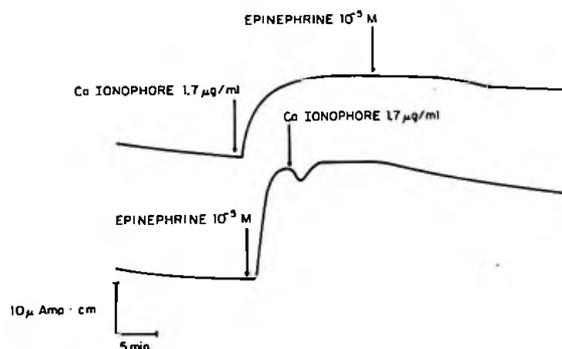


STIMULATION OF CHLORIDE TRANSPORT AND INTERACTION WITH EPINEPHRINE BY THE CALCIUM IONOPHORE A23187 ON THE FROG CORNEA

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The isolated cornea of frogs transports chloride ions into the tear side by a mechanism located in the epithelium, the outermost cellular layer of this transparent membrane of the eye. We have tested the action of calcium ionophore A23187 on the short circuit current produced by the isolated cornea of *Rana catesbeiana* placed as a membrane in modified Ussing lucite chambers. The effect of adding the ionophore to both sides of the preparation is shown in Figure 1. It consists of an increase in the short circuit current to a steady average value of 62% above the control levels, as indicated in Table 1.



The interaction of the calcium ionophore with the action of epinephrine was also tested, and is shown in Figure 1. After the rapid increase produced by epinephrine there is no further effect by the calcium ionophore; conversely, after addition and maximal effect of the ionophore, there is a reduced response to epinephrine. The average values for 15 experiments of this type can be seen in Table 1. The effect of epinephrine consisted of a stimulation of 64% above the control level, similar to the stimulation by the calcium ionophore. The effect of epinephrine in these experiments on the frog cornea was smaller than the one previously found and probably relates to seasonal variations in the transport characteristics of the corneal epithelium. However, the interaction between these two agents is evident from the present group of experiments. It was also observed that in chloride free solutions the calcium ionophore does not produce any increase in the short circuit current of the isolated cornea.

It is concluded that opening calcium channels reduces the effectiveness of epinephrine on the chloride transport and this is probably related to an interaction of calcium and epinephrine at the receptor site for the catecholamine.

TABLE 1: EFFECT OF CALCIUM IONOPHORE A 23187 ON THE SHORT CIRCUIT CURRENT OF FROG CORNEA AND ITS INTERACTION WITH EPINEPHRINE.

	S.C.C. $\mu\text{Amp} \cdot \text{cm}^{-2}$		
	n	MEAN	S INCREASE
Control	15	32.2 $\pm$ 4.0	-
After stimulation with Calcium Ionophore 1.7 $\mu\text{g/ml}$	15	47.4 $\pm$ 4.2	62*
After further stimulation with Epinephrine $10^{-5}\text{M}$	15	51.1 $\pm$ 4.1	12*
Control	15	41.3 $\pm$ 4.3	-
After stimulation with Epinephrine $10^{-5}\text{M}$	15	62.7 $\pm$ 5.8	66*
After further stimulation with Calcium Ionophore 1.7 $\mu\text{g/ml}$	15	62.4 $\pm$ 5.4	2*

\* Calculated from the average difference.