electrical activity of the cerebral cortex reflects the activity of neuronal systems which, in part at least, are independent of those neuronal systems that subserve behavior in general. The present studies cast no light on what the functions of such hypothesized independent neuronal systems might be, but other data indicate that they may be related to cerebral (not necessarily organismal) homeostasis(11).

Summary. 1. In unanesthetized, uncurarized dogs certain dose of morphine, N-allylnormorphine or atropine produce similar changes in the EEG, which are identical with, or resemble closely, the "burst-slow wave" patterns which occur in natural sleep or during pentobarbital anesthesia. 2. The synchronizing mechanisms which regulate the electroencephalogram are distinct from those which regulate the state of consciousness, although frequently, they are functionally interlocked. 3. The significance of these findings is discussed with reference to the possible functions of the spontaneous electrical activity of the cerebral cortex.

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Received January 14, 1952. P.S.E.B.M., 1952, v79.

Chemically Induced Degeneration of Chick Mesonephros.* (19346)

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Considerable attention has been given to the study of the effect of chemical agents on the development of chick embryos. Various workers have treated chick embryos with substances such as insulin(1-4), nicotinic acid (5), lead(6-9), and sucrose(10) and observed a variety of abnormal morphological types.

During recent experiments on the toxicity of various chemicals on chick embryos, it was observed that injection of tantalum hydroxide induced hemorrhage in the capillaries of the chorioallantois membranes and in the kidney (11). The kidney was enlarged and congested with blood and lymph. This observation prompted a histological study of kidneys of chick embryos of various ages and of day-old chicks following injection of various substances.

Materials and methods. The eggs for this investigation were from Rhode Island Red hens at the Agricultural Research Center, Beltsville, Md. The eggs were placed in forced-draft incubators on the day laid and incubated from 10 to 18 days before injection. The following substances were injected: DL-alanine, anthranilic acid, 3-hydroxyanthranilic acid, and salts of tantalum, thorium, and lanthanum (Table I). Distilled water was injected into the eggs employed as controls. The procedure was to inject distilled water or chemical in aqueous solution, not exceeding 0.5 ml in volume, into the allantoic cavity. The opening was then sealed with melted paraffin. Approximately 30 eggs were injected with various chemicals or distilled water at

* This project was supported in part by the U. S. Atomic Energy Commission.

TABLE I. Effect of Injections of Various Chemicals on Chick Mesonephros.

Inj. material	Quantity inj.	Day of incubation — Inj.	Day of incubation — Examined	Appearance of organ — Macroscopic	Appearance of organ — Microscopic
Distilled water	.5 ml	10	12	Normal	Normal
	.5	15	18	"	"
	.5	18	1 day chick	"	"
	.5	1 day chick	6 hr later*	"	"
Tantalum hydroxide	25 mg	10	12	Hypertrophic and hemorrhagic degenerate	
	25	15	18	" " "	"
	25	18	1 day chick	Normal	—
	25	1 day chick	6 hr later*	"	Normal
Lanthanum chloride	20 mg	10	12	Hypertrophic and hemorrhagic degenerate	
	20	15	18	" " "	"
	20	18	1 day chick	Normal	—
	20	1 day chick	6 hr later*	"	Normal
Thorium chloride	50 mg	10	12	Hypertrophic and hemorrhagic degenerate	
	50	15	18	" " "	"
	50	18	1 day chick	Normal	—
	50	1 day chick	6 hr later*	"	Normal
DL-alanine	50 mg	10	12	Hypertrophic and hemorrhagic degenerate	
	50	15	18	" " "	"
	50	18	1 day chick	Normal	—
	50	1 day chick	6 hr later*	"	Normal
Anthranilic acid	20 mg	10	12	Hypertrophic and hemorrhagic degenerate	
	20	15	18	" " "	"
	20	18	1 day chick	Normal	—
	20	1 day chick	6 hr later*	"	Normal
3-hydroxy-anthranilic acid	6 mg	10	12	Hypertrophic and hemorrhagic degenerate	
	6	15	18	" " "	"
	6	18	1 day chick	Normal	—
	6	1 day chick	6 hr later*	"	Normal

* Examined every half day until 7 days of age, then at 14 days of age.

each stage of development. They were broken and the embryonic kidneys removed, fixed in Bouin's, sectioned, and stained with Delafield's hematoxylin and eosin. Microscopic examination was then made to determine the extent of damage.

Results. The results, summarized in Table I as well as illustrated by microphotographs in Plate 1, reveal extensive kidney damage in the younger embryos following injection of the various chemicals. Histological examination of eggs injected on the 10th and 15th days of incubation revealed severe damage to the mesonephros (Fig. 1).† The damage was characterized by massive hemorrhages and marked edema throughout the intertubular tissue. Blood cells and edema fluid replaced large areas of the parenchymal tissue. Many of the tubules and glomeruli disintegrated or disappeared entirely, while in others edema fluid was noted between the intact membrane and the lining cells. In some of the tubules the cells were in a jumbled mass with an intact basement membrane. The primary pathological alternations were degeneration and alteration of many of the tubules and glomeruli as a result of the pressure exerted by edema fluid and the extravasated blood cells.

Chicks hatched from the eggs injected on the 18th day of incubation showed no evidence of kidney damage. The same was true of chicks injected 1 day after hatching and examined 24 hours, 7 days, and 14 days later (Fig. 3). No damage was visible at any time in kidneys from embryos and chicks injected with distilled water (Fig. 2 and 4).

Since kidney damage occurred in embryos from eggs injected on the 10th and 15th days of incubation and no damage occurred in embryos from eggs injected on the 18th day of incubation, and as day-old chicks, it is evident that the damage must be associated with the development of the embryonic kid-

† Acknowledgment is made to Dr. William T. Shalkop for his assistance in evaluating the damage to the mesonephros.

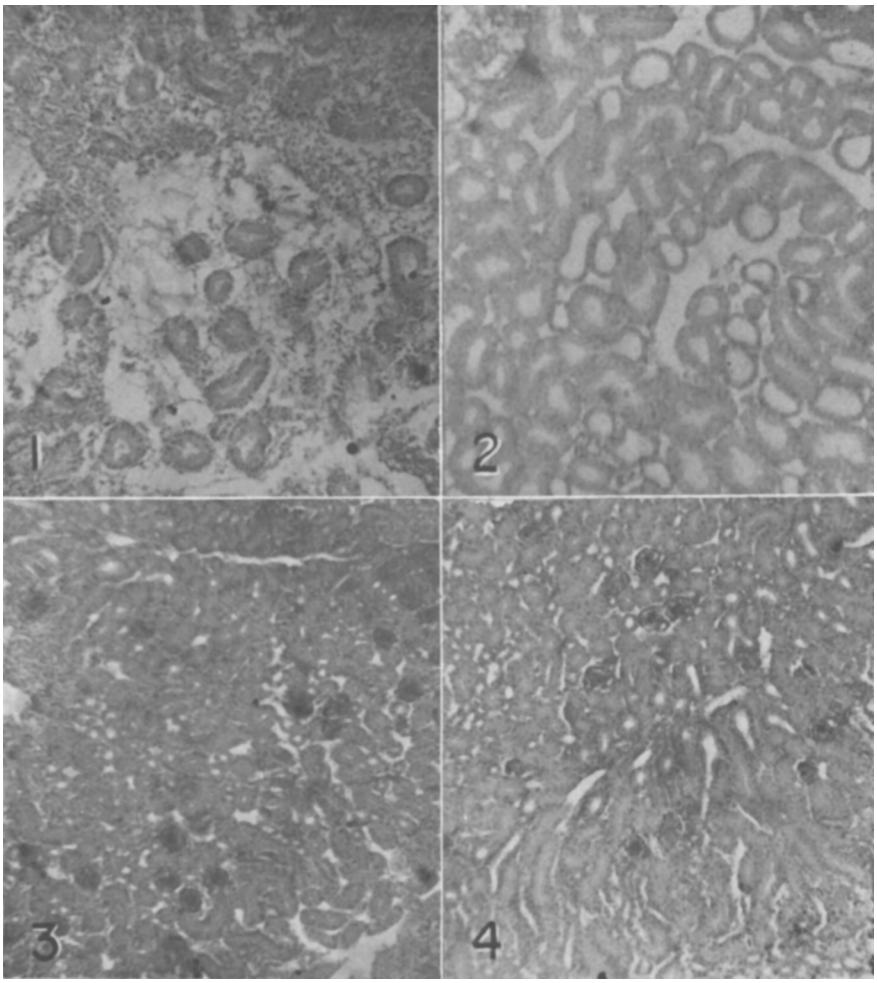

FIG. 1. Median cross section of mesonephros from 10-day embryo injected with tantalum hydroxide and examined 24 hours later. Note evidence of hemorrhage and edema as well as degenerative changes. × 150.

FIG. 2. Median cross section of mesonephros from 10-day embryo injected with distilled water as injected control. Tissue appeared normal. × 150.

FIG. 3. Median cross section of metanephros from day-old chick injected with tantalum hydroxide and examined 24 hours later. Tissue undamaged. × 150.

FIG. 4. Median cross section of metanephros of day-old chick injected with distilled water as injected control. Tissue appeared normal. × 150.

ney. Patten(12) and Lillie(13) state that after the 11th day the developing metanephros begins to become active and the mesonephros degenerates. In this investigation it was noted that in some cases histologically normal mesonephros was present with histologically normal metanephros in the same embryo from eggs that had been incubated as long as 17 days. Needham(14) reports that by the 20th day the mesonephros has atrophied until it is small, thin, and pale. From the evidence presented it appears that the chemical agents injected damaged mesonephric tissue but not metanephric tissue.

Summary. In an experiment on the toxicity of various chemicals on developing chick embryos it was demonstrated that the kidneys of 10- and 15-day embryos were severely damaged by injections of various chemicals. The kidneys of older embryos, those of day-old chicks, and those of control embryos of various ages treated with distilled water gave no evi-

dence of kidney degeneration. From the experiment it appears that the chemical substances injected had a toxic effect on the mesonephros but not on the metanephros.

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Received November 8, 1951. P.S.E.B.M., 1952, v79.

Effect of Ploidy in Photoreactivation.* (19347)

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This article will present and discuss some preliminary results of measurements of the relations between ultraviolet dose and survival of haploid and diploid strains of a common species of yeast, both in the dark, and with subsequent irradiation by visible light following initial ultraviolet irradiation. While much work on the effect of ultraviolet light on survival of microorganisms has been published (1), only very limited quantitative studies have been made on the yeast cell in particular; one of the purposes of this work is to emphasize the advantages of the yeast as a test organism in the study of radiation damage. That is, there are available strains differing only in ploidy,‡ making studies on genetic effects relatively easy. The cells are large (5 μ diameter for diploid), easily grown, and give rise to several mutant strains, which are often colored. The present work gives survival curves of the diploid and haploid strains of *Saccharomyces cerevisiae* (SC6 and 7 respectively) both with and without subsequent photoreactivation, with a view to testing the Novick and Szilard theory of the reactivation phenomenon(2).

Procedure. For the initial radiation, 10 ml suspensions of yeast cells in sterile distilled water contained in 50 ml short beakers, of concentrations convenient for plating, were placed on a Gump shaker about 50 cm below the center of a G.E. Sterilamp; after doses up to 220 sec. exposure, aliquots were taken and spread on the surfaces of the growth medium (Difco potato-dextrose agar) in petri dishes. The remainder of the irradiated batch was then used for photoreactivation. The visible light source consisted of four photoflood lamps, arranged such that the light intensity, as measured with a photometer, was uniform over a large area of a transparent plastic shelf supported about 20 cm above the lamps; a glass tray containing 0.05 M $CuSO_4$, interposed between the yeast suspensions and the lamps, effectively kept the temperature rise at the position of the yeast less than 3°C/hr. The concentration of the suspensions varied from 3×10^3 to 5×10^5 cells/ml; within these limits the survival for a given dose did not, as shown by auxiliary experiments, depend on

* This research was partially supported by U. S. Atomic Energy Commission and carried out in the laboratory of Professor R. E. Zirkle.

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‡ Genetic structure of yeast is described at length in C. C. Lindegren, Genetics and Cytology of the Yeast Cell (Carbondale, 1950).