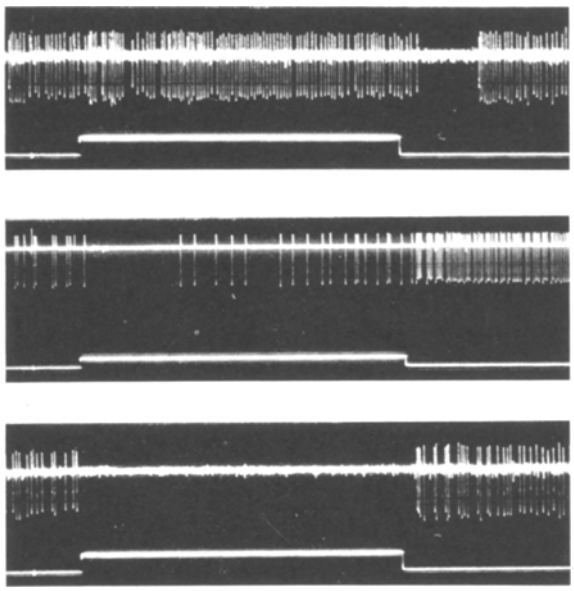
Strychnine-Resistant Inhibition in the Retina

Diffuse illumination of the retina produces transient changes in the maintained activity of retinal ganglion cells and/or fibres of the optic nerve. One type of response consists of a short burst of impulses followed by a silent period. In the other type, illumination produces primary inhibition, which subsides gradually. The responses to the cessation of illumination represent a kind of mirror image of the on-responses, i.e. the same reactions occur in reversed order. As shown by KUFFLER[1], these patterns of activity can be explained by the concentric organization of the receptive field: centre and surroundings act as antagonists. Since the centre responds with a shorter latency, it determines the primary reaction (excitation or inhibition). The latter part of the response is a result of the interaction between the centre and the surroundings. Therefore, it can be interpreted as a balance between post-synaptic excitatory and inhibitory processes[2].



Light responses of three single units in the cat's optic nerve after administration of 0.4 mg/kg strychnine. 1, on-centre unit (dark discharge 89/sec); 2, off-centre unit (dark discharge 46/sec); 3, off-centre unit (dark discharge 58/sec). Duration of light stimuli: 1 sec.

Studying the influence of strychnine on the maintained activity in the optic nerve fibres of the cat, it was necessary to classify the units by light stimulation. The impulses were picked up by microelectrodes from the chiasm[3]. Light stimuli of 3 to 800 nits intensity and 1 to 3 sec duration were used. The maintained activity was drastically changed by intravenous administration of 0.25 to 0.8 mg/kg strychnine hydrochloride, the intervals between the spikes becoming shorter and more regular. However, the typical impulse patterns of on-centre and off-centre units were not changed by strychnine. Surprisingly enough, inhibitory phases in on- and off-effects were preserved or even more marked than in normal preparations (Figure); this has been demonstrated with one exception in 69 units.

The preservation of inhibitory responses in the retina after administration of convulsive doses of strychnine cannot be taken as evidence against the post-synaptic nature of this inhibition. This is proved by the fact that in the brain strychnine-resistant post-synaptic inhibition has been found[4].

Zusammenfassung. Konvulsive Dosen von Strychnin (0,25–0,8 mg/kg) erhöhten die Impulsaktivität von Einzelfasern im N. opticus der Katze; die Hemmungsphasen in den on- und off-Antworten blieben jedoch bei 68 von 69 untersuchten Fasereinheiten erhalten. Die Ergebnisse beweisen die Existenz einer strychninresistenten Hemmung in der Retina.

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The Isolation and Amino Acid Sequences of New Pyroglutamylpeptides from Snake Venoms[1]

During the fractionation of the enzymes in the venom of *Agkistrodon halys blomhoffii* (Japanese name 'Mamushi')[2], a non-protein fraction was obtained. From this, two new tripeptides were isolated in pure form. They have tryptophan as a C-terminal, and pyroglutamic acid as an N-terminal amino acid, and they have been identified as follows[3].

$$\text{Pyr-Asp}(NH_2)\text{-Try}, \qquad \text{Pyr-Glu}(NH_2)\text{-Try}$$

Their amino acid sequences were confirmed by chemical synthesis[4].

Isolation procedure and determination of chemical structures of the peptides. A sample of 30.27 g of lyophilized venom of *A. halys blomhoffii* was applied to a DEAE-cellulose column (6.5 · 100 cm). Gradient elution was performed with 0.005 *M* to 0.1 *M* acetate buffer at pH 7.0, as described in the previous paper[2], and the absorbancy of the effluent fractions at 280 nm was measured. A fraction eluted as a third main peak contained low molecular weight peptides and the absorbancy of this fraction at 280 nm was about 10% of that of the unfractionated

[1] Supported in part by a grant from the Ministry of Education (Japan).
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[3] Pyr- = Pyroglutamyl.
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