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The elimination of certain dyes from the animal organism.

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The observations of Delprat and others¹ that an aqueous solution of rose bengal when injected intravenously into animals is rapidly eliminated through the bile, is not without theoretical significance as well as of practical value. Its behavior in this respect is wholly like that of the bile acids.² Rose bengal is not soluble in the ordinary fat solvents and its behavior in the body does not follow the assumption of Mendel and Daniels³ that substances which are eliminated from the body by way of the bile must be *insoluble in water* and soluble in bile or substances contained therein.

Rose bengal is a highly diffusible substance and it was not found possible to retain it within an ordinary collodion membrane. This property suggested that it might be possible by ligation of the bile duct to force the dye through the kidney. Numerous experiments* which were carried out on both dogs and rabbits showed that after ligation of the bile duct, rose bengal was found present in the blood stream for a period of 48 hours after the injection of the dye. The absence of color in the urines indicated that the dye did not pass through the kidney. Under similar conditions, congo red, a non-diffusible dye which in the normal animal appears in both bile and urine was eliminated in the urine.

That chemical makeup is not without influence upon the path of excretion of the dye from the body is shown by the experiments which are given in Table I. Both dogs and rabbits were

¹ Delprat, G. D., *Archiv. Int. Med.*, 1923, xxxii, 401. Delprat, G. D., Epstein, N. N., and Kerr, W. J., *Arch. Int. Med.*, 1924, xxxiv, 533. Kerr, W. J., Delprat, G. D., Epstein, N. N., and Dunievitz, M., *J. Am. Med. Assn.*, 1925, lxxxv, 942.

² Stadelmann, E., *Z. Biol.*, 1896, xxxiv, 1. Foster, M. G., Hooper, C. W., and Whipple, G. H., *J. Biol. Chem.*, 1919, xxxviii, 379.

³ Mendel, L. B., and Daniels, A. L., *J. Biol. Chem.*, 1912-13, xiii, 71.

* Certain of these experiments were carried out by Mr. J. A. Merrill.

TABLE I.
Mode of Elimination of Certain Dyes.

Dye	No. animals used		Mode of Excretion	
	Dogs	Rabbits	Bile	Urine
Rose Bengal.				
Tetra-iodo-di-chlor-fluoresceïn	2	3	+	
Tetra-iodo-tri-chlor-fluoresceïn	1	3	+	
Tetra-iodo-tetra-chlor-fluoresceïn	1	2	+	
Phloxin B. B. N.				
Tetra-brom-di-chlor-fluoresceïn	1	2	+	
Phloxin B.				
Tetra-brom-tri-chlor-fluoresceïn		2	+	
Phloxin R. B. N.				
Tetra-brom-tetra-chlor-fluoresceïn ..		2	+	
Erythrosine				
Tetra-iodo-fluoresceïn		2	+	+
Di-iodo-fluoresceïn		1	+	+
Eosin				
Tetra-brom-fluoresceïn		2	+	+
Fluoresceïn				
Tri-chlor-		1	Cannot determine accurately	
Tetra-chlor-		1	Cannot determine accurately	
Hexa-chlor-		1	Cannot determine accurately	

used in the experiments. For the purpose of studying the excretion of the dyes a temporary biliary fistula was made. Injection was made into the venous circulation and urine samples were drawn through a catheter at definite intervals of time.

The experiments indicate that the number of halogens which are present in the dye influence the path whereby the dye leaves the body. Thus, in this series of fluoresceïn dyes it is noted that the dyes which contain six or more halogens, namely the rose bengal series and the phloxin series, are eliminated in the bile, while the dyes which contain not more than four halogens are eliminated both in the bile and in the urine.