

MacIlwain's peripheral shift effect

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Fischer et al. [1] have described massive, short latency, discharges that occur in cat retinal ganglion cells in response to shifts of a grating that does *not* fall upon the receptive field, but fills much of the rest of the cat's field of view. We thought it might be caused by fluctuations of the scattered light falling in the receptive field but the following experiments rule this out.

(1) The effect cannot be abolished by adding light to or subtracting light from the receptive field synchronously with the shift.

(2) The effect *is not* abolished by flooding the receptive field with an intense background light; when this same flux of light is transferred to the part of the visual field where the grating moves, the effect *is* much reduced.

(3) Background light on the grating region reduces the periphery effect but has little influence on the response to a central flash; light on the centre has a converse effect.

(4) Intense light adaptation (3000 cd/m^2 though 7 mm^2 pupil for 60 sec) has persistent effects similar to a background light; it reduces the periphery effect when the grating region is bleached, not when the centre alone is bleached.

We conclude that the shift effect is an especially dramatic form of MacIlwain's periphery effect [2]. Excitation at any point on the retina can be conducted rapidly to far distant retinal ganglion cells, and when many points are synchronously stimulated these effects can vigorously excite the remote ganglion cells. Y-type ganglion cells typically show a large, brief effect of short latency; X-type show a weaker, more long-lasting effect.

- 1 Fischer, B., Krüger, J. and Droll, W., Quantitative aspects of the shift-effect in cat retinal ganglion cells, *Brain Res.*, 83 (1975) 391–403.
- 2 MacIlwain, J.T., Receptive fields of optic tract axons and lateral geniculate cells: peripheral latent and barbiturate sensitivity, *J. Neurophysiol.*, 27 (1964) 1154–1173.

Correlation between preference for familiar and acetylcholinesterase activity in the chick

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Previously it has been shown that the exposure of one-day-old chicks to an imprinting stimulus resulted in a localized increase of acetylcholinesterase (AChE) activity of 11% in the forebrain roof at 1 h post-exposure; followed by a more generalized whole brain increase at 6 h and a localized depression in midbrain after 12 h when compared to dark controls [3].

A new series of experiments scores the preference for the familiar as measured by a two-choice discrimination [1] test at the conclusion of 1 h exposure to the imprinting stimulus which was either a yellow flashing or red patterned light. Correlations between this behavioural measure and the activity of AChE in anterior and posterior forebrain roof, base and midbrain assayed by a modification of the method of Ellman et al. [2] at 1 h post-exposure will be discussed. The correlation method allows the possibility of improved resolution of localization, obviates the need for dark controls and makes it possible to determine the reliability of the imprinting measure in parallel with biochemical sequelae.

- 1 Bateson, P.P.G. and Wainwright, A.A.P., The effects of prior exposure to light on the imprinting process in domestic chicks, *Behaviour*, 42 (1972) 279–290.
- 2 Ellman, G.L., Courtney, K.D., Andres, V. and Featherstone, R.M., A new and rapid colorimetric determination of acetylcholinesterase activity, *Biochem. Pharmacol.*, 7 (1961) 88–95.
- 3 Haywood, J., Hambley, J. and Rose, S.P.R., Effects of exposure to an imprinting stimulus on the activity of enzymes involved in acetylcholine metabolism in chick brain, *Brain Res.*, 92 (1975) 219–225.