

Ferment diagnosis (Abderhalden) for cancer / by Charles Goodman and Samuel Berkowitz.

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Publication/Creation

[Chicago] : [American College of Surgeons], 1914.

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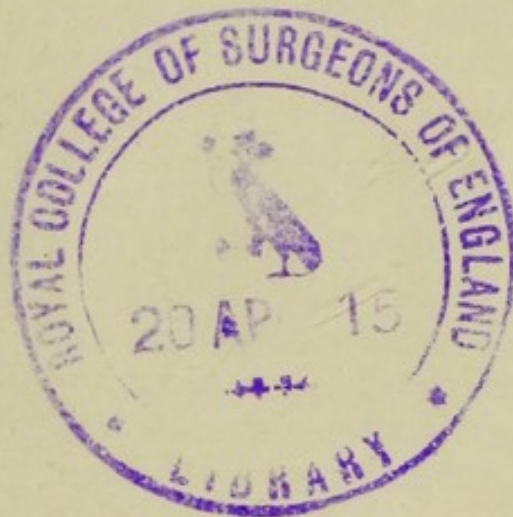
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WITH THE AUTHORS COMPLIMENTS.


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By CHARLES GOODMAN, M.D., F.A.C.S., and SAMUEL
BERKOWITZ, M.D., New York

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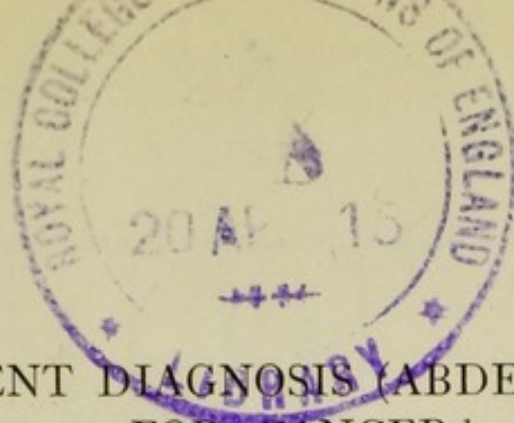


Reprint from
SURGERY, GYNECOLOGY AND OBSTETRICS
December, 1914, pages 797-799



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FERMENT DIAGNOSIS (ABDERHALDEN) FOR CANCER¹

By CHARLES GOODMAN, M.D., F.A.C.S., AND SAMUEL
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SEVERAL thousand tests by dialysis after the method described by Emil Abderhalden and his co-workers have now found their way into the literature. While conclusive evidence of the merits of the test are substantiated by some authors, there are others who up to the present time have not been convinced of the reliability of the test in their hands and therefore question its practicability for clinical purposes. A critical review of the reports of some of these writers makes it apparent that all the details of the technique described and laid down by Abderhalden have not been mastered and complied with. The technique is intricate, and the outcome of the test depends upon the scrupulous observance of each and every detail, however minute.

Some of the earliest workers have improved their results by acquiring a corrected technique from Abderhalden or from one of his pupils, and until the details of the test have become simplified the most reliable statistics of the dialysis test will necessarily be derived from those who have received such instruction.

That the action in this test is due to blood-ferments was shown in 1909 by Abderhalden, working with Pincussohn and Weichert.² Abder-

¹ From the Physiological Chemical Laboratory, Beth Israel Hospital, and the Department of Physiological Surgery of the New York University.

² Hoppe, Seyler's Ztschr., 1909, No. 61.

Case Number	ccm. Serum Each Test	Time of Dialysis (hours)	Serum - Control	Serum + Carcinoma	Serum + Sarcoma	Serum + Placenta	Serum + Stomach	Serum + Artery
D. 10	1.5	18	o	+	o	-	-	-
M. 11	1.5	18	o	+	o	-	-	-
M. 12	1.0	20	o	+	o	-	-	-
M. 13	1.0	18	o	o	++	-	-	-
B. 14	1.5	18	o	+	o	o	-	-
B. 15	1.5	20	o	++	o	-	-	-
B. 16	1.0	16	o	o	+	-	-	-
B. 17	1.5	20	o	++	o	-	o	-
M. 18	1.0	24	o	o	++	-	-	-
M. 19	1.5	24	o	o	o	+	-	-
M. 20	1.0	24	o	+	o	o	-	-
M. 31	1.5	24	o	o	++	-	-	-
M. 32	1.5	16	o	o	+	-	-	o
P. 1	1.0	24	o	+	o	-	-	-
P. 2	1.5	20	o	+	o	-	-	-
B. 41	1.0	18	o	+	o	-	-	-
P. 3	1.0	20	o	++	o	-	-	-
B. 42	1.0	24	o	+	o	-	-	-
M. 33	1.5	20	o	+	o	o	-	-
M. 34	1.0	24	o	+	o	-	-	-
P. 4	1.5	20	o	+	o	-	-	-
B. 43	1.5	16	o	+	o	-	-	-
B. 44	1.0	24	o	+	o	-	-	-
B. 45	1.5	24	o	+	o	-	-	-
B. 50	1.0	24	o	o	o	-	-	-
M. 35	1.0	24	o	+	o	-	-	-
B. 51	1.5	24	o	+	o	-	+	-
B. 52	1.5	24	o	++	o	-	+	o
B. 53	1.5	24	o	++	o	-	+	-
B. 54	1.5	24	o	++	o	-	-	o
B. 55	1.5	24	o	+	o	-	-	-
B. 57	1.0	24	o	++	o	-	-	-
P. 5	1.0	18	o	+	o	o	-	-

TION IN CANCER

Clinical Diagnosis	Remarks
Recurrent carcinoma breast	Post-mortem.
carcinoma intestines.....	Operated.
carcinoma breast.....	Post-mortem.
retroperitoneal sarcoma....	Marked cachexia.
general carcinomatosis	Carcinoma, stomach, op.
tumor, abdomen.....	Hydrocele fluid.
sarcoma testes.....	Refused exploration.
carcinoma liver.....	Section typical.
sarcoma femur.....	+ Wassermann.
carcinoma uterus?.....	Operated.
carcinoma breast.....	Ascitic fluid; post-mortem.
retroperitoneal sarcoma....	Blood serum.
retroperitoneal sarcoma....	4 years; no recurrence.
post-op., carcinoma breast.	
recurrent carcinoma breast.	Operated.
carcinoma stomach & liver.	Operated.
carcinoma stomach.....	Refused operation.
carcinoma stomach.....	Post-mortem.
carcinoma recti.....	Post-mortem.
carcinoma liver.....	Operated.
carcinoma stomach.....	Operated.
carcinoma breast.....	Refused operation.
carcinoma liver.....	Refused operation.
carcinoma recti.....	Operated.
carcinoma breast.....	Ascitic fluid; post-mortem.
carcinoma liver.....	Refused operation.
carcinoma stomach.....	Operation.
carcinoma stomach.....	Operation.
carcinoma stomach.....	Operation.
carcinoma stomach.....	Operation.
carcinoma pancreas.....	Marked jaundice; refused operation.
carcinoma recti.....	Operation.

halden was guided by his belief that the presence of a foreign substance in the circulation is conducive to the production of antagonistic or protective bodies. That this holds true not only in pregnancy but also in other conditions has been shown by many observers, and we find that syphilis, brain abscess, mania, Basedow's disease, and cancer are among the diseases which are readily diagnosed by this method.

Recently we reported that we had found in the blood following the transplantation of the thyroid gland a ferment which was capable of digesting suprarenal.

In a series of cases of malignancy we were able to obtain 30 reactions out of 33 cases in which the results corresponded to operative, post-mortem and clinical findings. In the accompanying table one case of carcinoma was not diagnosed and one negative case was diagnosed as a sarcoma.

The imperative precautions asserted themselves with each step in this difficult procedure. Among those which should receive special mention are:

1. *Absolute asepsis* must be carried out in all the details of the test. *Especially cleanliness* must be observed in caring for the glassware.

2. The *substrate* (antigen) must be tested before each series of reactions, to avoid error from this source. Failure to macerate properly or divide the tissue in the preparation of the substrate seems to be a frequent source of error. For the purpose of maceration an ordinary meat chopper serves very well, since connective tissue usually becomes stringy and can easily be removed. The tissue should be divided into minute pieces, and not into pieces the size of a silver quarter or a bean as noted by other writers,

for the point has been emphasized by Abderhalden that unless the tissue has been minutely divided before boiling it cannot be entirely freed from blood.

3. The *serum* must always be centrifuged until no red blood-corpuscles are visible after centrifuging for five minutes. Discolored serum is always discarded as valueless, as it usually gives positive results in negative cases.

4. Great care should be used in handling that part of the *thimble* which will take part in the dialysis. The thimbles used in our tests had been certified at Halle and were repeatedly tested.

The ninhydrin test is so delicate that only scrupulous care in handling the thimbles will avoid reaction due to perspiration or bacterial contamination. *Blowing* the water from the wash bottle, even with great precaution, may contaminate it with small amounts of saliva sufficient to produce conflicting results.

In conclusion one is competent to perform the tests only when such skill is acquired that negative cases are diagnosed as negative.

