Letter to the Editor

THE EFFECT OF RESERPINE ON SMOOTH MUSCLE

Sir,

Reserpine's cholinergic manifestations when administered in intact animals are well known. On isolated smooth muscles the effect of reserpine is controversial.

Gillis and Lewis (3) demonstrated the nonspecific spasmolytic effect of reserpine on isolated guineapig ileum against a variety of spasmogens. In the same preparation a partial anticholinergic effect and direct relaxant property has been reported (4). Costa (2) observed a selective antiserotonin effect of reserpine on oestrus rat uterus without affecting the sensitivity of the tissue to either acetylcholine or oxytocin. Reserpine antagonises serotonin and acetylcholine induced contractions only on rat colon.

On the basis of these observations it is evident that reserpine produces a spasmolytic effect on smooth muscles and it was thought worthwhile to investigate the spasmolytic effect of reserpine against different spasmogens on a variety of smooth muscles and to ascertain the probable mechanism of action.

In the present study the investigations were carried out on (*a*) guineapig ileum, (*b*) rabbit ileum, (*c*) oestrus rat uterus and (*d*) rat colon. Tyrode's solution was used for (*a*), (*b*), (*d*) and Dejalon's ringer for (*c*). The temperature of the bath was maintained at 37°C for all experiments other than rat uterus which was carried out at 31°C. The maximum dose of reserpine in the bath was 10 *µcg/ml* for all experiments. Higher doses were not tried. The capacity of the bath was 10 *ml*.

TABLE I

Test Organ	*Spasmogens*						
	Ach.	*5-HT*	*Nico-tine*	*Oxyto-cin*	*Hista-mine*	*Carba-chol*	*BaCl2*
G.P. ileum (5)	4	2	*	..	*	..	*
Rabbit ileum (6)	2.5	2.5	1.5	..	..	..	*
Rat uterus (5)	..	2	..	*	..	*	..
Rat colon (4)	3	3	*	..	..	..	*

Numbers in the table denote *µcg/ml* of reserpine to produce complete inhibition of the spasmogens. Numbers in the brackets show the number of experiments.

.. Not used.

*Failure to produce 50% inhibition with the maximum dose.

In these experiments the recovery of 5-HT induced contractions could not be ensured after administration of reserpine in the bath in any one of the test organs. The recovery of all other spasmogens were complete after use of reserpine. The probability of tachyphylaxis was eliminated in all the experiments with repeated spasms by 5-HT before using reserpine. Thus it seems probable that reserpine causes a persistent blockade of 5-HT receptors and this blockade was irreversible whereas complete and quick recoveries were obtained with all other spasmogens.

Reserpine manifested spasmolytic effects on rabbit ileum against nicotine, acetylcholine and 5-HT (Table I). On G.P. ileum and rat colon the spasms induced by nicotine could not be inhibited by reserpine even with higher doses but acetylcholine and 5-HT induced response were antagonised (Table I). The mechanism of antinicotine action of reserpine specifically and at lowest concentration on rabbit ileum is obscure. Anticholinergic effects as reported by other workers (4,5) were observed but in our experiments 5-HT and nicotine induced spasms on rabbit ileum were antagonised at lower concentrations than acetylcholine. Reserpine induced a low degree of antagonism of all other spasmogens like oxytocin, histamine, carbachol and $BaCl_2$ and should be considered due to nonspecific effect or direct relaxant property of reserpine.

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REFERENCES

1. Berger, F.M. and G.L. Campbell. Effect of tranquillizers on the electrical activity of the brain. *Ann. N.Y. Acad. Science*, **66**:689, 1957.

2. Costa, E. Effects of hallucinogenic and tranquillizing agents on serotonin-evoked uterine contractions. *Proc. Soc. Expt. Biol. Med.* **91**:39, 1956.

3. Gillis, C.N. and J.J. Lewis. A note on pharmacology of reserpine. *J. Phar. Pharmac.* **15**:606, 1956.

4. Jean Castian. Influence of reserpine on effects of various agents which stimulate smooth muscle. *Compt. Rend. Soc. Biol.* **151**:1208, 1958.

5. Plummer, A.J., W.E. Barret, and R. Rutledge. Action of reserpine on the motility of the digestive tract. *Amer. J. Digest. Diseases*, **22**:337, 1956.