in pH within wide limits of concentration and exposure time. The drug acts on enzyme systems located in the periphery of the yeast cell and the action is catalytic rather than stoichiometric.

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Physiological Activity of Some Catechol Derivatives.

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Muhlmann,[1] and later Dakin[2] determined that catechol and certain of its derivatives that resemble epinephrine in their skeletal structure were capable of raising the blood pressure of the anesthetized rabbit. Barger and Dale[3] found that catechol raised the blood pressure of the decapitated cat, showing that this drug acts peripherally to the vasomotor center. They claimed also that catechol did not dilate the pupil of the intact animal, but did cause contraction of the isolated virgin cat uterus, and drew the conclusion that catechol raises the blood pressure by direct muscle stimulation, rather than by sympathetic imitation.

We have confirmed their results, on blood pressure and pupil, but have determined further that catechol depresses the uterus and intestine of many animals. On the basis of these findings, it occurred to us to test anew the suggestion of Dakin that epinephrine owes much of its typical sympathomimicity to the catechol group.

Our results show that catechol, ethylcatechol, acetocatechol, and chloracetocatechol possess sympathomimetic powers (Table I). In this, inhibitory effects predominate, so that when an organ contains but one type of sympathetic innervation, as in the dilator pupili, the nictitating membrane, or the intestine, that action is brought out by these drugs. On the other hand, when both motor and inhibitor fibers of the sympathetic are present in the same organ, as in the blood vessels and uterus, the inhibitory action predominates, although the action of catechol is not reversed after ergotoxine. In epinephrine, the motor effects are much more in evidence than the inhibitor, but other non-catechol containing amines

[1] Muhlmann, *Deutsch. Med. Wchnsch.*, 1896, **22**, 409.

[2] Dakin, *Roy. Soc. Proc. B.*, 1905, **76**, 498.

[3] Barger and Dale, *J. Physiol.*, 1910, **41**, 19.

TABLE I.

Animal and Organ	Chloracetylcatechol	Acetocatechol	Ethyl catechol	Catechol	Epinephrine	Ephedrine
Uterus						
Virgin Cat	—(16	—(5	—(3)	—(12)	—(10)	0(2)
						—(4)
Pregnant Cat	+(4)	—(3)	—(3)	—(3)		—(6)
	0(25)			0(6)	+(27)	
Rabbit	—(21)	—(3)	—(3)	—(8)	+(9)	—(3)
				0(2)		+(3) 0(3)
Virgin Guinea Pig	—(6)	—(3)	—(3)	—(2)	—(4)	
Small Intestine						
Cat	—(20)	—(4)	—(4)	—(11)	—(14)	—(7)
						0(8)
Rabbit	—(30)	—(5)	—(4)	—(13)	—(13)	—(7)
						+(4)
Monkey	—(46)			—(21)	—(15)	—(10)
						+(2) 0(9)
Blood Pressure (16 animals)						
Intact Cat	+(44)	+(6)	+(6)	+(13)	+(26)	+(4)
Pithed Cat	—(24)			+(5)	+(16)	+(3)
Pupil						
Cat, Rabbit	dil.	0	0	0	dil.	dil.
Excised Frog; Beef	dil.	0	0	0	dil.	dil.
Blood Sugar						
Rabbit	+(10)			+(6)	+(75)	+(6)

\+ means stimulation.
— means depression.
0 means no effect. A blank means not tried. The numbers refer to total injections on 20 cats; 12 rabbits; 71 strips of intestine; 44 strips of uterus.

such as ephedrine seem incapable of strong inhibitory activity, especially in the presence of motor fibers.

Chloracetylcatechol is the most powerfully sympathomimetic drug of our series. In it a chloride molecule has replaced the usual amino group ordinarily associated with sympathomimetic activity. Chloracetylcatechol raises the blood pressure by medullary stimulation, for there is no rise but a fall after decapitation. Catechol retains its vaso-pressor powers, even after decapitation and double adrenalectomy. Chloracetylcatechol alone, of these derivatives, causes pupilo dilation, even after pithing and double adrenalectomy. The blood sugar of unanesthetized rabbits is raised. It depresses the isolated intestine and virgin cat uterus, but has no effect on, or occasionally stimulates the pregnant cat uterus.

In view of these findings for 3,4-dihydroxy-phenylchlormethylketone (chloracetylcatechol), and those of Schaumann[4] for 3,4-dihydroxy-ephedrine; of Hartung,[5] etc., for 3,4-dihydroxy-phenyl-l-amino-2-propanol; of Tiffeneau[6] for 3,4-dihydroxy-benzylamine;

of Barger and Dale[8, 9] for epinephrine and for β-3,4-dihydroxy-phenyl-ethanolamine; of Pyman[7] for 3,4-dihydroxy-phenyl-ethylmethylamine; and of Alles[8] for β-3,4-dihydroxy-phenyl-isopropylamine and β-3,4-dihydroxy-phenyl-ethylamine, we agree with Dakin that the catechol nucleus is in great part responsible for the typical sympathomimicity of epinephrine. The 3,4-position of the phenyl-hydroxyls; a 2 carbon side chain; a beta carbon hydroxylated; an alpha carbon hydrogen substituted by some indifferent molecule, preferably an amine; and where all of these are present, the levorotatory isomer, are contributory factors in the formation of a typically sympathomimetic drug.

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A Poliomyelitis Antiserum.*

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A normal sheep was bled, and no neutralizing antibodies for poliomyelitis virus were found in the blood serum in 1:1 dilutions. The animal was then injected as follows: September 8, 12, 17, and 24, 1934, 10 cc. of a suspension of equal parts of 2% poliomyelitis virus and P.C.B. filtrate intradermally;[1] October 1st and 8th, 30 cc. of a suspension of equal parts of a 2% virus combined with P.C.B. filtrate subcutaneously; October 13th, 40 cc. of a suspension made up of equal parts of a 5% virus combined with P.C.B. filtrate subcutaneously; October 23rd, November 8th and 20th, and December 8th, 50 cc. of a suspension made up of equal parts of 5% virus combined with P.C.B. filtrate subcutaneously and intramuscularly. On September 13th, there was some local induration about the injection, and on September 15th, there was a small localized abscess.

4 Schaumann, *Arch. Exp. Path. u. Pharm.*, 1931, **160**, 127.

5 Hartung, Munch, Miller and Crossly, *J. Am. Chem. Soc.*, 1931, **53**, 4149.

6 Tiffeneau, *Ch. Richet Festschritt*, 1912, 399.

7 Pyman, F., *J. Chem. Soc.*, 1910, **97**, 266.

8 Alles, G., *J. Pharm. and Exp. Therap.*, 1933, **47**, 339.

9 Barger, Some Applications of Organic Chemistry to Biology and Medicine, 1930, 80.

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1 Toomey, John A., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 869.