominate, blastocytes cells. Epithelial tissue of the bursa folds consists of stratified epithelial cells, mostly cylindrical (nr.1).

Interfollicles space is presented by a serous fluid containing lymphocyte cells and plasma cells (nr. 3).

In figure 4 presents the histological exchange in structure of bursa of Fabricius in chickens vaccinated with intermediate strain "Winterfield 2512" on the 20th day after

vaccination where it notes that in bursa of Fabricius lymphoid follicles (nr.2) in the central cell are many small and large lymphocytes and peripheral lymphocytes are a small percentage of destroyed.

Fold mucosa of bursa is partially affected, which is expressed by epithelial cell layer lack of clarity. Under interfollicles bursal fold and space (nr. 3) or serous fluid is observed in some sero-bloody areas. Lymphoid follicles are represented by medium and small lymphocytes.

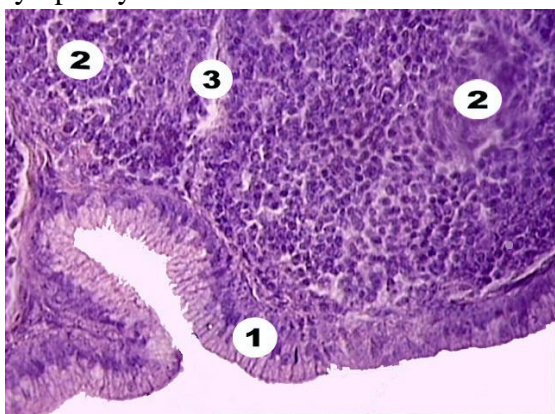


Fig. 5. Histological structure of the bursa of Fabricius on chickens vaccinated with strain "Winterfield 2512" on the 30th day after vaccination. Objective x 40.  
1 - epithelial tissue; 2 - lymphoid follicles,  
3 - interfollicles space.

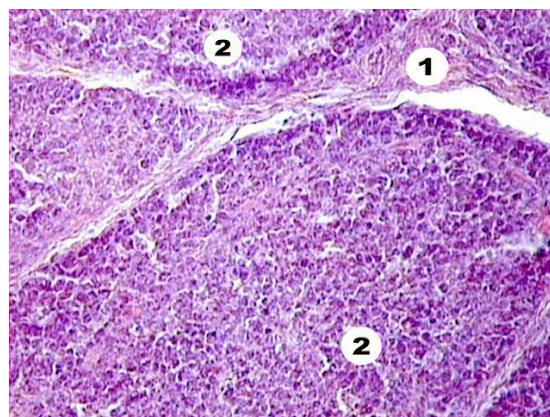


Fig. 6. Histological structure of bursa of Fabricius on chickens vaccinated with strain "Winterfield 2512" on the 40th day after vaccination. Objective x 40.  
1- interfollicles space, 2 - lymphoid follicles.

In figure 5 bursa of Fabricius has normal structure. Lymphoid follicles are populated with lymphocytes of various forms, predominantly the middle and high plasmatic cells (nr. 2). Epithelial tissue simultaneously folds of bursa is represented by cylindrical epithelial cells visible and symmetrical.

On the 40th day after the vaccines of intermediate strains "Winterfield 2512» histological structure is similar as investigations on the 30th day after vaccine administration (figures 6). Lymphoid follicles (nr. 2) are populated with mostly medium and large lymphocytes, interfollicles space has a serous fluid, and in some places without fibrin tissue inflammatory processes and exudate. Epithelial tissue simultaneously folds of bursa are represented by cylindrical epithelial cells visible and symmetrically placed (figure 5, nr. 1).

*Histological appearance of bursa of Fabricius in chickens vaccinated against avian infectious bursitis with hot strain.*

This study was conducted as for analog use of vaccines of intermediate strains. Investigations were carried out respectively at the 10th, 20th, 30th and 40th day after vaccination. The results of these investigations are presented in figures 7-10.

Figure 7 presents the histological tissue changes in bursa of Fabricius on chickens vaccinated with hot strain "BG" on the 10th day after vaccination.

In the interfollicles space is observed blood coagulations and exudate, cell migration plasmocytes, lymphocytes. Sero-bloody effusion can be observed in peripheral areas of lymphoid follicles (nr. 1). Lymphoid follicles are clearly defined and each other enough to populate mainly medium-sized lymphocytes and large plasmocytes cells. Epithelial tissue of the fold is partially destroyed; clarity of stratification is not observed epicylindrically cells.

On the 20th day after vaccination with hot strain "BG" in some segments of the bursa of Fabricius, especially the cells from region are observed lymphoid follicles lymphocytes, plasma cells in stage cariolizis, cariopicnoză (Fig.8, (nr. 2 )). In space there is a concentration interoffice hemorrhagic effusion with cellular elements, particularly macrophages, lymphocytes (nr. 1).

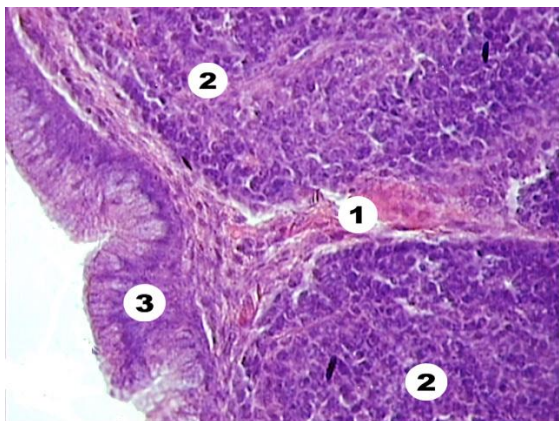


Fig. 7. Histological structure of bursa of Fabricius on chickens vaccinated with strain "BG" at 10th day after vaccination; objective x 40.  
1 - interfollicles space, 2 - lymphoid follicles;  
3 - epithelial tissue.

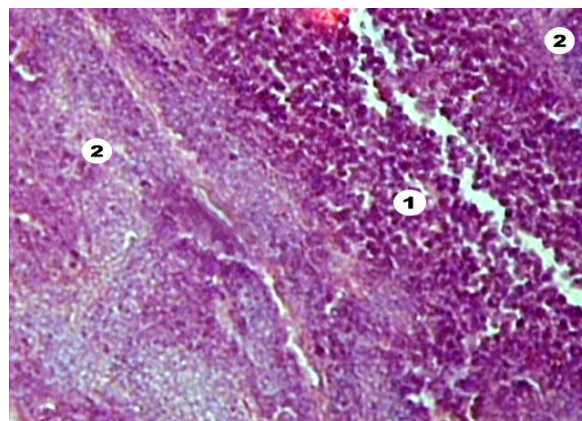


Fig. 8. Segment histological structure of bursa of Fabricius on chickens vaccinated with strain "BG" at 20th day after vaccination; objective x 40. 1- lymphocyte cells in stage of cariolizis, cariopycnosis: 2 - depleted lymphoid follicles.

On the 30th day after vaccination with strain "BG" (Figures 9) histological tissue changes are similar changes established at the 20th day after vaccination. Lymphoid follicles are composed of a greater number of lymphoid cells with features of cariolysis, cariopicnosis (nr.1). Less obviously this is observed in cortical areas of lymphoid follicles (nr. 2 and 3).

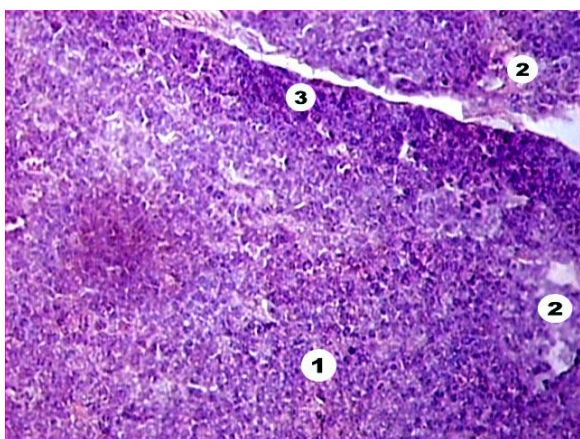


Fig. 9. Histological structure of bursa of Fabricius on chickens vaccinated with strain "BG" at 30th day after vaccination, objective x 40.  
1 - cell destructive process of lymphoid follicles;  
2 - partial vacuolization process of lymphoid follicles;  
3 - cortical area of lymphoid follicles.

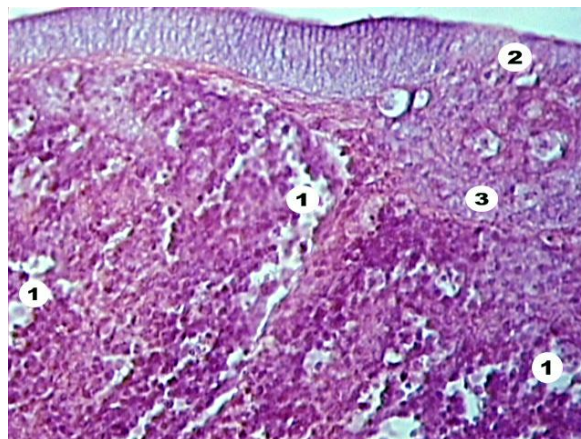


Fig.10. Histological structure of bursa of Fabricius on chickens vaccinated with strain "BG" at 40<sup>th</sup> day after vaccination, objective x 40.  
1- lymphoid follicles with vacuoles :  
2 – destructive elements of epithelial tissue:  
3 -- interfollicles space with hemorrhagic exudates.

At 40th day after vaccination in the tissue of bursa of Fabricius there are lymphoid follicles multiple vacuoles (figure 10, nr. 1), destructive elements of epithelial tissue of bursa fold (nr.2). The space is observed accumulation of exudate interfollicular sero-hemorrhagic elements of fibrous tissue (nr. 3).

## CONCLUSIONS

- Vaccines of intermediate strains cause tissue changes in bursa of Fabricius which is observed at 10, 20 and 30 days after vaccination, expressed with hypertrophy of lymphoid follicles, partial destruction of lymphocytes, plasma cells, accumulation of serous or sero-bloody exudate in the interfollicle space which return to normal over 30, 40 days after vaccination.
- Hot vaccine strain causing deep tissue destructive processes that are expressed by peeling bursa epithelium, mass destruction of lymphoid follicle lymphocytes, accumulation of sangvinolen exudates interfollicle and follicular regions.
- Hot vaccine strains caused destructive lesions in tissue of bursa of Fabricius leading to further immunosuppressant state.

## REFERENCES

1. Akan M., Izgur M., Sareyyupoglu B. Diagnosis of infectious disease infection by immunofluorescence technique. Ankara, Turkey, 2007, 54(3), p. 177-181.
2. Calnek B.W. Diseases of poultry. Tenth edition. Iowa, USA, 2000, p. 280-288.
3. Lima A. et al. Haematological and histological findings in Leghorn chickens infected with infectious bursal disease virus strain 73688. National Autonomous University of Mexico. In: Acta Vet Hung., 2005, p. 501-506, [http://www.ncbi.nlm.nih.gov/sites/Pubmed\\_RV](http://www.ncbi.nlm.nih.gov/sites/Pubmed_RV) (citat 06.11.2008).
4. Subler K.A., Mickael C.S., Jackwood D.J. Infectious bursal disease virus induced immunosuppression exacerbates *Campylobacter jejuni* colonization and shedding in cickens. In: Avian Diseases, Athens, USA, 2006, 50(2), p. 179-184.
5. Zeleke A. et al. Investigation on infectious bursal disease outbreak in Debre Zeilt, Ethiopia. In: International Journal of Poultry Science, Faisalabad, Pakistan, 2005, 4(7), p. 504-506.