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Author(s)	MATSUMOTO, Rei
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Immunohistochemical Study on the Development of Lymphoid Tissues in the Chicken Proventriculus

Rei Matsumoto

Laboratory of Anatomy,
Department of Biomedical Sciences,
School of Veterinary Medicine,
Hokkaido University, Sapporo 060–0818, Japan

A lot of immnohistochemical investigations on the gut-associated lymphoid tissues of chicken lower digestive tract have been done, but little is known about those of upper digestive tract. The present study investigated the localization and development of lymphoid tissues in the chicken proventriculus where the lymphoid tissues remained to be less developed.

In HE-stained specimens, the lymphoid masses were found to be localized in three different sites of the wall of chicken proventriculus ; in the lamina propria, near the duct orifices of the deep proventicular gland, and in the areas of the deep proventricular gland.

Immunohistochemistry staining of the lymphoid masses near the duct orifices demonstrated that, $CD4^+$, $TCR2^+$ T lymphocytes occupied their central part, and B lymphocytes were localized at periphery of the T lymphocyte masses. $CD8^+$, $TCR1^+$ cells were evenly distributed in the masses. This particular pattern of lymphocyte distribution was also commonly observed in the lymphoid masses at lamina propria.

In prehatching periods, T or B cells infiltrations were first observed on the 20th embryonic day in the areas where lymphoid masses would be formed later. The unique distibution pattern of the T and B lymphocytes was observed at 1week after hatching. Then the lymphoid masses developed and increased in size with aging. Ultrastracturally, no M cells were found in the epithelia of the mucosa and of the duct regions that were close to the lymphoid masses.

In the areas of the deep proventricular glands, the lymphoid masses which possessed germinal center and surrounding T lymphocyte-rich regions were observed. These lymphocyte masses were recognized first at 3rd post-hatching week, and it was suggested that they were formed against the invaded possible antigens into the lumen of proventricular glands.

On the other hand, the masses at the lamina propria and near the duct orifices (DALT) were considered to be the preparatory lymphoid tissues to establish the immune barrier against the antigenic invasion at the mucosa of proventriculus, because of their appearance at prehaching period. However, because the lymphoid masses near the duct orifice of the deep proventricular glands were not associated with the germinal center and M cells, the proventricular lymphatic tissues fuction in a manner as different from that of the lower alimentary tract. Further investigations are needed to elucidate whether these lymphoid masses have a comparable fuction as those of mammalian DALT.