the LLD and TJ factor activities in these materials suggests that they may be involved in chicken nutrition.

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Activity of Vitamin B_{12} in Addisonian Pernicious Anemia

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Crystalline vitamin B_{12} has shown positive hematological activity in three cases of addisonian pernicious anemia.

Collaborative clinical studies were begun in 1942 with chemical investigators in the Merck Research Laboratories on the further purification of liver concentrates which are effective in the treatment of pernicious anemia. Recently, a correlation was found between clinical activity and the activity of concentrates for the growth of *Lactobacillus lactis* Dorner. Shorb (*3*) has reported a relationship of the unit potency of liver extracts used in the treatment of pernicious anemia to a factor (LLD) required by *L. lactis.* These researches led to the isolation from liver of a crystalline compound designated vitamin B_{12} (*2*), which is very potent for the growth of *L. lactis* (*2, 4*). Vitamin B_{12} has produced a positive hematological response in three patients following single intramuscular injections of 3, 6, and 150 μg, respectively.

Four patients receiving single injections of impure amorphous concentrates containing 20,000–40,000 LLD units gave strong or maximal hematological responses, while three receiving 10,000 LLD units or less gave weak or negative responses.

Results from the last case receiving amorphous material and the three receiving crystalline vitamin B_{12} are summarized in Tables 1 and 2. One mg of crystalline vitamin B_{12} is equivalent to about 11×10^6 LLD units; 1 μg, to about 11,000 units.

TABLE 1

Amorphous Liver Concentrates

Case	*P.H. 88–58–92*						
Day	0	6	14	23	29	42	119
RBC × 10^6	1.7	...	2.4	2.6	2.8	3.3	4.5
Hgb (gm)	6.8	...	7.8	9.5	9.8	11.0	14.0
Reticulocytes (%)	2.4	20.0	1.5	1.0	13.6	1.1	...
LLD units	2×10^4			1.8×10^6			

Case 88–58–92 went home on the 45th day and has received no treatment aside from that recorded. Case 9178–48 had eaten some liver before entering the hospital and had a reticulocyte count of 8% a week before day 0, by which time the count had fallen to 2.8%.

It is evident that there has been a rise in reticulocytes, red cell count, and hemoglobin, but it is still too early to say whether the blood picture will return to normal without further treatment in the last three cases. The rise in white count in case 9007 is striking; the platelets have risen from 120,000 to 340,000 in case 9178–48.

TABLE 2

Crystalline Vitamin B_{12}

Case	*Kings County 9007*				*Bellevue 8900–48*			*Bellevue 9178–48*			
Day	0	5	14	23	0	5	14	0	5	9	15
RBC × 10^6	1.5	...	2.6	3.4	1.5	...	2.6	1.4	...	...	2.6
Hgb (gm)	4.5	...	7.0	9.0	7.8	...	10.0	6.8	...	...	9.8
Reticulocytes (%)	0.5	27.0	2.0	0.5	2.8	26.0	3.1	2.8	10.2	4.0	2.6
Hct (%)	14.0	...	25.0	29.0	17.0	...	31	17	...	...	31
WBC × 10^3	9.0	25.0	9.0	...	2.3	...	5.8	4.2	...	...	8.1
Vitamin B_{12} (μg)	150	...	...	...	6	...	...	3	...	50	...
LLD units	1.6×10^6				6.6×10^4			3.3×10^4		5.5×10^5	

It is of interest that Preparation #31 of Dakin, Ungley, and West (*1*), which was clinically positive in 1936, has been shown by the microbiological assay to contain about 30,000 LLD units (3 μg B_{12})/25 mg, the dose used at that time.

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