

GLOBULE LEUCOCYTES AND MAST CELLS IN
THE BILIARY SYSTEM OF CATTLE INFECTED
WITH GIGANTOCOTYLE EXPLANATUM

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SUMMARY

Globule leucocytes and Mast cells were detected in the epithelial mucosa of the biliary system of cattle infected with Gigantocotyle explanatum. The results showed that the cytoplasmic granules of globule leucocytes and mast cells were, in large extent, identical in their contents of the acid mucopolysaccharide associated with a highly basic protein.

INTRODUCTION

The globule leucocyte (Gl.) which is one of the few cells in the body characterized by large acidophilic granules (1,2). It is found predominantly within the epithelium of the mucosal surface of different organs of many animal species infected with parasites (3,4,5) and connected with the onset of the expulsion of the parasites (6). Murray et. al. (30) considered that Gl were derived from the subepithelial mast cells (Mcs.).

The subepithelial Gls. and Msc. could play an important role in the translocation of antibodies from the mucosa to reach the parasites (7). Globule leucocytes had been studied in the wall of the bile ducts of cattle, sheep and goats infected with fascioliasis (5,10,11).

The present study was conducted to detect the Gls. and Mcs. in the biliary system of cattle infected with G. explanatum. The histochemical properties and the relationship between these cells were also studied. It is the first work carried out for G. explanatum infection in cattle.

MATERIALS AND METHODS

Livers from ten cattle infected with G. explanatum were selected from Al-Dora abattoir, Baghdad. Examination of the livers were carried out to be sure that there were no other parasitic infections. The liver specimens were fixed in the Corony's fluid and sectioned at 3-4 μ and stained with the following stains:

1. Haematoxylin and Eosin.
2. Alcian blue PH 1.0 and 2.5, according to Spicer (10).
3. Alcian blue-Safranin PH 0.3, according to Enerback(11).
4. Acid hydrolysis-Alcian blue PH 1.0, according to Macarty and Reid (12).
5. Toludin blue PH 0.3 and 4.0, according to Enerback (11).
6. Biebrich Scarlet Ph 8, 9 and 10, according to Lillice(13).

RESULTS

The Gls. were noticed in large numbers within the mucosa of the bile ducts of cattle infected with G. explanatum. The histochemical reactions of the Gls. and Mcs. are given in Table 1. The reactions of these cells appeared to be, in large extent, indentical. Less variation was found in the degree of staining with Alcian blue at PH 1.0. The granules of Gls. and Mcs. were metachromatic with toludine blue at PH 4.0 while they showed negative reaction with this stain at higher acidity (PH 0.3).

They were bound alician blue very strongly even after counter staining with safranin. The granules of these cells took blue colour with acid hydrolysis-alcian blue at PH 1.0 (Fig. 1) and took deep red colour after using the Biebrich Scarlet technique. This indicated that they contains basic protein.

Table 1: Histochemical properties of the globule leucocytes and mast cells in the epithelium of bile ducts of cattle infected with G. explanatum.

Staining Method	Globule leucocyte	Mast cells
Haematoxylin and Eosin	R+++	-
Alcian blue PH 10	B++	B+++
Alcian blue PH 2.5	-	-
Alcian blue-Safranin PH 0.3	B+++	B+++
Acid hydrolysis-Alcian blue PH 1.0	B++	B++
Toludin blue PH 4.0	V+++	V+++
Toludin blue PH 0.3	-	-
Biebrich Scarlet PH 8,9,10	R+++	R+++

R = red, B = blue, V = violet, +++ = strong reaction, ++ = medium reaction, -= negative reaction.

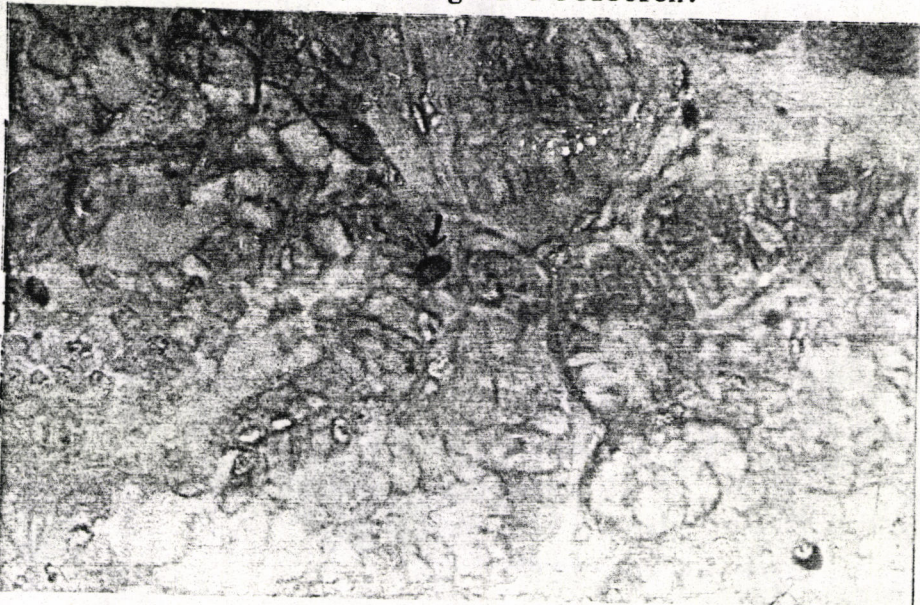


Fig. 1 - Cross section in the bile duct, the granules of the Gls. and Mcs. retained blue staining after acid hydrolysis-AB PH 1.0 (400 x).

DISCUSSION

The presence of Gls. and Mcs. in the bile ducts epithelium is demonstrated by this work. These cells associated with the immune response of the hosts against parasitic infections (5). The Gls. facilitate the passage of antibodies through the mucosa to reach the parasites (14).

This study revealed significant cytochemical relationship between these two type of cells, thus their granules contained sulfated acid mucopolysaccharide associated with the highly basic protein. This could be due to that the immature Mcs. which had a greater affinity for alcian blue than safranin and did not stained metachromatically with toluidin blue below PH 4.0 (11,15).

The mast cells were proliferated during the expulsion of the worms (15) and these cells reacted with an allergin (produced by the worms) and the reagin (17). This lead to degranulation of the Mcs. which altered the relationship between the acid mucopolysaccharide and the basic protein of the Mcs. granules, then migrated intraepithelially and called Gls. (5,7):

The less variation between the granules of the two type of cells to staining with alcian blue at different PH migh indicate the presence of certain structural difference in the mucopolysaccharide.

The histochemical reactions results of Gls. and Mcs. agreed with those of the corresponding cells in the biliary system of sheep infected with chronic fasciolosis (8,18) and in the parasitic infection of the respiratory tract of sheep (2).

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دراسة الخلايا البدينة وخلايا الدم البيض
في الجهاز الصفراوي في ابقار المصابة طبيعيا
بطفيلي Gigantocotyle explanatum

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الخلاصة

اجريت هذه الدراسة على اعداد عشرة ابقار مصابة طبيعيا
G. explanatum لدراسة الصفات الكيمياوية النسيجية للخلايا
الدم البيض الكروية وكذلك لمعرفة العلاقة بين هذه بطفيلي
وبين الاصابة بطفيلي G. explanatum، لقد البدينة وخلايا بين
الخلايا البدينة وخلايا الدم الخلايا من جهة وبينها G. وكذلك
اوضحت نتائج بينت هذه الدراسة عمق العلاقة البدينة وخلايا
البيض الحروية والاصابة بطفيلي explanatum مرتبطة الفحوصات
الكيمياوية النسيجية بأن حبيبات الخلايا الكيمياوية الدم
البيض الكروية تحتوي على المادة المخاطية بالبروتين
القاعدي وان هذه الخلايا تتشابه في الصفات النسيجية.