

dog's gall bladder bile, normal or ox bile fed dogs, is high indicating with a certainty of approximately 45% greater than sheer chance that concentrated biles will possess a greater hydrogen-ion concentration than those which are more diluted.

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Effect of Metrazol Convulsions on Brain Metabolism.*

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The wide use of metrazol in the treatment of schizophrenia has made it advisable to study the physiological changes produced by metrazol convulsions.¹ Twelve observations were made on 7 patients with schizophrenia. As seen in Table I, 7 samples of blood were collected from the femoral artery during various stages of the convulsions, 4 pairs of samples were collected simultaneously by 2 observers from the femoral artery and internal jugular vein immediately after the seizure had ceased, as was one additional sample of arterial blood. Breathing was greatly diminished during the convulsions and this was reflected in the analyses of the arterial blood, which disclosed a retention of CO₂ as well as a diminished O₂ content. Even during the first part of the seizure, as seen in Wi, 9/13, the O₂ content was diminished so that the Hb saturation $\left(\frac{\text{O}_2 \text{ content}}{\text{O}_2 \text{ capacity}}\right)$ was reduced from a theoretical normal of 95% to 84%. As the convulsions progress, the Hb saturation continues to fall so that towards the end of the seizure the saturation of Hb may be below 50% (M., 9/7). During these convulsions the patient's face is at first a dark red color. When the convulsion is completed, the anoxemia is evidenced by a leaden cyanosis. Nevertheless, as soon as unimpeded breathing is reestablished the Hb saturation, though still reduced, is found rapidly rising towards a normal value (last 5 observations of Table I). The anoxemia, as well as the severe

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¹ von Meduna, L., *Z. f. d. ges. Neur. u. Psychiat.*, 1935, **152**, 235.

TABLE I.

Patient	Date	Oxygen Content vol. %		CO ₂ Content vol. %		Glucose Content mg. %		Lactic Acid mg. %		Oxygen Capacity vol. %	Hb %	Blood drawn in regard to duration of seizure
		Arterial	Venous	Arterial	Venous	Arterial	Venous	Arterial	Venous			
Wi	9/13	18.97		50.31		138				22.62	84	First half
M	9/7	8.70		63.02		102		34		20.64	42	Late
Wi	9/8	16.45		44.94		129		74		23.11	71	"
R	9/9	14.05		56.33						22.74	62	"
M	9/11	11.17		58.37		136				22.99	49	"
Wa	9/11	15.35		53.78		124				22.71	68	"
R	9/13	11.43		59.43						22.74	50	"
N	9/3	21.37	18.36	54.23	40.91	118	103	107	105			After
Wi	9/4	17.60	9.98	38.25	47.56	104	94	126	117	22.16	78	"
M	9/4	15.93	9.94	52.30	57.19	104	92	82	70	20.58	77	"
F	9/4	16.28	12.80	42.45	45.19	127	110	88	89	21.99	74	"
Wa	9/8	20.43		36.06		106				22.71	90	"

muscular effort, combine to increase blood lactic acid and blood sugar.

These convulsions, grand mal in character, cause a temporary but marked depression of cerebral functions as evidenced by amnesia, confusion, disorientation, and the elicitation of various abnormal reflexes, such as the Babinski and ankle clonus. This change in function may be attributed to the anoxemia.

The insulin therapy for schizophrenia also involves depression of cerebral functions. It is, therefore, interesting to compare the physiological mechanism of these two forms of treatment. Insulin hypoglycemia depresses cerebral metabolism by diminishing the food supply of the brain (blood sugar),² while metrazol achieves the same effect by decreasing the oxygen available for the combustion of this foodstuff. Thus, insulin therapy affects the brain specially, for that organ utilizes carbohydrate chiefly, while metrazol has a generalized effect on all the organs of the body, including the brain. The effect of insulin on the brain is more prolonged, while that of metrazol is more severe. However, in both cases, the depression of cerebral metabolism seems to favor the amelioration of schizophrenia.

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Chronic Adrenal Insufficiency and Pancreas Diabetes.*

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Grollman and Firor¹ have demonstrated that chronic adrenal insufficiency, induced by various methods, is primarily a disturbance of pituitary origin. The syndrome which follows, cessation of growth, failure of reproductive activity and subnormal body temperature is, according to the above workers, relieved by administration of pituitary extracts and not by cortin. Long² has shown that acute adrenal insufficiency caused by the removal of the adrenal gland, though accompanied by injections of cortin, ameliorates ex-

² Himwich, H. E., Bowman, K. M., Wortis, J., and Fazekas, J. F., *Science*, 1937, **86**, 271.

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¹ Grollman, A., and Firor, W. M., *Am. J. Physiol.*, 1935, **112**, 310.

² Long, C. N. H., *Am. J. Med. Sci.*, 1937, **191**, 741.