

TABLE 2
Distribution of CF antibody to ERV in different categories of stallions

Category of animals	Age in years	No. of sera tested	Reciprocal of serum dilutions (CF titre)		
			16 and above Significant	8 Doubtful	8 Insignificant
Horse stallion	4-11	7	—	—	7 (100)
Horse stallion	12 and above	3	—	—	3 (100)
Donkey stallion	4-11	16	13 (81.25)	—	3 (18.75)
Donkey stallion	12 and above	6	1 (16.67)	3 (50.0)	2 (33.33)
TOTAL		32	14	3	15

Figures in parentheses indicate percentages

susceptibility to EHV1 infection foals do not manifest clinically symptoms of the disease owing to active immunity which generates thereafter¹².

Our study on the incidence of CF antibody in horse and donkey stallions yielded contrasting results. While none of the horse stallions showed significant or doubtful titres, 17 (77.27%) of 22 donkey stallions (both age groups included) had significant and doubtful titres. Preliminary study⁶ on army horses and mules indicated that only 0.60% horses had 1 in 16 CF titre. The present study shows that donkey stallions between 4 and 11 years of age reveal high incidence of CF antibody to EHV1 which substantially recedes after this age. Matumoto¹³ found 100% positive sera in 1-12 year old Egyptian donkeys. Shimizu *et al*¹⁴ reported that CF antibody titres fluctuate up to the age of 11 years in male horses and retard after this age.

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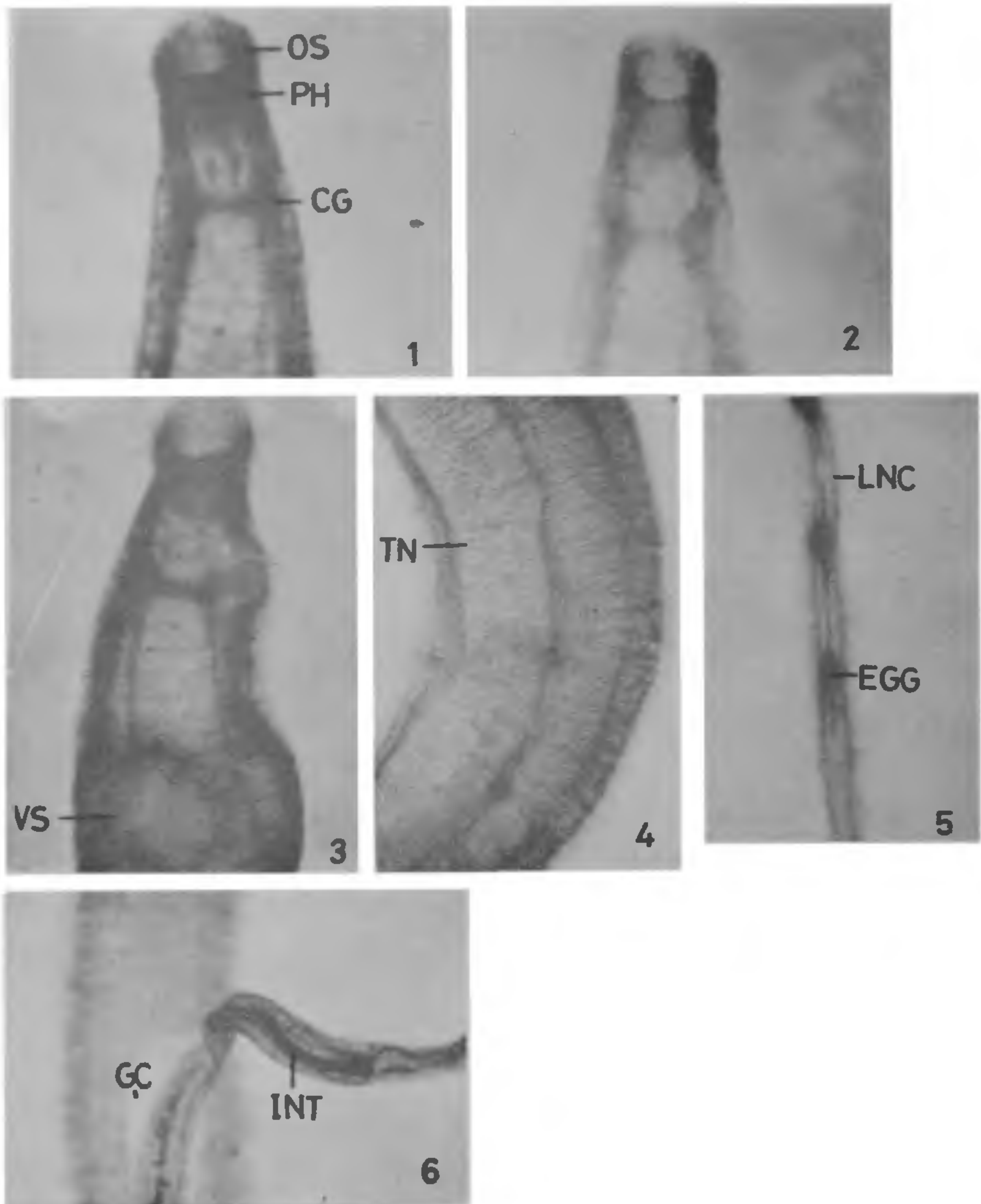
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THE NERVOUS SYSTEM AND ESTERASE DISTRIBUTION IN *SCHISTOSOMA SPINDALIS* (TREMATODA)

S. LAKSHMAN RAO, G. VENKATA RAMA KRISHNA AND S. S. SIMHA

Department of Zoology, Osmania University, Hyderabad 500 007, India

THE role of esterases in synaptic or neuromuscular transmission of nerve impulse is well-known in vertebrates and invertebrates¹. The role, distribution and functions of these enzymes in trematodes has also been studied²⁻⁶. Though much work has been done on esterases in different groups of trematodes, the blood flukes have received little attention. The only available literature in this field on blood flukes is on human Schistosomes^{7, 8}. Unfortunately no data are available on the esterase distribution in cattle blood flukes and Indian blood flukes in particular. The present study



Figures 1-6. 1. The anterior region of the parasite showing the cerebral ganglia (CG), the lateral nerve cords and distribution of nerves to pharynx (PH) and oral sucker (OS) after incubation in AThchI ($\times 100$). 2. BchE activity in the anterior region of the parasite after incubation in BThchI. Note the less activity of the enzymes ($\times 100$). 3. NSE activity and nerve distribution in the anterior region. Note the distribution of nerves to the ventral sucker (VS) after

incubation in acetate substrate ($\times 100$). 4. Distribution of transverse nerves (TN) can be seen clearly after incubation in AThchI ($\times 120$). 5. AchE activity in the eggs and the lateral nerve cord (LNC) in female *S. spindalis* ($\times 200$). 6. The location of female *S. spindalis* in gynaecophoric canal (GC). Note the absence of AchE activity in GC. ($\times 100$). INT = Intestine.

attempts to demonstrate the distribution of esterases and the nerve arrangement in *Schistosoma spindalis*, one of the blood flukes of cattle in India.

Mature *S. spindalis* were collected from the peritoneal blood vessels of a freshly slaughtered Indian buffalo, *Bubalis bubalus* L. from the local slaughter house. The worms were washed several times with Tyrode's solution and were immediately flattened and fixed in 10% neutral formalin for 4-6 hr at 5°C. They were then washed with distilled water fixed at 10°C and incubated in different substrates at room temperature. Some worms were incubated in acetylthiocholine iodide (AThchl) to localize acetylcholinesterase (AChE) activity. Some worms were incubated in butyrylthiocholine iodide (BThchl) and O-acetyl-5-bromo indoxyl to localize butyrylcholinesterase (BChE) and non specific esterase (NSE) activities. For the localization of AChE, BChE and NSE, the direct colouring technique^{9, 10} was used. A solution of eserine sulphate (physostigmine- 10^{-5} M) in distilled water was used as inhibitor. Since better elucidation of the gross anatomy of nervous system has been obtained along with the distribution of esterases when techniques were applied to the whole mount preparations^{4, 5} in the present study, the same techniques were adopted.

The results revealed that AChE activity is prominent in the nervous tissue, oral sucker, pharynx, ventral sucker and excretory bladder. Eggs also showed intense AChE activity. The activity of AChE is more than that of BChE (figures 1, 2). As a result of esterase localization the neuroanatomy of *S. spindalis* has been traced.

The nervous system *S. spindalis* consists of a pair of cerebral ganglia which are located far below the pharynx. From each cerebral ganglion, three nerves arise in the anterior region which anastomose into finer branches and innervate pharynx and oral sucker. These three lateral nerves also proceed posteriorly. Two nerves are thick and dorsal in position, one nerve is thin and ventral in position. The thicker nerves are named as dorsolateral nerves and the thinner as median ventral nerves according to their position. All these three pairs of lateral nerves are connected by many transverse nerves. The outermost dorso lateral nerve is ganglionated due to the origin of transverse nerves from it (figure 4). The ventral sucker is innervated by many branches of nerves arising from the median ventral nerve (figure 3).

The female *S. spindalis* has comparatively simple nervous system. Only two lateral nerve cords are present (figures 5, 6). The transverse nerves are not prominent.

The presence of higher AChE activity as against BChE, in the nervous tissue suggests that acetylcholine is the main neurotransmitter in this parasite. When eserine was used as inhibitor in media containing

AThchl, the enzyme activity was completely inhibited suggesting the presence of AChE. In *Paramphistomum cervi* the BChE activity was more than that of AChE⁶. An interesting feature in the nervous system is the location of two cerebral ganglia connected by a small commissure far below the oral sucker and pharynx. In other trematodes, the cerebral ganglia are located immediately below the oral sucker^{4, 5}. The nervous system is not well developed in female when compared to the male in *S. spindalis*. It is not surprising, because the female is always lodged in the gynecophoric canal of the male. It is also interesting to note the intense AChE activity present in the eggs of this blood fluke. The enzyme activity observed is due to the fully developed miracidium that is present in the eggs.

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FIRST REPORT OF THE GENUS *ADENOLAIMUS* ANDRASSY, 1973 (NEMATODA : DORYLAIMIDA) FROM INDIA

WASIM AHMAD AND M. SHAMIM JAIRAJPURI*
Department of Zoology, Aligarh Muslim University,
Aligarh 202 001, India.

*Present address: Commonwealth Institute of
Helminthology, St. Albans, Herts, England.

ANDRASSY¹ proposed the genus *Adenolaimus* for the species, *Adenolaimus dadayi* (type) collected from New Guinea. He placed it under the family Aulolaimoididae on the basis of the three parts oesophagus. Goseco *et al.*² transferred *Doryllium orthum* Thorne, 1939 to *Adenolaimus* and considered