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Studies on Acetylcholinesterase activity in Neyraia Multicoronata

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Abstract
Acetylcholinesterase is responsible for the hydrolysis of acetyl choline into acetic acid and choline. Acetylcholine is an important chemical transmitter substance in the nervous system of helminth parasites. Acetylcholinesterase activity have been biochemically estimated in Neyraia multicornata. Significant amount of the enzyme was present in the helminth parasite. The possible functional role of cholinesterase in helminth parasites was discussed.

Keywords: acetylcholinesterase, neyraia multicoronata

Introduction
Acetylcholine is an important chemical transmitter substance in the nervous system of most animals including helminth parasites. Acetylcholine is hydrolysed by an enzyme acetylcholinesterases into acetic acid and chline.

$$(CH_3)\,NC_2\,H_4\,OCCH_3 \rightleftharpoons CH_3\,NC_2\,H_4\,OH + CH_3\,COOH$$

Acetylcholine Choline Acetic Acid

Cholinesterases are of two types
Cholinesterase found in red cells is known as acetylcholinesterase which hydrolyses acetyl choline.
The next type is found in the serum known as butryl cholinesterase, which hydrolyses butryl choline much more rapidly than acetylcholine. Acetylcholinesterase have been reported in few parasites. In Cestodes Diphyllobothrium latum (Pylkko 1956 ab) Hymenolepis diminuta (Graff and Read 1967) Raillietina tetragona and Avitellina centripuctata and stilesia globipucata (Patwari, 1982).
Acetylcholinesterase (or at any rate a cholinesterase) has been found frequently within the nervous system and its demonstration have become a useful tool in elucidating the details of nervous system in parasitic helminthes (Schardien and Waitz, 1955). Ramakrishna (1979) demonstrated the nervous system in tape worms, by localizing the acetylcholine within the nervous tissue.
Although acetylcholinesterase is primarily involved in the neuronal transmission of an impulse, it is also observed that it plays many other roles. Schwabe *et al*., (1961), suggested that acetylcholinesterase was involved in permeability control and osmoregulation of hydatid cyst wall of Enchinococcus granulosus. Akpan *et al*., (1974) have reported that acetylcholine stimulates glycogen synthesis.

Material and Methods
Neyraia multicoronata a common parasite of Hoopoe was selected for the present investigation. These birds were sacrified in the laboratory. The intestines were cut open and the parasites were flushed into saline water and then repeatedly washed in ice-cold saline water to remove the adhering mucus and food Pericles. Mature and live worms of same size and length were taken for biochemical studies. The parasites were then transferred on to what man's Filter No.1 to remove the moisture contents. The Parasites were weighed and homogenized for the experiment. The enzyme activity of acetylcholinesterase was determined by the method of Murali Krishnadas (1967) adopted from Metcalf (1951).

Results
In Neyraia multicoronata the enzyme activity was 36.011 + 0.373 µ moles of acetylcholine hydrolyzed/mg protein/hour (Table 1. Fig. 1)

Table 1: Acetylcholinesterase activity in Neyraia multicoronata

S. No.	Neyraia multicoronata
1.	34.303
2.	36.563
3.	35.899
4.	36.687
5.	36.702
6.	35.912
Mean	36.011
S.E. +	0.373

Values expressed as µ moles of acetylcholine hydrolised/mg protein/hour.

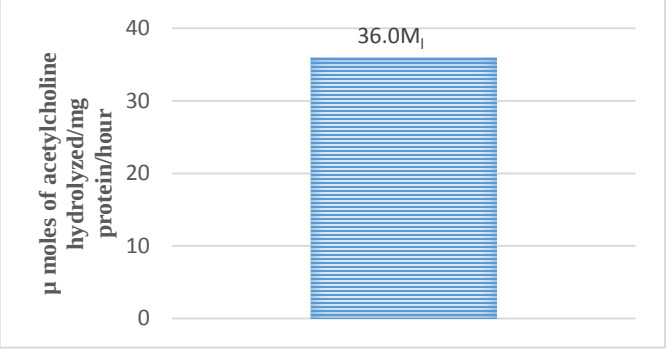

Fig 1

Discussion
The present studies indicate the acetylcholinesterase enzyme was present in considerable amounts in the helminth parasite i.e., Neyraia multicoronata. The quantitative estimation of the

acetylcholinesterases shows a fairly high activity of the enzyme which is also supported by the hsitochemical localization of the enzyme in Cotugnia digonopora and Raillietina tetragona by Ramakrishna *et al*., (1979).

The significant activity of this system in the parasites under the study could be appreciated in view of various important roles ascribed to it. The acetylcholinesterase have been stated to act as:-

1. A neuromuscular transmitter (Hutchinson and Probert, 1972).
2. A regulator of permeability and osmosis (Schwabe *et al*., 1961).
3. A reducer of immune responses of the host (Kaliner and Austen, 1974).
4. A stimulant to bring about glycogen break down to glucose facilitating the parasite to absorb the same from the gut (yeates *et al*,. 1976).

References

1. Akpan JO, Gardner R, Wagle SR. Studies on the effects of insulin and acetylocholine on activation of glycogen synthetase and on glycogenesis in hepta; tocystes isolated from normal fed rats. Biophys. Res. Commun. 1974; 61:222-229.
2. Bueding E. Acetylcholinesterase activity of Schistosoma mansoni. Brit. J. Pharmacol. 1952; 8: 134-138.
3. Graff DL, Read CP. Specific acetylcholinesterase in Hymenolepis diminuta. J. Parasit. 1967; 53:1030-1031.
4. Hutchinson GW, Probett AJ. Ascaris suum Kinetic properties, tissue specificity and ultrastructural location of cholinesterase Expt. Parasitol. 1972; 32:109-116.
5. Murali Krishna Dass P. Some aspects of muscular dystrophy on denervation pertaining to sub cellurlar change and enzyme activity, Doetoral dissertation Sri Venkateshwara University, Tirupati, India, 1967.
6. Patwari. Studies on some Biochemical and Physiological aspects of two cestodes Avitellina Centripuctata and Stilesia Globipunctatta (Thesis submitted to Osmania University). 1982, 181-187.
7. Pylkko OO. Studies of the acetycholine content and cholinesterase activity of the human pathogenic fish type worm (Diphyllobotrium latum), Annls. Exp. Biol. Fenn. 1956; 34 (Suppl. 8), 1-81.
8. _____. Cholinesterase in Diphyllobothrium latum and Taenia saginata. Annls. Med. Exp. Biol. Fenn., 34: 328-334.
9. Ramakrishna GV, Narsiah J, Simha S. Histochemical localization of acetylcholinesterase activity in the whole mounts of Cotugnia species. Current Science, 1979; 48:183-84.
10. Scharden JL, Saitz JA. Histochemical studies of esterases in the cuticle and nervecords of four cycholophyllidian cestodes, J. Parasit. 1955; 51: 326-368.
11. Schwabe Cw, Koussa M, Acra AN. Host parasite relationship in Echinococcosis vi. Acetylcholinesterase and permeability regulation in the hydatid cyst wall, Comp. Biochem. Physio. 1961; 2:161-172.
12. Yeast BA, Anda Ogilvie BN. Nematode Acetycholinesterase in Biochemistry of Parasites and host-parasite relationships (H. Von den Bossche, Ed), 1967; 307-10. North Hall and Biomedica press, Amsterdam.