Dept. of Pathology
Fac. Vet. Med. Assiut University,
Head of Dept. Dr. M.I. El-Sherry

IDENTIFICATION OF M-CELLS IN THE INTESTINE OF NILE CATFISH (CLARIAS LAZERA). AN INSIGHT FOR ITS ROLE AS ANTIGEN TRANSPORTING CELLS

(with 2 Figures)

By

S.S. EL-BALLAL , and S.H. AFIFI

(Received at 21/10/1992)

التعرف على خلايا أم فى أمعاء القراميط النيلى، رؤية على دور هذه الخلايا فى نقل الأجسام الغريبة

صلاح البلال ، صلاح عفيفى

أجرى هذا البحث على أربعة أسماك القراميط النيلى بغرض التعرف على خلايا أم. قسمت الامعاء فى جميع الاسماك وفحصت كل ١ سم بعد حقن الاسماك بالحبر الشينى. أثبتت هذه الدراسة غياب هذه الخلايا كذا ألانسجة الليمفاوية المصاحبة للامعاء فى قراميط الاسماك النيلى.

SUMMARY

Four mature nile catfish (Clarias lazeria) of an average weight of 250 gm were used in this investigation. The whole intestine of all fish were screened every 1 cm for the presence of M-cells after indian ink injection. The study showed absence of M-cells neither the gut associated lymphoid tissues in the intestine of clarias lazera. The significance of this observation has been discussed.

INTRODUCTION

M-cells are present in the follicle-associated epithelium of Peyer's patch in mammals. M-cells are capable of endocytose a variety of antigens for later presentation to the gut associated lymphoid tissues in mammals *(EL- BALLAL, 1990)*. The ontogeny of M-cells in mammals has been widely studied. It was suggested that M-cells might represent an early stage in the life cycle of columnar enterocytes *(OWEN, 1977)*. Recently, it has been found possible to identify antigen transporting M-cells by different methods. For example, membrane potential, cl conductance *(CREMASCHI et al., 1990)*, allkaline phosphatase marker *(EL-bALLAL, 1990)*, and indian-ink *(WOLF and BYE, 1984)*. In fish, there is no reports indicate the presence of M-cells. Consequently, little is known about regional differentiation of the intestinal mucosa of fishes and the functional aspect(S) of these cells regarding entric fish pathogens. The purpose of the present study was to identify the presence or absence of M-cells in the intestine of Nile catfish.

MATERIAL and METHODS

Four mature Nile catfish *(Clarias lazera)* of an average weight of 250 gm were used in this study. Fish were anesthetized in Triacine Menthanosultonate (Ms-222) Sigma Co., St. louis, Mo., USA).

Fish received 0.2 ml of indian ink orally using a syringe and a plastic tube directly to the stomach. Fish were returned to the aquarium after injection. Fish were killed at 0.5, 1,2,4 hour post-injection (one fish/interval) by pithing the brain tissue. Ligature of the whole intestine from the begining to the end, and flushing of the intestinal lumen by Bouin's fixative were made. Every I cm, a tissue slices of the intestine were taken, fixed in Bouin's fixative, dehydrated,

embedded in paraffin, sectioned at 4-6 u, stained with H. & E and examined by ight microscopy.

RESULTS

the whole intestine of all fish was screened for endocytosis of indian ink by the enterocytes and the presence of gut associated lymphid tissue. There was no evidence of indian ink uptake by the enterocytes throughout the different exposure periods. Adherence of indian-ink particles to the mucous of goblet cells was the only finding in this investigation (Fig. 1). The number of gobelet cells was increased toward the posterior intestine (Fig. 1). We are not able to detect any of the gut associated lymphoid tissue in the intestine of *Clarias lazera.* The lamina propria of the intestine was sometimes heavily populated with melanin cells (Fig. 2).

DISCUSSION

The absence of M-cells in the intestine of Nile catfish in the present study is unique to this particular species in comparison to mammals. There is no reports indicate either the presence or absence of M-cells in fish. *KERMENTZ and CHAPMAN (1985)* examined the posterior half of the intestine of the channel catfish, *Ictalurus punctatus* by electron microscopy. The study showed a difference between Juvenile and mature catfish, but did not show the presence or absence of M-cells. The regional differentiation of the intestinal wall in fishes has been identified in the larval and juvenile stages of sea-bass *(CONNES and BENHALIMA, 1984).* The study showed an early differentiation of the anterior and posterior enterocytes and has lead to assume the functions of these cells. The enterocytes of *Barbus conchonius* (Cyprinidue) had a strong pinocytic activity at six day old larvae and apparently lost this function at late stage of differentiation *(ROMBOUT et al., 1984).* In the present study, absence of M-cells suggested that either these cells could be present in early stages of differentiation, then disappeared at late stage. It is also possible that, the functional needs for M-cells in fish is minimal in comparison with mammals. For example, a wide variety of entric pathoges in mammals have shown to be presented by M-cells such as reoviruses in mice, vibrio in rabbits, and salmonella organisms *(WOLF and BYE, 1984).* It is also possible, that the entric pathogens in fishes may be defeated by humoral mechanisms rather than cellular. Consequently, the need for M-cells is minimal in fishes.

In the present study, the adsorption of indian ink to the mucous of goblet cells suggested a passive process rather than an active one.

From this study, it is apparent that the process of entropy and extropy in fishes is necessary for further studies to help elucidate the pathogensis of a disease.

REFERENCES

Connes, R. and Benhalima, K. (1984): Ultrastructure of the gut of the sea-bass during its larval development. Bull. Soc. Zool. FR., log: 19-34.

Cremaschi, D.; James, P.S.; Rossetti, C. and M.W. Smik (1990): Chloride conductance and intracellular chloride accumulation in mouse Peyer's patch enterocyte. J. Physiology 427: 71-80.

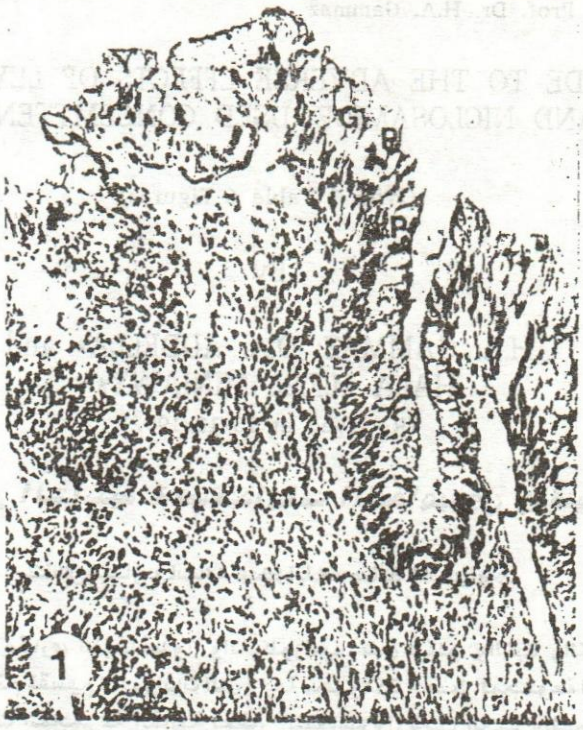
Kermentz, A.B. and Chapman, B.G. (1985): Ultrastructure of the posterior half of the intestine of the channel catfish, *Ictalurus Punctatus.* J. Morph. 145: 441-482.

Owen, R.L. (1977): Sequential uptake of horseradish peroxidase by lymphoid follicle epithelium of Peyer's patches in the normal unobstructed mouse Gastroentrology 72: 440-451.

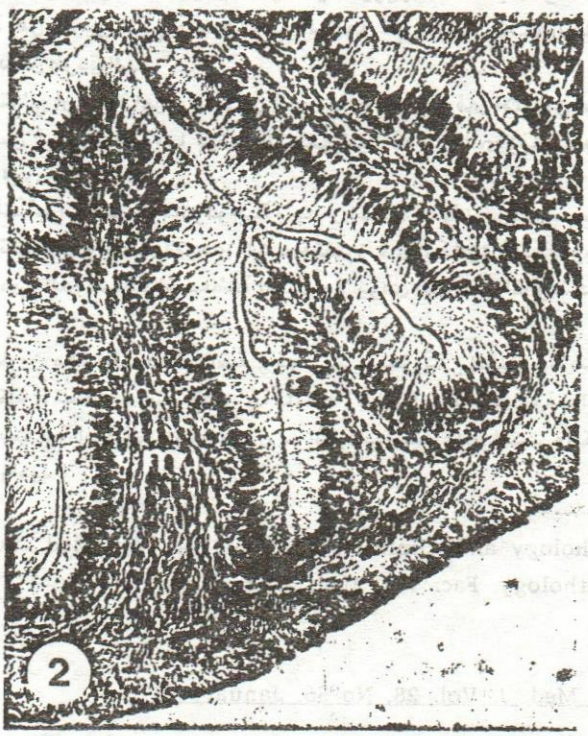
Rombout, L.H.W.M.; Stroband, H.W.J. and Tavernethiele, J.J. (1984): Proliferation and differentiation of intestinal epithelial cells during development of Barbus Conchonius (Teleosti, Cyprindiae) Cell and Tissue Research 236: 207-216.

Salah, S. El-Ballal (1990): Light, transmission and Scanning electron microscopical investigations of the intestinal tract with special referance to entritis in calves. Ph.D. Thesis, Assiut-Hannover.

Wolf, J.L. and Bye, W.A. (1984): The membranous epithelial (M-cell) and the mucosal immune system. Ann. Rev. Med. 35: 95-112.



1



2