Summary and Conclusions. *Cl. welchii* was grown in a medium free from peptone or other substances of large molecular weight. Toxins were consistently produced which were equal to or more potent than those produced in glucose peptone beef infusion broth. The pH of the culture media did not fall below 6.0. This may in part be responsible for the higher potency of toxin obtained in this medium. The basal medium alone did not support growth; when it was supplemented with pantothenic acid, pimelic acid, nicotinic acid, riboflavin, or liver-extract, there was a marked increase of growth and toxin-production.

The fact that the highest bacterial-nitrogen value was obtained in glucose-peptone beef-infusion broth, appears to indicate that the casein hydrolysate still lacks one or more chemical ingredients required for maximal growth.

The work is being continued in an effort to identify a chemically defined medium for maximal growth and consistent toxin production by *Cl. welchii.*

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Retention of Radiophosphorus in Whole and Aliquot Portions of Tissues of Patient Dead of Leukemia.

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This note presents the radioactive phosphorus (P^{32}) and the non-radioactive phosphorus (P^{31}) content of tissues obtained from a patient dead of chronic lymphoid leukemia, who had received orally 19 days before death a single administration of a sodium phosphate solution, containing radio-phosphorus, which emitted 20 millicuries of beta radiation on the day of administration.[1]

Materials and Methods. The radio-phosphorus was produced by the Berkeley cyclotron.[2] The patient was a 65-year-old carpenter

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1 Lawrence, J. H., Scott, K. G., and Tuttle, L. W., *New International Clinics,* 1939, **3**, 33.

2 Lawrence, E. O., and Cooksey, D., *Phys. Rev.*, 1936, **50**, 1131.

TABLE I.

		Total wet wt. in g.	Whole organs μc/g. wet wt.	Mg of P^{31} per g. wet wt.	μc/mg P^{31}	Aliquot samples of whole organs μc/g. wet wt.
		(1)	(2)	(3)	(4)	(5)
1.	*Aorta*	122.0	.03	1.25	0.18	.02
	Bladder					
2.	Gall bladder	14.2	.02	0.39	.05	.03
3.	Urinary bladder	86.5	.02	0.38	.04	.02
	Bone					
4.	Calverium	55.5	.02	87.1	.0002	.01
5.	Femur diaphysis	192.5	.04	92.8	.0004	.01
6.	Femur epiphysis	441.9	.04	44.4	.0007	.02
7.	Ribs (12)	142.0	.09	46.1	.0016	.16
8.	Tibial diaphysis	123.9	.03	89.5	.0003	.02
9.	Sternum	11.0	.08	19.9	.0033	.12
10.	Vertebral bodies (thoracic and lumbar)	84.3	.09	20.8	.0038	.08
	Brain					
11.	Cerebellum	175.0	.03	2.72	.0093	.03
12.	Cerebrum	1192.0	.03	1.97	.013	.02
13.	*Colon*	393.0	.03	1.46	.016	.03
14.	*Cord,* Spinal	18.6	.03	2.18	.01	.03
15.	*Duodenum*	120.5	.05	1.46	.028	.04
16.	*Fat,* mesenteric	61.0	.02	0.30	.041	.01
17.	*Eyes*	17.0	.02	0.51	.031	
18.	*Ileum*	211.0	.03	0.81	.032	.03
19.	*Jejunum*	311.0	.03	1.24	.022	.04
20.	*Kidney*	278.5	.06	1.22	.045	.05
21.	*Liver*	1830.0	.09	1.57	.047	.07
22.	*Lung*	1305.5	.04	1.20	.03	.04
	Lymph nodes					
23.	Bronchial	15.8	.08	1.64	.039	.06
24.	Peripheral	34.5	.07	3.08	.019	.06
	Marrow					
25.	Tibia, diaphyseal marrow	20.5	.03	11.48	.0025	.07
26.	Femur, epiphyseal "	63.6	.04	26.6	.0012	.03
27.	Femur, diaphyseal "	37.9	.03	11.29	.0026	.03
	Muscle					
28.	Diaphragm	159.0	.03	1.25	.021	.03
29.	Heart	403.0	.04	1.16	.029	.05
30.	Rectus femoris	300.5	.05	1.77	.022	.04
31.	Tongue	74.0	.06	1.35	.036	.05
32.	*Pancreas*	113.5	.02	1.22	.015	.03
33.	*Prostate*	16.3	.04	3.21	.011	.04
34.	*Skin*	228.0	.01	0.82	.016	.01
35.	*Spleen*	910.0	.07	1.60	.035	.04
36.	*Stomach*	193.0	.04	1.08	.032	.04
37.	*Testes*	16.8	.06	1.67	.031	.05
38.	*Thyroid*	10.3	.04	1.83	.017	.04

who on August 16, 1940, complained of fatigue and headaches of 2 weeks' duration, and who on physical examination had an enlarged spleen and enlarged inguinal glands. The blood findings were: Hemoglobin, 37%; r.b.c., 2,000,000; w.b.c., 125,600. 99% of the latter were small leukemic lymphocytes. On October 20, 1940, the

patient took orally 120 cc of a solution containing 3.6 g of sodium phosphate and emitting 20 millicuries of beta radiation. Between 10/28/40 and 11/7/40 the patient received 2350 cc of blood without marked alterations in the blood findings. The patient died 11/8/40. Fortunately it was possible to obtain at postmortem all of the organs and one entire lower extremity. Typical gross pathological findings of leukemia were observed. Thirty-eight organs and tissues were weighed as were small aliquots (5 g approx.) of each. Then the whole organs and tissues and their aliquots were placed in separate crucibles and all ashed at 400°C. The ashes (all of which weighed less than 200 mg each) of the aliquots were immediately measured for radioactivity by use of an electrometer. The ashes of the whole organs and tissues were thoroughly mixed and 100 mg aliquots were assayed for radioactivity. Quantitative phosphorus analyses were made by the method of Pregl.[3]

Results. The microcuries per gram wet weight of the whole organs and tissues (Column 2) and their respective aliquots (Column 5) and the total number of milligrams of P^{31} per gram wet weight (Column 3) of the samples are listed in Table I. In 13 (Nos. 2, 3, 8, 13, 14, 15, 16, 18, 28, 32, 34, 36, and 38) the concentrations of P^{32} were quite similar in the ash of the aliquot and in the ash of the respective whole organ. In 7 (Nos. 4, 5, 7, 9, 19, 25, and 29) the concentration of P^{32} was greater in the ash of the aliquot while the opposite was true in the remaining 17 samples. Aliquot samples of the eyes were not taken. In Column 4 is listed the "specific radioactivity," or the microcuries per mg of P^{31} of each tissue.

Discussion. The variations of the P^{32} content of the ash of the whole organs and their respective aliquots is probably due to the fact that small aliquots of organs cannot be representative samples as most organs are not uniform throughout in structure or function.

[3] Pregl, F., and Roth, H., *Quantitative Organische Analyse*, Julius Springer, Berlin, 1935.