DISTRIBUTION AND HISTOCHEMICAL CHARACTERIZATIONS OF DOG'S MAST CELLS

PENYEBARAN DAN PENCIRIAN HISTOKIMIAWI SEL MAST PADA ANJING

Deni Noviana[1], Risa Tiuria[2], Setyo Widodo[1], Yoichiro Horii[3]

[1] Department of Veterinary Clinic, Faculty of Veterinary Medicine, Bogor Agriculture University, Jl. Taman Kencana 3 Bogor 16151 INDONESIA
[2] Department of Parasitology and Patology, Faculty of Veterinary Medicine, Bogor Agriculture University, Jl. Taman Kencana 3 Bogor 16151 INDONESIA
[3] Department of Veterinary Internal Medicine, Faculty of Agriculture, Miyazaki University, JAPAN

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Mast cells occur in all vertebrate classes from fishes to mammals, but wide variation exist in their distribution, numbers, and intracellular constituent (Macy, 1986). They are classified into two subtypes, mucosal type (MMC) and connective tissue type (CTMC), based on their histochemical properties (Enerback, 1986), reactivity to secretagogues (Shanahan *et al.*, 1985), type of granule protease's (Miller *et al.*, 1989), and also of their growth factor dependency (Smith and Weis, 1996). Their primary function appears to concern with defense mechanism, particularly the induction of acute inflammatory reactions and participation in immune responses (Galli, 1990). It is well known that dog mast cells contain an impressive array of physiologically active component (Mc Kay and Bienenstock, 1994).

The tissue from ear (skin), tongue, lung,heart, lymphoglandula bronchiole, lymphoglandula mesentery, spleen, kidney, peritoneum, liver, stomach, duodenum, jejunum, ileum, caecum, colon and rectum of three clinically healthy adult dogs fixed in Carnoy's fluid, embedded in paraffin, and then sections were stained with alcian blue and safranin O for their distribution (Nawa *et al.*, 1994). Another section, before staining, was fixed in buffered formalin for their stainability against these fixation. Some sections (tongue, liver, and jejunum of dog) were first stained with berberine sulfate and examined under a fluorescence microscope to confirm the presence of heparin (Enerback, 1974), washed in distilled water, and then stained with alcian blue and safranin O to examine the samefield under a light microscope (Horii *et al.*, 1992). To define glycosaminoglycans *in situ*, the CEC of mast cells in tongue, liver, jejunum of dogs and duodenum of rats infected with 25.000 third stage infective larvae (L_3) of *Strongyloides venezuluensis* were examined for comparison with the method of Scott and Dorling (1965). The distribution of mast cells were found in the whole organ examined and the number varied among their sites. Stained with alcian blue and safranin O, they contained blue granules against a pale red background, distributed throughout connective tissue consisting of collagen, elastic and reticular fibers, adjacent to blood or lymphatic vessels. With the exception of mast cells in villous lamina propria of dogs and duodenum of rats, they were formalin resistant. Strongly berberine sulfate fluorescence positive mast cells of jejunum and colon of dogs present in muscularis mucosa, submucosa, muscle layer and serosa, whereas very few in villous lamina propria. Practically all mast cells in tongue and liver were exclusively berberine-positive. These conditions indicate heparin content in their granules, moreover these mast cells were formalin resistant. The CEC of mast cells in the tongue and liver of dogs were about 1.3 M and 1.0 M. All these values were far more higher than that of duodenum rats mast cells about 0.5 M (Figure 1).

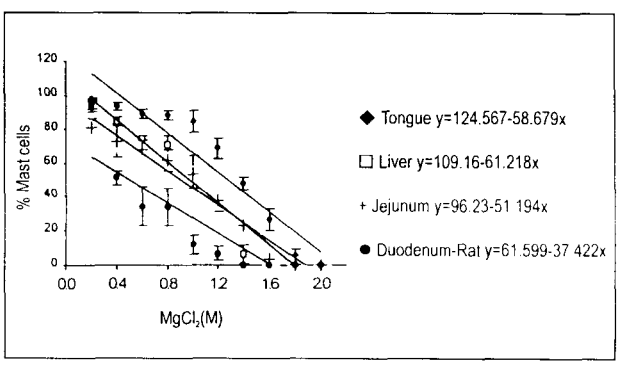

Figure 1. Critical electrolyte concentration staining of tongue (◆), liver (□) and jejunum (+) mast cells of dogs in comparison with duodenum mast cells of rats (·). Each point and vertical bar represent means value ± standard deviation of three animals.

As shown in Figure 2, the CEC of mast cells in the villous lamina propria of dog's jejunum was 0.5 M and of those in muscularis mucosa and submucosa as well as in muscle layer and serosa were about 1.2 M and 1.2 M. These situations seemed to indicate that tongue, liver, and jejunum mast cells from muscularis mucosa until serosa contained heparin in their granules.

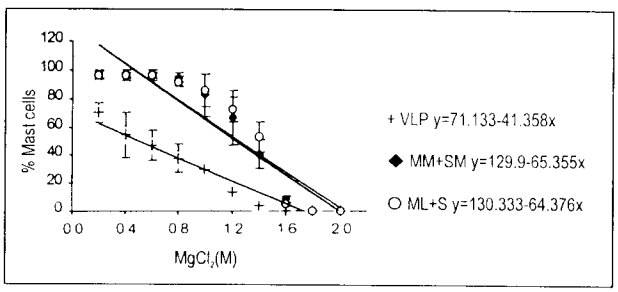

Figure 2. Critical electrolyte concentration staining of VLP (+), MM+SM (◆) and ML+S (o) jejunum mast cells of dogs. Each point and vertical bar represent means value ± standard deviation of three dogs. VLP=villous lamina propria; MM+SM=muscularis mucosa and sub mucosa; ML+S=muscular layer and serosa.

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- Dr. Drh. I Wayan Teguh Wibawan, MS., Bagian Parasitologi dan Patologi Fakultas Kedokteran Hewan Institut Pertanian Bogor, Kampus Taman Kencana Jl. Taman Kencana 3 Bogor 16151 Indonesia;

- Dr. Drh. Tuty Laswardi Yusuf, MS., Bagian Reproduksi Fakultas Kedokteran Hewan Institut Pertanian Bogor, Kampus Cilibende Jl. Cilibende Bogor 16151 Indonesia;

- Prof. Dr. Mozes R. Tolihere, Bagian Reproduksi Fakultas Kedokteran Hewan Institut Pertanian Bogor, Kampus Cilibende Jl. Cilibende Bogor 16151 Indonesia;

- Dr. Iman Supriatna, Bagian Reproduksi Fakultas Kedokteran Hewan Institut Pertanian Bogor, Kampus Cilibende Jl. Cilibende Bogor 16151 Indonesia;

- Drh. Sukardi Hastiono, MS., Balai Penelitian Veteriner (Balitvet) Departemen Pertanian RI, Jl. R.E. Martadina No. 30, Bogor Indonesia;

- Prof. Drh. Bibiana Widiawati Lay, M.Sc. Ph.D., Bagian Penyakit Hewan dan Kesehatan Masyarakat Veteriner Fakultas Kedokteran Hewan Institut Pertanian Bogor, Kampus Taman Kencana Jl. Taman Kencana 3 Bogor 16151 Indonesia;

- Dr. Drh. Setyo Widodo, Laboratorium Penyakit Dalam, Bagian Klinik Veteriner, Fakultas Kedokteran Hewan Institut Pertanian Bogor, Jl. Taman Kencana 3, Bogor 16151 Indonesia.