Jap. J. vet. Res., **27**, 16~18 (1979)

BRIEF COMMUNICATION

THYMUS ORIGIN OF GLOBULE LEUCOCYTES IN CHICKEN

Hiroshi KITAGAWA, Kenji OGATA, Makoto SUGIMURA*,
Yoshiharu HASHIMOTO and Norio KUDO

(Received for publication, March 27, 1979)

Globule leucocytes have been found in the alimentary canal's epithelium of several mammalian species and domestic fowl, and the derivation and function are under discussion.

In the present study the origin of globule leucocytes was researched in chicken (White Leghorn, N strain chicken from our own colonies). The following five groups were designated; group (C)-5 untreated chickens, group (CX)-5 chickens of 2 days old were irradiated with a total X-ray's dose of 650 R, group (Bx-Cy)-5 chickens were surgically bursectomized on the day of hatching by injecting with 4 mg cyclophosphamide daily, intramuscularly the first 3 days from the day of hatching, group (Tx-X)-12 chickens were surgically thymectomized on the day of hatching by X-ray irradiation (650 R) the next day and group (Tx-Bx-Cy)-5 chickens were surgically thymectomized and bursectomized on the day of hatching by injecting with 4 mg cyclophosphamide daily, intramuscularly the first 3 days from the day of hatching.

The chickens were killed at 6 weeks old. The lymphoid organs were fixed in Bouin's fluid, embedded in paraffin, sectioned 4 μ in thickness, and stained with hematoxylin-eosin and Dominici. Chicken globule leucocytes were localized in the epithelium, and had the lymphocytic nucleus and several different sizes of granules in their cytoplasm. Globule leucocytes could be clearly differentiated from other similar types of cells by Dominici. The number of globule leucocytes per 1,000 epithelial cells was counted at the villi of the neck of the caeca (caecal tonsilla).

An apparent effect of thymectomy on the globule leucocytes can be seen in text figure 1. The number of globule leucocytes in thymectomized groups was greatly reduced, but not in group C, CX and Bx-Cy ($P<0.01$): Globule leucocytes appear to be thymus-dependent.

As the origin of mammalian globule leucocytes, investigators proposed mast cells

Department of Veterinary Anatomy, Faculty of Veterinary Medicine, Hokkaido University, Sapporo 060, Japan

* Present address: Department of Veterinary Anatomy, Faculty of Agriculture, Gifu University, Kakamihara-shi, Gifu 504, Japan

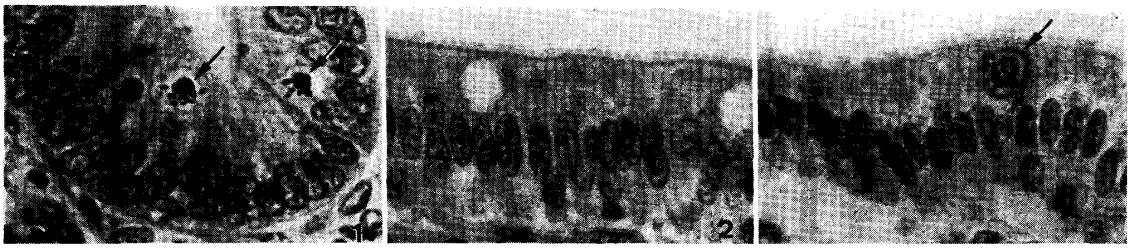
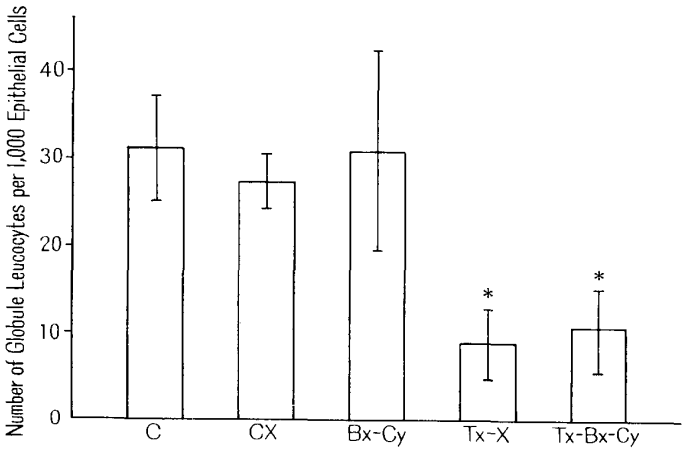


Fig. 1 Globule leucocytes (↑) were seen in the caecal epithelium of control chicken. Hematoxylin-eosin × 800 Fig. 2 No globule leucocytes could be seen in Tx-X. Hematoxylin-eosin × 800 Fig. 3 Globule leucocyte-like cell (↑) was stained positive by anti T-cell serum. Hematoxylin counter-stained × 800

TEXT-FIGURE

Globule leucocytes in the villous epithelium of chicken caecal tonsilla



* : Mean significantly differs from mean of C, CX or Bx-Cy ($P<0.01$). The bar represents SD.

(CANTIN & VEILLEUX, 1972., HEINE & SCHAEG, 1977), plasma cells (WHUR & JOHNSTON, 1967), eosinophils (HEINE & SCHAEG, 1977) or lymphocytes (KENT, 1952). In domestic fowl the lymphocytic origin is supported by light and electron microscopical morphology and ontogeny (TONER, 1965., BÄCK, 1972., BJERREGAARD, 1975).

In addition to this study, immunohistochemical research by indirect method with anti chicken T-cell serum (rabbit) and peroxydase conjugated anti rabbit IgG (goat) is now in progress. The result of the preliminary experiment showed that globule leucocyte-like cells were stained positive by anti T-cell serum. This observation strongly suggested that intraepithelial globule leucocytes in chicken were derived from the thymus lymphocytes.

REFERENCES

1) BÄCK, O. (1972): *Acta path. microbiol. scand.*, **80**, 84 2) BJERREGAARD, P. (1975): *Cell Tiss. Res.*, **161**, 485 3) CANTIN, M. & VEILLEUX, R. (1972): *Lab. Invest.*, **27**, 495 4) HEINE, H. & SCHAEG, G. (1977): *Acta anat.*, **98**, 275 5) KENT, J. F. (1952): *Anat. Rec.*, **112**, 91 6) TONER, P. G. (1965): *Acta anat.*, **61**, 321 7) WHUR, P. & JOHNSTON, H. S. (1967): *J. Path. Bact.*, **93**, 81