ISSN: 2349-7637 (Online)
Volume-1, Issue-3, October 2014
RESEARCH HUB – International Multidisciplinary Research Journal
Research Paper
Available online at: www.rhimrj.co.in

Effect of Dimethoate on the distribution of AChE in optic lobe of Gallus dometicus (In Vitro)

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Abstract: *Most of the layers of optic lobe are predominantly operating cholinergic neurotransmission circuits as indicated by the presence of AChE activity. Moreover, the in vitro, dimethoate treatment resulted in the marked inhibition of AChE.*

Keywords: Dimethoate, AChE, Gallus dometicus

1. Introduction

The mechanism involves in blurring of the vision owing to organophosphate intoxication is not clear. Although accumulation of endogenous acetylcholine due to organophosphate pesticide induced inhibition of AChE is causing several symptoms of nervous origin (Taylor, 1980). Besides other neurotransmitter circuits operating in the brain and retina, cholinergic transport system is of much concern in the present study. Since the dimethoate is an organophosphate pesticide and the cholinergic system is the target. Therefore it effect is studied on the distribution of acetylcholinesterase in optic lobe of gallus domesticus, hitherto unreported.

2. Material and method

The gallus domesticus were collected from local poultry form. Optic lobes were quickly and carefully removed and immediately fixed in 10% chilled neutral formalin for 12-15 hours. Frozen section of 8-10 mu thickness were cut.after through washing with distilled water the section were processed for localization of AChE by "direct coloring method" of karnovasky and roots(1964)

Abbreviations used to describe various concentration of dimethoate
N = controlled condition
100mm = D2
200mm = D3

Dimethoate was added in the solution form in the incubation media to get desired concentration.

3. Result and discussion

The following layers are found in the optic lobe of Gallus dometicus; stratum opticum (SO), stratum fibrosum et griseum superficiale (SFGS), stratum album centrale (SAC), Nucleus isthmus pars magnocellularis (NIM), nucleus mesencepahlicus lateralis (NML).

The outer most layer is stratum opticum (SO), which is negative for AChE activity in N, D2 and D3 conditions. The SFGS, which constitutes a major receptive field, and SAG revealed very strong AChE activity in normal group. The Stratum album centrale (SAC) present below the SGC revealed strongly positive AChE activity in N, strong in D2, and D3 conditions. In the nucleus isthmus pars parvocellularis, very intense AChE activity was observed in normal optic lobe, while moderate and mild activity was seen in D2 and D3 concentrations. In the Nucleus isthmus pars magnocellularis (NIM) very strong was depicted in normal condition, while moderate and mild AchE activity was noted in D2 and D3 concentration, respectively. The nucleus mesencephalicus lateralis (NML) showed intense AChE activity in normal while this area is midly stained inD2 and negative in D3(Table 1).

Table 1- Effect of Dimethonate on the distribution of AChE in different layers of optic lobe (in vitro)

Sr. no.	Different layers of optic lobe	Normal condition	Different concentrations	
			D2	D3
1	SO	-	-	-
2	SFGS	++++	+++	++
3	SGC	++++	+++	++
4	SAC	++++	+++	+
5	NIP	++++	++	+
6	NIM	++++	++	+
7	NML	++++	+	-

Note- - = negative activity, + = mild activity, ++ moderate activity, +++ = strong activity, ++++= intense activity

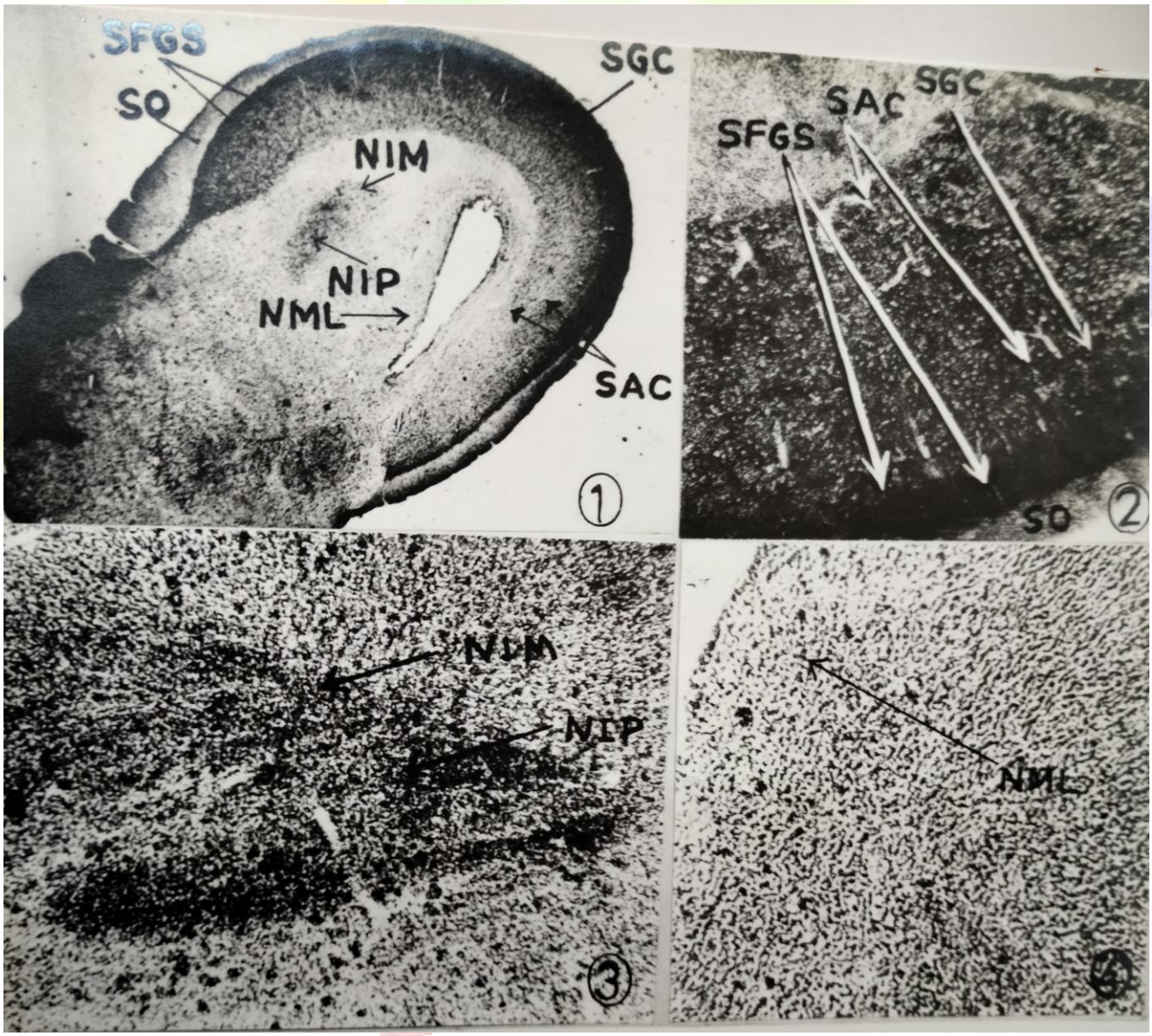

Figure A – (1) Low power photomicrograph of optic lobe of Gallus dometicus showing AChE activity in the various layers in the normal condition. Stratum opticum (SO), Stratum fibrosum et griseum superficiale (SFGS), stratum griseum centrale (SGC), Stratum album centrale (SAC), nucleus isthmus pars parvocellularis (NIP), nucleus isthmus pars magnocellularis (NIM); (2) magnification of SO and SFGS. Depicts negative activity in SO and intense in SFGS; (3) High magnification of NIP and NIM, Observe intense AChE activity in NIP and NIM; (4) showing also intense AChE activity in NML

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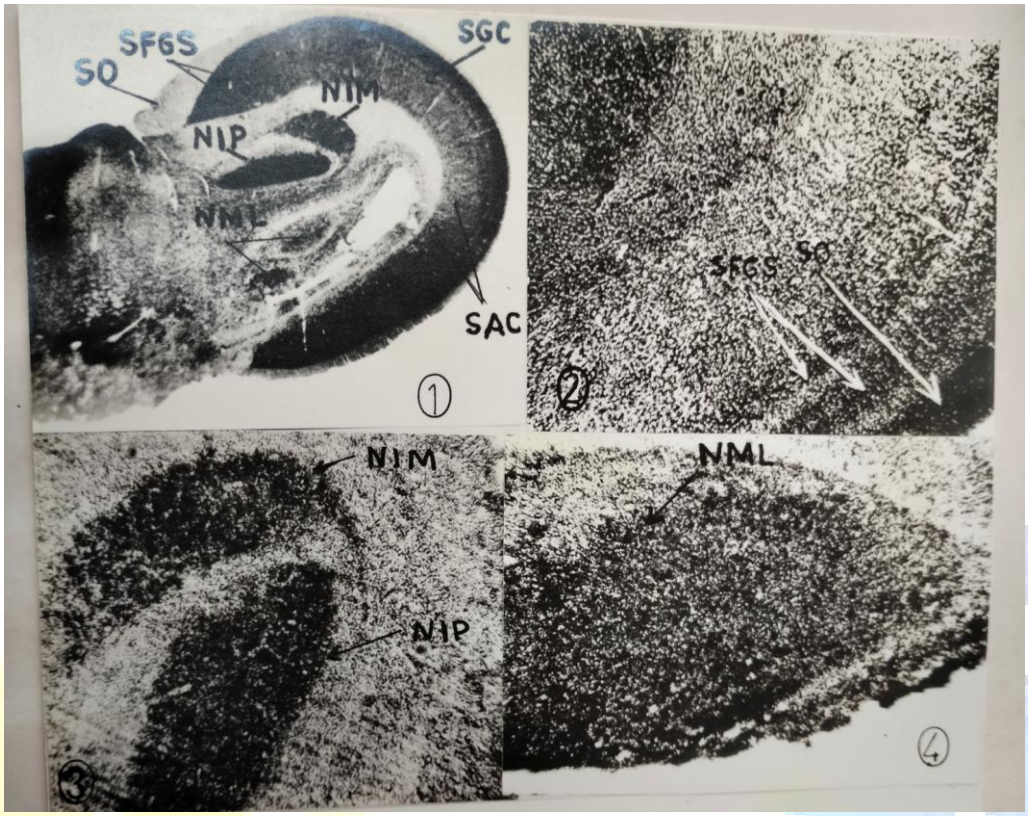

Figure B- (1) low power photomicrograph of optic lobe Gallus dometicus in the D2 condition of treatment; (2) high magnification of SO, SFGS, SAC and SAC and SGC. Demonstrate the negative activity in SO, strong in SFGS, SGC, moderate in SAC; (3). High modification of NIP and NIM. Note moderate AChE activity in NIP and NIM; (4) Depicts mild activity in NML.

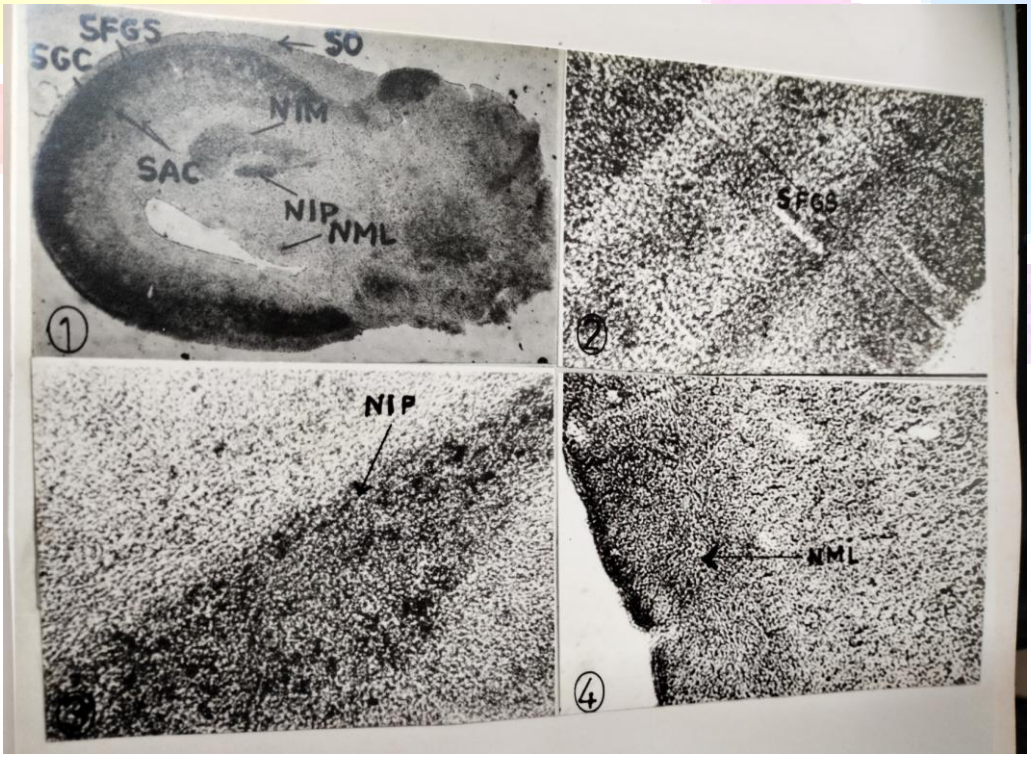

Figure C – (1) Low power photomicrograph of optic lobe showing AChE activity in the D3 condition of treatment in the various layers. Stratum opticum (SO), Stratum fibrosum et griseum superficiale (SFGS), stratum griseum centrale (SGC), stratum album centrale (SAC), nucleus isthmus pars magnocellularis (NIM), Nucleus mescephalicus lateralis (NML); (2)High modification of SFGS, moderate in SFGS, SGC; (3) High modification of NIP. Mildly positive activity in NIP; (4) negative activity in NML.

ISSN: 2349-7637 (Online)

4. Conclusion

It may be proposed that organophosphate pesticide should be used with the most care and safely since they are quite likely to adult the vital enzyme profiles of the neuronal circuits of optic lobe.

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