TABLE I.—*Leptospiral Agglutination Tests*

Duration of illness	Reciprocal of Titres	
	<i>L. icterohaemorrhagiae</i> (Strain Jackson)	<i>L. canicola</i> (Strain Utrecht)
12th day ..	300	300
19th „ ..	1,000	300. $\pm$ at 1,000. Trace at 3,000
48th „ ..	300. Trace at 1,000	3,000
66th „ ..	100	1,000. Trace at 3,000

Broom for confirmation. In view of the nearly equal titres for both *L. icterohaemorrhagiae* and *L. canicola*, a cross-absorption test was carried out. Dr. Broom's result is shown in Table II, clearly demonstrating *L. canicola* as the infecting organism.

In addition, agglutination reactions against *L. icterohaemorrhagiae* and *L. canicola* were performed on blood samples from the patient's wife and eight children, and from three of his workmates. All results were negative.

TABLE II.—*Results of Cross-absorption Test*

	Reciprocal of Titres	
	<i>L. icterohaemorrhagiae</i>	<i>L. canicola</i>
Unabsorbed ..	1,000	1,000. Trace at 3,000
Absorbed:		
<i>L. icterohaemorrhagiae</i>	0	300. Trace at 1,000
<i>L. canicola</i> ..	0	0

0 = Negative in all dilutions from 1/30 upwards.

Other Laboratory Investigations

The blood urea was 100 mg. per 100 ml. on May 4, 44 mg. on May 7, and 38 mg. on May 26. On May 5 the white blood cells numbered 16,300 per c.mm. On May 27 the cerebrospinal fluid (examined after readmission) was normal, and the erythrocyte sedimentation rate 4 mm. in one hour (no E.S.R. done on first admission). On May 28 a blood count showed: haemoglobin, 13.3 g.% (90% Haldane); red cells, 4,400,000 per c.mm.; white cells, 6,600 per c.mm.; haematocrit, 42%; mean corpuscular volume, $96 \mu^3$; mean corpuscular haemoglobin concentration, 32%; normal film. Liver-function tests: serum bilirubin, normal; thymol turbidity, 4 units; alkaline phosphatase, 7 units per 100 ml.; plasma proteins—albumin 5.6 g.%, globulin 2.4 g.%, total 8 g.%; bromsulphthalein, normal (no retention of dye). The Wassermann reaction was negative.

Animal Inoculation.—After the urine had been made alkaline to litmus a guinea-pig was inoculated intraperitoneally with 2 ml. of the centrifugalized deposit (33rd day of illness). The animal remained well and was sacrificed 22 days later: no leptospirae were seen by direct microscopy and none were isolated by culture. Failure to isolate the organism was probably due to the fact that the guinea-pig is not highly susceptible to infection with *L. canicola* (Mackay-Dick and Watts, 1949; Whitehouse, 1952, and others). Also, the patient's premature departure prevented the collection of a urine specimen at the optimum time. The patient had earlier received several injections of penicillin, which may have been lethal to the leptospirae.

Summary

The occurrence of a case of canicola fever in Ireland is reported. Infection was probably by dog's urine. The case presented characteristic clinical features—namely, abrupt onset with rigors, muscular pain, headache, photophobia, and gastro-intestinal and renal upset. Jaundice was absent. Recovery was rapid.

We wish to thank Dr. J. C. Broom, of the Wellcome Research Institution, London, for his advice and for carrying out the cross-absorption test. We are indebted to Dr. A. H. Diamond for his help with the early clinical details, and to Dr. Mary Uprichard, resident medical officer, Belfast City Hospital, for her painstaking

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TWO EXAMPLES OF THE -D/-D- GENOTYPE IN AN AMERICAN FAMILY

BY

R. K. WALLER,* M.D.

Department of Clinical Pathology, Medical College of Virginia, Richmond, Virginia

RUTH SANGER, Ph.D.

Medical Research Council, Blood Group Research Unit, the Lister Institute, London

AND

O. B. BOBBITT, M.D.

Department of Clinical Pathology, University of Virginia Medical School, Charlottesville, Virginia

This report deals with unusual findings in both the red blood cells and serum of a 48-year-old white woman (Mrs. V. W.) suffering from tuberculosis. In 1940 she received one bottle of blood following the first stage of a thoracoplasty. No transfusions were required for the two operations performed several months later. In May, 1952, she submitted to partial lobectomy, during which procedure four bottles of blood were administered. Eight days after the operation her serum was found by one of us (O. B. B.) to be incompatible with 72 random Group O bloods. The only blood found to be compatible was that of the patient's brother, J. C.

The Red Cells of Mrs. V. W.

The blood groups of the patient (Mrs. V. W.) are: O, NsNs, P+, Lu(a-), kk, Le(a- b+), Fy(a+), Jk(a-), Tj(a+), and Mi(a-); the blood groups of her brother (J. C.) are the same save that he is MNSs and Jk(a+). Only the Rh grouping presented any difficulty.

The red cells of Mrs. V. W. and of her brother were strongly agglutinated by anti-D sera; though not agglutinated by anti-c sera they were only weakly agglutinated by a powerful anti-C serum. The clue to the situation was revealed when it was found that saline suspensions of both samples of red cells were agglutinated by incomplete anti-D. This called to mind the remarkable case of Mrs. B., whose genotype was -D/-D- (Race, Sanger, and Selwyn, 1950, 1951).

Subsequent investigation showed that the Rh genotypes of Mrs. V. W. and of her brother were indeed -D/-D-. Saline suspensions of the two samples of red cells were agglutinated by three complete anti-D sera, by 14 incomplete anti-D sera, by five anti-C sera which also contained incomplete anti-D, and by one anti-E serum which also contained incomplete anti-D.

*Dr. R. K. Waller has died since the completion of this report.

Saline suspensions of both samples were *not* agglutinated by one anti-C serum free from incomplete anti-D, five anti-E sera free from incomplete anti-D, five anti-c sera, three anti-e sera, one anti-C^w serum, and three samples of incomplete anti-D. Neither sample of red cells reacted with two incomplete anti-C sera free from incomplete anti-D (from Rh-positive donors). Neither sample reacted with the serum of the original -D-/-D- patient, Mrs. B.: this serum had agglutinated all of more than 1,400 samples of Group O red cells, and was shown to contain anti-C, anti-c, and anti-e (Race, Sanger, and Selwyn, 1950, 1951).

Saline suspensions of red cells of the original -D-/-D- patient, Mrs. B., had been agglutinated by 14 out of 16 incomplete anti-D sera. Dr. Philip Levine, of Ortho Research Foundation, has tested saline suspensions of the red cells of Mrs. V.W. against titrations of 13 incomplete anti-D sera; the results are shown in the Table; the cells were agglutinated by 11 of the 13 sera. The agglutination of these cells, however, is not directly related to the titre of incomplete anti-D, as is indicated by the striking differences observed in the behaviour of the five sera of highest titre. Dr. Levine showed that the absence of C from the red cells of Mrs. V.W. could also be demonstrated with the aid of a complete anti-D+anti-C serum; he found that the anti-D component could be successfully blocked by the addition of selected incomplete anti-D (see Table).

Differences in Behaviour of Various Anti-D Sera. Tests by Dr. Philip Levine with 13 Sera Containing Incomplete Anti-D

Titre	No. of sera	Titration with cells of Mrs. V. W. in saline
1/4	1	1/2
1/8	1	1/1
1/16	1	1/8
1/32	1	1/2
1/64	3	1/4, 1/4, 1/64
1/128	1	1/4
1/512	5	0, 0, 1/2, 1/128, 1/256

The Serum of Mrs. V.W.

The serum of Mrs. V.W. has reacted with all of approximately 250 unselected samples of Group O red cells so far tested; it does not react with those of her brother J.C. or with those of Mrs. B. The serum reacts only weakly with cells suspended in saline but strongly by the indirect antiglobulin, the albumin, and the trypsin methods.

Titration of the serum of Mrs. V.W. showed values of 1/128 to 1/256 with the indirect antiglobulin test. Titration with bloods of various genotypes failed to reveal direct evidence of a mixture of antibodies. Absorption experiments now being done present considerable difficulties because of the small quantities of serum available and a gradual diminution of titre in more recent bleedings. So far only anti-e has been isolated, after absorption with cDE/cDE red cells. In view of the parallelism with the blood of Mrs. B. it is very likely that the high incidence of positive reactions is due to the presence of antibodies for both C and c and perhaps E as well as e. Under such conditions all bloods would be incompatible except those with the identical genotype -D-/-D-. No atypical antibodies could be demonstrated in the serum of the compatible sibling, J.C.

As in the case of Mrs. B., there is a history of cousin marriage: the parents of Mrs. V.W., each of whom must have contributed the chromosome -D-, were first cousins. Efforts are being made to trace any consanguineous relationship between the British and American families. Further studies are planned on three additional surviving siblings, five others having died—three from tuberculosis, one from influenza, and one from accidental causes.

It may be that the chromosome -D- is not as rare as it was first thought to be; it may, for example, be no rarer than the chromosome Cde. In the heterozygous state the chromosome -D- would usually escape detection, though it can be recognized if it is specially sought for (Race, Sanger, and Selwyn, 1951).

Summary

Two further examples of blood representing the Rh genotype -D-/-D- are described. The samples come from a white American woman and her brother, offspring of a first-cousin marriage.

The sister has had five blood transfusions. Her serum is incompatible with all of about 250 unselected samples of Group O blood, but it is compatible with her own red cells, her brother's, and with those of the original -D-/-D- British patient. Of the several antibodies which are doubtless present only anti-e has so far been identified. No unusual antibodies could be found in the serum of the brother.

The red cells of the two Americans are the only samples so far found to be compatible with the serum of the British patient, besides her own, though more than 1,400 samples have been tested.

We wish to thank Mrs. V.W.'s physician, Dr. I. N. Hunnicutt, of Virginia, for his active help in this investigation.

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Medical Memoranda

Uterine Chorionepithelioma

The possible development of chorionepithelioma following hydatidiform mole is well recognized, although there is a wide variation in estimates of the incidence of the malignant change. In the follow-up of cases of hydatidiform mole the biological tests for the excretion of gonadotrophin in the urine occupy a prominent position, but the interpretation of their results presents problems which are not widely enough understood, despite the excellent summary by Brews (1950). The following case illustrates the difficulty of diagnosis when the Aschheim-Zondek reaction is only weakly positive.

CASE REPORT

The patient, a 1-para aged 32, had had an uneventful pregnancy three years previously. Her last menstrual period began on February 1, 1950, and very early in the pregnancy she attempted to procure a miscarriage by taking a large dose of quinine. At the ninth week of amenorrhoea vaginal bleeding occurred and the case was treated as one of threatened abortion. It was noted at this time that the uterine enlargement corresponded to that of a 12-weeks pregnancy. The diagnosis of hydatidiform mole was made at the eleventh week, when the fundus of the uterus had arisen to midway between the pubic symphysis and the umbilicus. At this stage the early morning urine gave a positive Aschheim-Zondek reaction in a dilution of 1 in 10, but was negative at 1 in 100.

Vaginal evacuation of the uterus was effected on April 22 after dilatation of the cervix by laminaria tents. The tumour removed was a typical hydatidiform mole with characteristic microscopical appearance. There was no evidence of malignancy in the sections. Twenty days later the uterus had involuted satisfactorily and the Aschheim-Zondek reaction had become negative. But further biological tests were made at intervals, and 57 days after evacuation it was found that the Aschheim-Zondek reaction was again positive, though negative in dilution.

The patient was readmitted to hospital and examined under an anaesthetic on July 7. The uterus was bulky, the cavity measuring 3½ in. (9.5 cm.), and the left ovary was