

# Ultrastructure of granulated cells in the bile duct of reindeer

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*Abstract:* The presence and ultrastructural characteristics of mast cells and globule leucocytes in bile ducts of the reindeer have not been previously documented. Tissue blocks of *ductus hepaticus communis* from six reindeer were processed by commonly used methods for TEM and examined with a JEOL JEM 100 S electron microscope. The present material originates from reindeer without clinical signs of parasites. However, several types of granulated cells were identifiable. The granules of connective tissue and subepithelial mast cells were small and mostly diffusely electron dense but also fine granular matrices were shown. The globules of intraepithelial globule leucocytes were fewer in number and distinctly larger than the granules of the mast cell. In addition there were noted intraepithelial granulated cells appearing similar to the neuroendocrine cells reported in bovine bile ducts.

**Key words:** anatomy, bile ducts, mast cells, globule leucocytes

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## Introduction

The presence of numerous mast cells and globule leucocytes in tissues of animals and man has been associated with parasitic infections (Befus and Bienenstock 1982). The function of these cells is, however, far from clear (Befus et al. 1986).

It has been established that the properties of mast cells depend on the animal species and even on the tissue location (Barrett and Metcalf 1984). Since no reports on mast cells and globule leucocytes in bile ducts of the reindeer are available, this study seemed appropriate.

## Material and methods

The tissue samples originated from six reindeer

slaughtered in the winter at the Reindeer Research Station at Kaamanen, in Lapland of Finland. Small tissue blocks of common bile duct wall were taken and as soon as possible transferred into cold 2.5 % glutaraldehyde in 0.1 M phosphate buffer and fixed for 24 hours. Then the blocks were processed by commonly used methods for TEM and examined with a JEOL JEM 100 S electron microscope.

## Results and discussion

Mast cells and globule leucocytes were identified according to the characteristics described for these cells in general (Rahko 1971). Connective tissue mast cells were rare in the tissue

samples (Figs. 1 to 3). On the other hand, the subepithelial mast cells occurred frequently. The numerous intracytoplasmic granules of the mast cells were usually electron dense with rounded profiles.

The intraepithelial globule leucocytes were easily distinguished from the subepithelial mast cells (Figs. 4 to 6). The globules of the globule leucocytes were few in number and distinctly larger than the granules of the mast cell. The nucleus of the globule leucocyte was often deeply indented by the large globules. All the globules were usually electron dense while some cells possessed globules with apparently dissolving matrices (Figs. 7 and 8). The mast cells, on the contrary, displayed mostly electron dense granula but also fine-granular matrices in a few granula.

In addition to these granulated cell, there were intraepithelial cells with numerous small electron-lucent intracytoplasmic granules (Fig. 9). The intraepithelial location and ultrastructural appearance of these cells was similar to the neuroendocrine cells present in bile ducts of cattle (Morales 1983) and in intestine of some other species of animals (Dellman and Brown 1976).

The present material originates from reindeer without clinical signs of parasites. However, numerous globule leucocytes and subepithelial mast cells were identified in the wall of the common bile duct. Mast cells located both in subepithelial and connective tissues while globule leucocyte displayed a strictly intraepithelial occurrence. To contribute to the clarifying of functional significance of the mast cells and globule leucocytes future studies by the present authors will be concentrated on these cell types in other mucosal tissues of reindeer.

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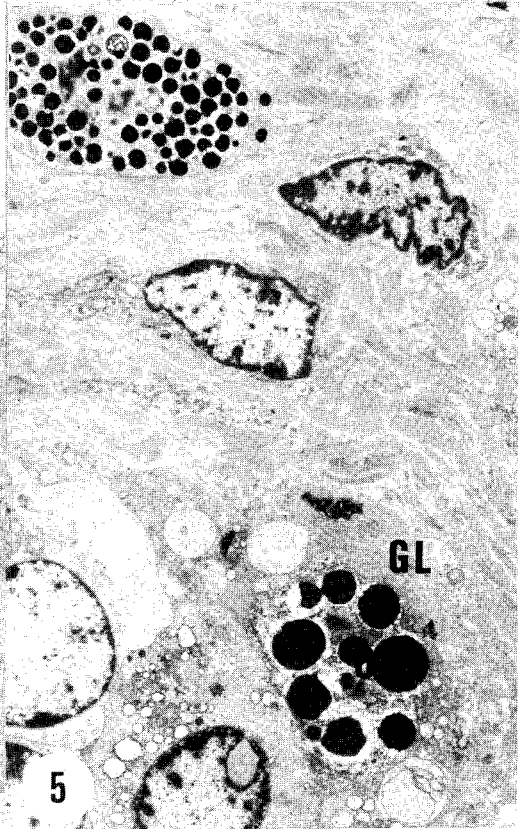
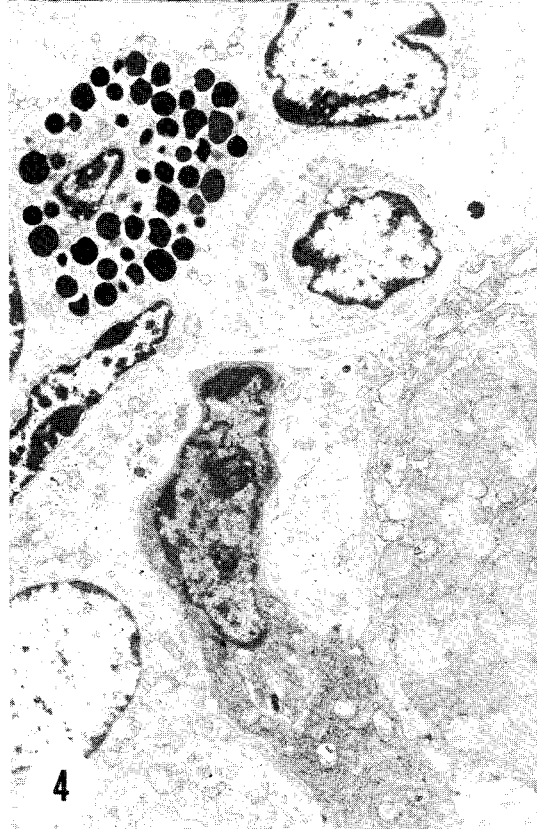
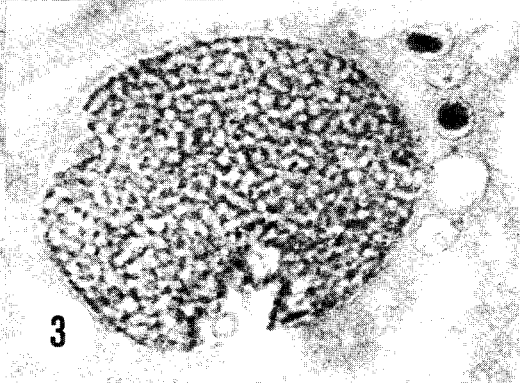
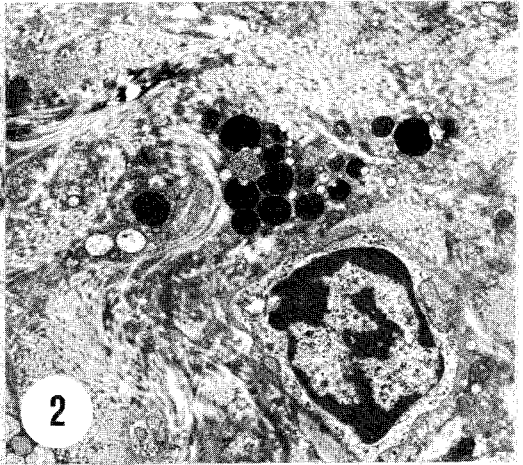
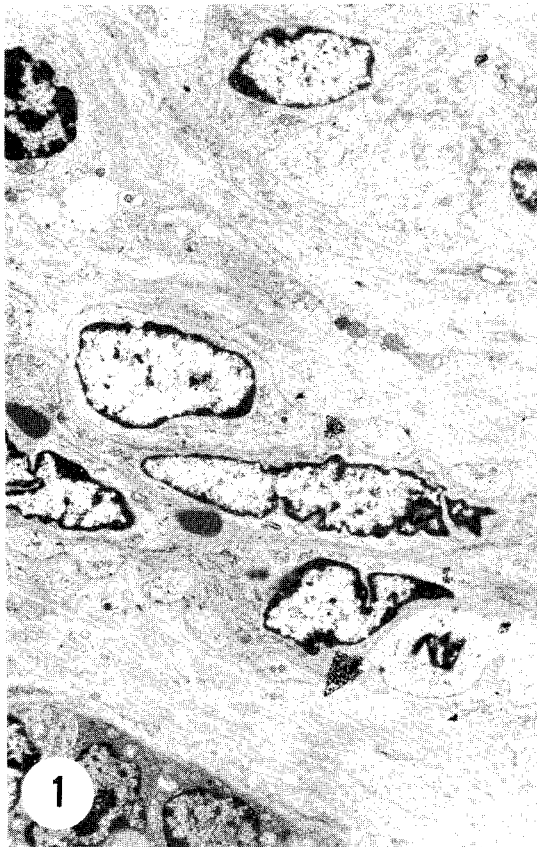
Fig. 1. A transverse section of the wall of the common bile duct. x 2.400.

Fig. 2. Ultrastructure of granules of a connective tissue mast cell. x 4.800.

Fig. 3. Detail of exceptionally small mast cell granules. x 24.000.

Fig. 4. A subepithelial mast cell. The granules appear homogenic. x 3.600.

Fig. 5. Ultrastructural appearance of a subepithelial mast cell and a globule leucocyte (GL). x 2.400.



- Fig. 6. Typical location of a globule leucocyte (GL). x 2.400.
- Fig. 7. Typical appearance of the nucleus and globules of a globule leucocyte. x 4.800.
- Fig. 8. Ultrastructure of different organelles in a globule leucocyte. x 24.000.
- Fig. 9. A detail of an apparently endocrinic cell with small basally locating granules. x 7.200.

