depresses the blood sugar below the fasting level represents an overdose which entails high degrees of hyperglycemia, *i. e.*, a further diminution of carbohydrate tolerance. In the case of the non-diabetic subject, whose pancreas supplies adequate amounts of insulin, any added quantity of extraneous insulin represents an excess and leads to deterioration of the carbohydrate tolerance just as overdosage does in the diabetic.

9663

Blood and Spinal Fluid Magnesium and Calcium Levels in Epilepsy and Convulsive States.*

DAVID M. GREENBERG AND ROBERT B. AIRD. (With the assistance of Muriel Boelter.)

From the Division of Biochemistry and the Department of Surgery, University of California Medical School.

Certain of the constituents of blood and spinal fluid in cases of epilepsy have been subjected to analysis by a number of investigators in order to test the hypothesis that the incidence of convulsions in this condition is associated with a disturbance of the ion balance of the body. No significant variation from normal has been found in the calcium content of the blood and spinal fluid in epileptics.[1-4]

Some time ago Hirschfelder and Haury[5] reported that they observed low magnesium and high potassium levels in the blood plasma in a high percentage of epileptic subjects during convulsive attacks.

To our knowledge virtually no information is available on the magnesium content of the spinal fluid and red blood corpuscles in epilepsy.

Since the blood and spinal fluid of epileptic subjects were available to the authors, a series of analyses was undertaken on the composition of the blood and spinal fluid of subjects afflicted with epilepsy

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1 Hamilton, B., *J. Biol. Chem.*, 1925, **65**, 101.

2 Osnato, M., Killian, J. H., Garcia, T., and Mattice, M. R., *Brain*, 1927, **50**, 581.

3 Katzenelbogen, S., *J. Nerv. and Ment. Dis.*, 1931, **74**, 636.

4 Scott, M., and Pigott, A. W., *Arch. Neurol. and Psych.*, 1936, **36**, 596.

5 Hirschfelder, A. D., and Haury, V. G., PROC. SOC. EXP. BIOL. AND MED., 1935, **33**, 40.

and convulsive conditions. The cerebrospinal fluid was collected in the course of encephalography.

Determinations were made of the levels of plasma, red corpuscle and spinal fluid magnesium, serum and spinal fluid calcium, and spinal fluid inorganic phosphorus. Magnesium was determined by the method of Greenberg and Mackey,[6] calcium by a modification of Kirk and Schmidt's procedure,[7] and inorganic phosphorus according to Fiske and Subbarow's method.[8]

TABLE I.
Calcium, Magnesium, and Inorganic Phosphorus Levels in the Blood and Cerebrospinal Fluid in Epilepsy and Convulsive States.

Element	No. of Subjects	Extreme Variation mg. per 100 ml.	Arithmetical Mean mg. per 100 ml.	Stand. Dev. mg. per 100 ml.	Coeff. of Variation %
Plasma Mg	22	1.55-4.0	2.67	0.45	17
Red Corpuscle Mg	27	5.15-15.5	7.72	2.9	38
Serum Ca	20	8.15-13.4	10.35	1.3	12.5
Spinal Fluid Ca	24	4.75-6.25	5.30	0.4	7.5
Spinal Fluid Mg	17	1.0-3.95	2.93	1.15	39
Spinal Fluid Inorganic P	19	1.35-2.10	1.57	0.7	45

A statistical evaluation of the results is given in Table I. The convulsive states of the 28 subjects investigated may be classified on an etiological basis as follows:

	Cases
Idiopathic	14
Post-traumatic	8
Cortical scar or adhesion (not post-traumatic)	2
" atrophy (degenerative)	4

A comparison of the values of the arithmetical means with those for normal subjects taken from the compilation of Schmidt and Greenberg[9] is given in Table II. The data show that the levels of

TABLE II.
Comparison of Chemical Composition of Blood and Spinal Fluid in Normal and Epileptic Subjects.

	Plasma Mg	Red Corpuscle Mg	Serum Ca
Normal	2.74±0.3	6.6 ±0.5	10.3 ±0.5
Epilepsy	2.67±0.45	7.72±2.9	10.35±1.3
	Spinal Fluid Ca	Spinal Fluid Mg	Spinal Fluid P
Normal	5.3±0.6	3.3 ±0.2	1.7 ±0.4
Epilepsy	5.3±0.4	2.93±1.15	1.57±0.7

[6] Greenberg, D. M., and Mackey, M. A., *J. Biol. Chem.*, 1932, **96**, 419.

[7] Kirk, P. L., and Schmidt, C. L. A., *J. Biol. Chem.*, 1928, **76**, 115.

[8] Fiske, C. H., and Subbarow, Y., *J. Biol. Chem.*, 1925, **66**, 375.

[9] Schmidt, C. L. A., and Greenberg, D. M., *Physiol. Rev.*, 1935, **15**, 297.

the components analyzed are essentially normal with a tendency toward a greater degree of variation than is normally found in red corpuscle magnesium, serum calcium, and spinal fluid magnesium. Such variations from the normal arithmetical means as were found do not appear to be significant. The few instances of abnormally low or abnormally high analytical values that were observed did not fall into any special category of the cases.

If the epilepsy is associated with a disturbance of ion balance, it does not appear to involve magnesium, calcium, or phosphorus.

9664 P

Effect of Rapidly Repeated Pregnancies on Transplantable Mammary Rat Adenofibromas.*

LUDWIG A. EMGE AND KATHLEEN M. MURPHY.

From the Department of Obstetrics and Gynecology, Stanford University School of Medicine.

Assuming that rapidly repeated pregnancies stimulate breast tissue to unusual activity and assuming that unusually long storage of milk in such tissue might be detrimental, 20 mature white rats, including 5 males, were simultaneously implanted with a fast-growing rat mammary adenofibroma, 5-B 1. Eleven were bred from 2 to 4 times in close sequence, all producing litters of good size which were immediately destroyed. All tumors were removed at the end of 96 days of growth.

Wide variations were observed in the daily weight gain of tumors in all groups, and no conclusions in regard to weight gain are permissible because of this.

A detailed cytologic study of all tumors showed that the adenomatous tissue underwent hyperplastic changes well within the limit of the ordinary mammary response to pregnancy. Retention of secretion was observed grossly and microscopically in all tumors removed within one week after the last pregnancy. In no tumor was there seen any tendency toward malignant degeneration. In the control groups the tumors of male animals showed a very marked loss of adenomatous components. Those from female controls showed no variations from the donor tumor.

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