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Histochemical Study to Investigate Carbohydrates, Proteins and Lipids Compounds and Their Physiological Role in Microcercous and Distome Cercariae

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ABSTRACT

Histochemical techniques revealed the presence of proteins, carbohydrates and lipids in both microcercous and distome cercariae. There was an abundance of glycogen and different mucopolysaccharides when lead tetra acetate-Schiff technique was used, but the result was negative in case of microcercous cercariae when maxilon blue RL technique was used as no metachromatia was noticed. The reaction was moderately

positive with distome cercariae by using the same technique. Also there was an abundance of proteins containing tryptophan and arginine in tissues of both cercariae. Both cercariae showed very strong positive reaction with the technique used to detect lipoproteins.

.(Pearse, 1985)

(Butler and Fried, 1977)

Oil red O

O

Echinostoma revolutum

Bolbogonotylus corkumi

acid-mucopolysaccharides

glycocalyx

.(Walker and Wittrock, 1992)

Echinostoma caproni

Alcianblue

periodic acid Schiff (PAS)

O

(Walker and Wittrock, 1999)

.(Idris and Fried, 1996)

O

Gryptogonimus chyli

Zygocotyle lunata

.(Marsit *et al.*, 2000 a,b)

E. caproni

(2002)

(DNA)

Clinostomum complanatum

.....

(AL-Hayyali, 2004)

protoscolices

Echinococcus granulosus

(2006)

.1

Melanopsis nodosa

()

soft tissues

normal physiological

.saline

acetocamine

microcercous cercariae

.(Gurr, 1962)

Roberts and Janovy, 2005;)

distome cercariae

.(Mohammed and Rahemo, 2001

.2

buffer neutral formalin

()

.(Pearse, 1985)

7-5

: .3

:

.Lead tetra acetate-Schiff (LTA-S) – .1

.Maxilon blue RL method (MB – RL) .2

.β – metablashia

α – metablashia

.

.1

Naphthyl ethylene diamine for tryptophan (NED-T)

Sakaguchi reaction for arginine (SR-A) .2

Salt extraction for residual lipoproteins (SE-RLP)

Pearse (1968)

(1)

.....

:1

SE-RLP	NED-T	SR-A	MB-RL	LTA-S	
+++	++++	+++	-	+++	
+++	++++	++++	++	+++	

:

:-

:++

:++++ ++

:

.1

-

M. nodosa

(PAS)

.(2 1)

(Walker and Wittrock, 1992, 1999)

(2002

)

.PAS

C. chyli B. corkumi

Clinostomum complanatum

PAS

(1:2 glycoles)

(

)

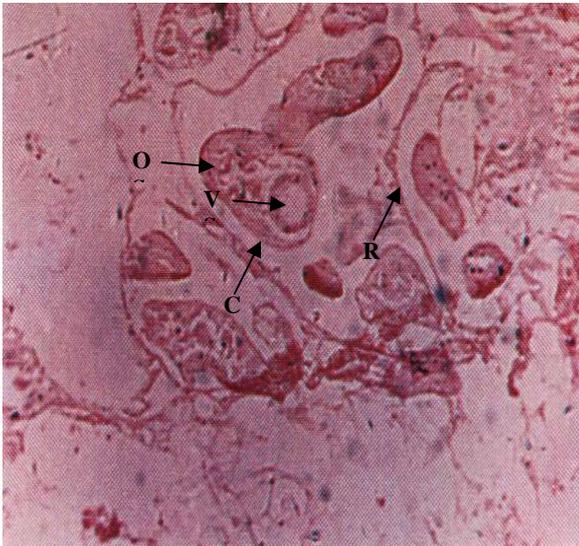
-

glycocalyx

.(Georgieva and Boevska, 1999)

.(Walker and Wittrock, 1999)

(2006)



:2

:1

(R) : *M.nodosa*
 (OS) (C)
 .(VS)
 .(125x) -

(R) : *M.nodosa*
 (OS) (C)
 (T) (VS)
 .(125x) -

SO₃H

β - metachromatia

.(3) COOH
 metachromatia

10.3

.(Pearse, 1968, 1985)

(2002)

C. complanatum

.....

(4)

Richards (1982)

Walker and Wittrock (1992, 1999)

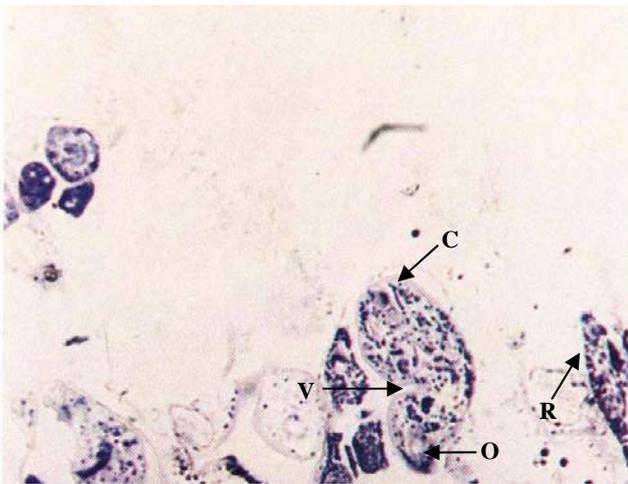
(2002)

C. chyli *B. corkumi*

Joyeuxiella sp.

Dibothriocephalus sp.

.(1990)



:4

(R) : *M.nodosa*
 (OS) (C)
 .(VS)

.(125x)



:3

(R) : *M.nodosa*
 (VS) (OS) (C)
 . (125x) (T)

.(6,5)

.(8,7)

(Olsen, 1974)

Sulphydral

disulfid

(Pachuski *et al.*, 2002)

E. caproni

(Barrett, 1991)

E. caproni

(Roberts and Janovy, 2005)

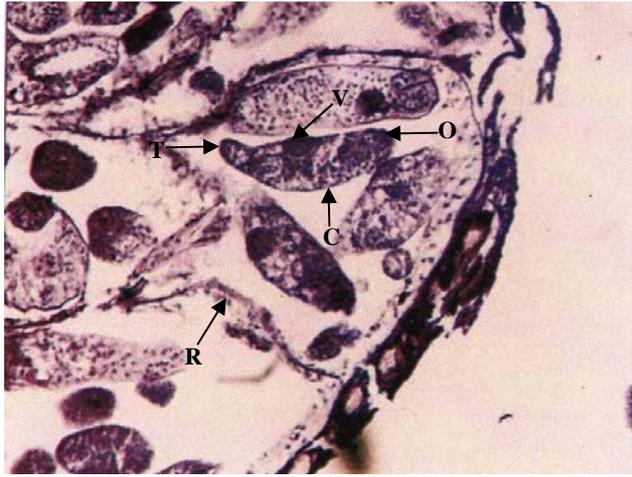
(Murray *et al.*, 2000)

.....



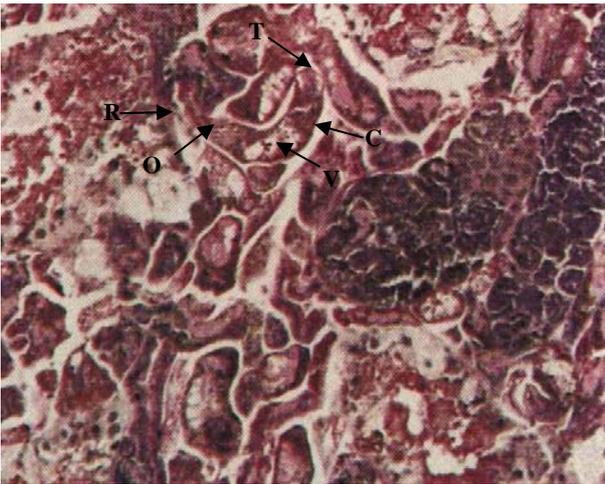
:6

(R) : *M.nodosa*
 (OS) (C)
 .(125x) .(VS)



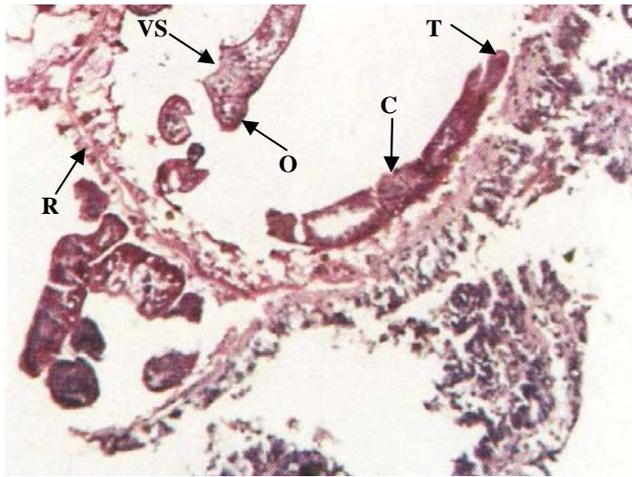
:5

(R) : *M.nodosa*
 (OS) (C)
 (T) (VS)
 .(125x)



:8

(R) : *M.nodosa*
 (OS) (C)
 .(125x) .(VS)



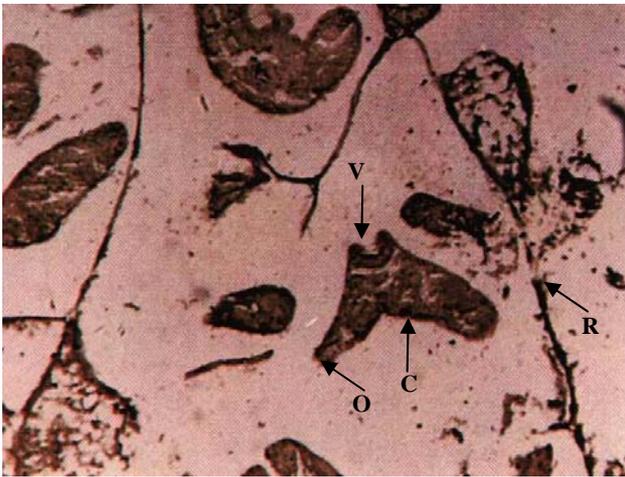
:7

(R) : *M.nodosa*
 (OS) (C)
 .(125x) (T) (VS)

.3

(10,9)

O *E. revolutum* Butler and Fried (1997)
 (Walker and Wittrock, 1992, 1999)
) *C. chyli* *B. corkumi* (
 (Marsit *et al.*, 2000b)
 (2002) *E. caproni*
C. complanatum
 (Humiczewska and Rajska, 2005) *Barbus luteus*
Fasciola hepatica



	:10		:9
:	<i>M.nodosa</i>	:	<i>M.nodosa</i>
(OS)	(C)	(R)	(OS)
	(VS)		(T)
	(125x)		(125x)

O -
 phospholipids
 granular myoblastoma neutral fats

.(Georgieva and Boevska, 1999)

(Roberts and Janovy, 2005)

(2006)

.2006

.2002

.1990

.211

- Al-Hayyali, F.Q., 2004. Histological and Histochemical Studies on Developmental *Echinococcus granulosus* Protoscolices. Rafidain Journal of Science, Biology, Special Issue, 15(4): pp.37-44.
- Barrett, J., 1991. Amino Acid Metabolism in Helminths. Advance Parasitology, 30: pp.39-105.
- Butler, M.S., and Fried, B., 1977. Histochemical and thin Layer Chromatographic Analysis of Neutral Lipids in *Echinostoma revolutum* Metacercariae Cultured *in vitro*. The Journal of Parasitology, 63 (6): pp.1041-1045.
- Georgieva, K., and Boevska, Y.A., 1999. Surface Carbohydrates in Helminths (Cytochemical Review). Experimental Pathology and Parasitology, 3: pp.32-37.
- Gurr, E., 1962. Staining Animal Tissue: Practical and Theoretical. Leonard Hill (Books) Ltd., London.

- Humiczewska, M., and Rajski, K., 2005. Lipids in the Host-parasite System: Digestive Gland of *Lymnaea truncatula* Infected with the Developmental Stages of *Fasciola hepatica*. *Acta Parasitologica*, 50 (3): pp.235-239.
- Idris, N., and Fried, B., 1996. Development, Hatching, and Infectivity of *Echinostoma caproni* (Trematoda) Eggs, and Histologic and Histochemical Observations on the Miracidia. *Parasitology Research*, 82: pp.136-142.
- Marsit, C.J.; Fried, B., and Sherma, J., 2000a. Neutral Lipids in Cercariae, Encysted Metacercariae, and Rediae of *Zygocotyle lunata*. *Journal of Parasitology*, 86 (5): pp.1162-1163.
- Marsit, C.J.; Fried, B., and Sherma, J., 2000b. Neutral Lipids in Cercariae, Encysted Metacercariae, and Rediae of *Echinostoma caproni*. *Journal of Helminthology*, 74: pp.365-367.
- Mohammed, M.S.A., and Rahemo, Z.I.F., 2001. The Nervous System of Four Types of Cercariae as Revealed by Cholinesterase Activity. *Rivista di Parassitologia*, 18 (3): pp.200-207.
- Murray, R.K.; Granner, D.K., and Mayes, P.A., 2000. *Harper's Biochemistry*. 25th Edn., A Lange medical Book McGraw-Hill Companies, New York.
- Olsen, O.W., 1974. *Animal Parasites: Their Life Cycles and Ecology*, 3rd Edn. University Park Press, Baltimore.
- Pearse, A.G.E., 1968. *Histochemistry: Theoretical and Applied*. 3rd Edn, Vol. 1, Churchill-Livingstone, London.
- Pearse, A.G.E., 1985. *Histochemistry: Theoretical and Applied*. 4th Edn, Vol. 2, Analytical Technology. Churchill-Livingstone. Edinbrgh.
- Pachuski, J.; Wagner, S.; Fried, B., and Sherma, J., 2002. Thin Layer Chromatographic Analysis of Amino Acid and Carbohydrates in Adults of *Echinostoma caproni*. *Comparative Parasitology*, 69: pp.202-205.
- Richards, K.S., 1984. *Echinococcus granulosus* Equinvs: The Histochemistry of the Laminated Layer of the Hydatid cyst. *Folia Histochemica et Cytobiologica*, 22 (1): pp.21-32.
- Roberts, L.S., and Janovy, J., 2005. *Schmidt and Roberts Foundation of Parasitology*. 7th Edn. Wm. C. Brown Publishers, Dubuque.
- Walker, D.J., and Wittrock, D.D., 1992. Histochemistry and Ultrastructure of Metacercarial Cyst of *Bolbogonotylus corkumi* (Trematoda: Cryptogonimidae). *The Journal of Parasitology*, 78 (4): pp.725-730.
- Walker, D.J., and Wittrock, D.D., 1999. Histochemistry and Ultrastructure of Metacercarial Cyst of *Cryptogonimus chyli* (Trematoda: Cryptogonimidae). *The Journal of Helminthological Society, Washington*, 66 (1): pp.82-86.