THE TYPES OF TUBERCLE BACILLI OCCURRING IN TUBERCULOSIS OF THE HUMAN GENITO-URINARY TRACT.

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This report deals with the bacteriological characteristics of the tubercle bacilli isolated from seventeen[1] consecutive cases of tuberculosis affecting one or other part of the genito-urinary system.

For the supply of material we wish to express our indebtedness to the hospitals specified in the following table and to the many surgeons, physicians, and pathologists who have been kind enough to place both hospital and private cases at our disposal, and to provide us with clinical notes.

The methods of investigation were the same as those described in our previous reports. Cultures from urines were usually obtained through guinea-pigs inoculated with centrifuged deposit; in the case of two specimens the deposit was antiforminised and direct cultures were obtained.

Additional Clinical and Bacteriological Data.

Regarding the cases where the bacilli were found to be of "human" type, there is nothing to add to the clinical facts stated in Table I. In cultural characters the bacilli were all typically eugonic; this is in accordance with the results of the tests on rabbits (see Table II, below), which show that they were all of relatively low virulence for this animal.

The three cases where the bacilli proved to be "bovine" call for fuller description.

Case 1. E. H., female. First sample of urine received on May 1st, 1912, when patient was 24 years old. She suffered from frequency of micturition but her general health was good. In August, 1910, she had been examined in hospital under anaesthetic and material containing tubercle bacilli had been obtained from each kidney. Subsequent

[1] Six cases from which negative results were obtained are excluded from the series. In four of these negative cases egg tubes were inoculated with the spleens of guinea-pigs killed six weeks after intraperitoneal inoculation with centrifuged deposit of urine. In every instance the culture tubes remained sterile.

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samples of urine were received for examination on August 22nd, 1912, December 9th, 1912, February 4th, 1913, and October 17th, 1913. Throughout this period her general condition remained as before. In 1914 she married and left London. At the end of that year her general health was still reported to be good.

Six cultures in all were obtained and tested, viz., direct cultures from the antiforminised deposits of the first and second specimens and cultures from guinea-pigs inoculated with the first, third, fourth and fifth specimens. All the cultures were found to be typically "bovine," being highly dysgonic on glycerinated media and of high virulence for rabbits. Cultures from the later specimens showed no indication of modification in the "human" direction, and, as will be seen from Table III, below, there was no abatement of their virulence for the rabbit.

Case 2. A. D., male, 19 years. Shortly after a specimen of urine had been received from this case, the left kidney was removed by operation and found to be extensively tuberculous.

The culture from the urine was highly dysgonic and typically "bovine" on glycerinated media. As will be seen from Table III, the tests on rabbits also justify the designation "bovine," though in two of the rabbits the pathogenic effects were less severe than those exhibited by the typical bacillus of bovine origin.

Case 17. R. K., female, 20 years. History of tuberculous cervical glands, of which the scars remained, in early childhood. Specimen of urine received on May 22nd, 1914. Symptoms of renal disease first occurred in August, 1913. The surgeon diagnosed tuberculosis of the right kidney. He informed us that she was improving under Beranek's tuberculin and vaccines prepared from time to time for the secondary infection present. There was no pyrexia except after an inoculation, and not much then.

Bacteriologically, the tubercle bacilli were identical with those from Case 1.

SUMMARY.

Seventeen cases were examined, the disease affecting the genital organs in nine instances (seven testes, one salpinx, one prostate) and the urinary tract in eight.

The bacilli obtained were of "human" type in fourteen cases and "bovine" in three.

The three "bovine" cases were affections of the kidney in persons aged, respectively, 25, 19 and 20 years.

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TABLE I.

Clinical Data and Bacteriological Results.

No. of Case	Initials of Patient	Sex	Age in years	Institution or Home Address	Situation of tuberculous lesions	Source of Cultures isolated		Type of Tubercle Bacillus
						Original Material	Direct or through G.P.	
1	E. H.	F	24–5	(Private) London	Both kidneys	Urine	Both	Bovine
2	A. D.	M	19	St Bartholomew's Hosp., E.C.	Left kidney	,,	Through G.P.	,,
3	D. W	M	30	St Peter's Hosp., W.C.	Right kidney, bladder, epididymis	,,	,,	Human
4	G. C.	M	38	,, ,,	Both kidneys	,,	,,	,,
5	E. L.	F	20	St Bartholomew's Hosp., E.C.	Salpinx	Tissue from	,,	,,
6	W. E.	M	45	St Peter's Hosp., W.C.	Kidneys and bladder	Urine	,,	,,
7	V. B.	F	11	Fulham Inf., W.	Abdomen, lungs, ? right kidney	,,	,,	,,
8	E. H.	F	19	(Private) Ipswich	Bladder	,,	,,	,,
9	C. S.	M	15	St Bartholomew's Hosp., E.C.	Testicle	Epididymis	,,	,,
10	A. M.	M	20	,, ,, ,,	,,	,,	Direct	,,
11	M. J.	M	28	(Private) London	,,	,,	,,	,,
12	R. J.	M	52	Southern Hosp., Liverpool	,,	,,	,,	,,
13	D. N.	M	20	(Private) London	Prostate	Urine	Through G.P.	,,
14	S. N.	M	34	St Bartholomew's Hosp., E.C.	Bladder	,,	,,	,,
15	W. P.	M	22	(Private) Margate	Testicle	Epididymis	Direct	,,
16	D. W.	M	34	St Bartholomew's Hosp., E.C.	,,	Testicle	,,	,,
17	R. K.	F	20	(Private) Doncaster	Right kidney	Urine	Through G.P.	Bovine

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TABLE II. *Rabbits inoculated with Eugonic Viruses.*

No. of Case	Source of Cultures	Details of Cultures: Age of sub-culture in days	Details of Cultures: Generation	Details of Cultures: Total duration of cultivation in days	Dose (mg.)	Mode of Inoculation	No. of Rabbit	Weights of Rabbits in grammes: Initial	Weights of Rabbits in grammes: Final	Duration of Experiments (days)	Post-mortem Results*: Local lesion	Local glands	Lungs	Bronchial glands	Spleen	Kidneys
3	Urine (through G.P.)	4	3rd	45	10	sub.	482	2,100	2,120	K 101	Cystic	Cystic	A few translucent tubercles	Nil	Nil	Nil
	,, ,,	4	3rd	45	13	sub.	483	1,850	1,720	K 101	Cystic	Nil	Several discrete tubercles	Nil	Nil	Two small tubercles
4	Urine (through G.P.)	8	6th	85	10	sub.	622	1,630	1,720	K 100	Caseous	Caseous	A few translucent tubercles	Nil	Nil	Nil
	,, ,,	7	7th	190	10	sub.	824	2,270	1,990	K 100	Caseous	Cystic	Few small caseous patches	Nil	Nil	Two grey foci
	,, ,,	7	7th	190	10	sub.	825	1,590	1,420	K 100	Cystic	Nil	Thin caseous layer on surface	Nil	Nil	Nil
5	Salpinx (through G.P.)	5	3rd	36	10	sub.	476	2,770	3,150	K 100	Cystic	Nil	A few caseous patches on surface	Nil	Nil	Nil
	,, ,,	6	5th	90	10	sub.	589	2,250	1,700	K 100	Cystic	Nil	A few translucent tubercles	Nil	Nil	Nil
	,, ,,	6	5th	90	10	sub.	590	1,650	1,870	K 100	Cystic	Nil	A few translucent tubercles	Nil	Nil	Nil
6	Urine (through G.P.)	7	5th	68	13	sub.	571	2,020	2,140	K 100	Cystic	Caseous	Nil	Nil	Nil	Nil
	,, ,,	7	5th	68	13	sub.	572	1,300	1,190	K 100	Cystic	Nil	A few small tubercles	Nil	Nil	Nil
7	Urine (through G.P.)	7	3rd	32	11	sub.	533	1,700	1,600	K 100	Cystic	Caseous focus	Thin caseous layer nearly covering surface	Nil	Nil	A few grey foci
	,, ,,	7	3rd	32	11	sub.	534	2,270	2,000	K 100	Cystic	Caseous foci	A few flat tubercles on surface	Nil	Nil	Nil
8	Urine (through G.P.)	7	5th	104	10	sub.	740	1,950	2,050	K 100	Cystic	Nil	Translucent tubercles on surface	Nil	Nil	One tubercle
	,, ,,	7	5th	104	10	sub.	741	1,200	1,500	K 100	Cystic	Nil	Caseous tubercles and patches on surface	Caseous focus	Nil	A few small tubercles
9	Epididymis (through G.P.)	9	6th	115	11	sub.	788	2,720	2,200	K 100	Cystic	Nil	A few grey patches on surface	Nil	Nil	One grey focus
	,, ,,	9	6th	115	11	sub.	789	1,700	1,620	K 100	Caseous	Nil	A few small tubercles on surface	Nil	Nil	One grey focus
10	Epididymis (direct)	7	7th	144	11	sub.	743	3,080	3,050	K 100	Caseous	Nil	A few small tubercles	Nil	Nil	A few pits on surface
	,, ,,	10	10th	227	12	sub.	903	1,920	2,090	K 100	Cystic	Nil	A few small tubercles	Nil	Nil	One caseous focus
	,, ,,	10	10th	227	12	sub.	904	2,300	2,120	K 100	Cystic	Nil	A few small tubercles	Nil	Nil	One minute focus
11	Epididymis (direct)	9	8th	151	14	sub.	786	1,910	1,650	K 100	Caseous	Caseous focus	Nil	Nil	Nil	Nil
	,, ,,	9	8th	151	14	sub.	787	1,850	1,700	K 100	Cystic	Nil	A few translucent foci	Nil	Nil	Nil
12	Epididymis (direct)	11	7th	172	11	sub.	853	2,150	2,140	K 100	Caseous	Nil	A few translucent foci	Nil	Nil	One small tubercle
	,, ,,	11	7th	172	11	sub.	854	1,850	2,040	K 100	Caseous	Nil	A few translucent tubercles	Nil	Nil	Nil
13	Urine (through G.P.)	6	7th	204	14	sub.	943	1,900	2,000	K 100	Cystic	Nil	Two small tubercles	Nil	Nil	Nil
	,, ,,	6	7th	204	14	sub.	944	2,020	2,200	K 100	Cystic	Nil	Two small tubercles	Nil	Nil	Nil
14	Urine (through G.P.)	7	4th	162	11	sub.	963	1,450	1,620	K 100	Caseous	Cystic	Scattered tubercles on surface	Nil	Two small tubercles	Two small tubercles
	,, ,,	7	4th	162	11	sub.	964	1,550	1 640	K 100	Cystic	Nil	A few translucent tubercles	Nil	Nil	Nil
15	Epididymis (direct)	11	6th	170	13	sub.	5	1,970	1,890	K 101	Cystic	Caseous	Extensive superficial caseation	Nil	Nil	Several small tubercles
	,, ,,	11	6th	170	13	sub.	6	1,690	1,720	K 101	Cystic	Nil	Extensive superficial caseation	Nil	Nil	One grey tubercle
16	Testicle (direct)	7	6th	157	14	sub.	56	1,920	2,120	K 101	Cystic	Nil	One translucent focus	Nil	One small tubercle	Nil
	,, ,,	7	6th	157	14	sub.	57	1,750	1,800	K 101	Caseous	Caseous	A few translucent tubercles	Nil	Two tubercles	Nil

* In addition to the rabbits recorded in this table, three died prematurely from intercurrent disease, 44, 54 and 58 days after inoculation. Only a slight amount of tuberculosis was found in each case.

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TABLE III

Rabbits inoculated with Dysgonic Viruses.

No. of Case	Source of Cultures	Details of Cultures: Age of sub-culture in days	Details of Cultures: Generation	Details of Cultures: Total duration of cultivation in days	Dose (mg.)	Mode of Inoculation	No. of Rabbit	Weights of Rabbits in grammes: Initial	Weights of Rabbits in grammes: Final	Duration of Experiments (days)	Post-mortem Results
1	1st spec. urine (through G.P.)	11	4th	51	·01	i.v.	82	2,200	1,970	D 35	General tuberculosis of organs and lymphatic glands.
	1st spec. urine (direct)	9	5th	83	·01	i.v.	84	2,070	1,400	D 24	,, ,, ,,
	,, ,, ,,	9	5th	83	1	i.m.	85	2,020	1,640	D 34	,, ,, ,,
	2nd spec. ,, ,,	16	4th	74	10	sub.	122	2,180	1,400	D 22	,, ,, ,,
	,, ,, ,,	16	4th	74	10	sub.	123	2,170	1,350	D 51	,, ,, ,,
	3rd spec. urine (through G.P.)	10	4th	90	5	sub.	218	1,130	1,200	D 26	,, ,, ,,
	4th spec. urine (through G.P.)	9	4th	90	10	sub.	351	2,400	1,750	D 63	,, ,, ,,
	5th spec. urine (through G.P.)	4	6th	74	10	sub.	519	2,800	2,100	D 37	,, ,, ,,
2	Urine (through G.P.)	6	6th	85	10	sub.	567	1,770	1,020	D 38	,, ,, ,,
	,, ,,	6	6th	85	10	sub.	568	1,920	1,370	K 101	Chronic general tuberculosis; kidneys beset with tubercles projecting above surface; lungs not enlarged but contain numerous tubercles and caseous nodules; spleen and bronchial glands normal.
	,, ,,	10	11th	210	10	sub.	804	2,130	1,240	K 100	*Cystic local lesion; caseous foci in subscapular, bronchial, and one* popliteal gland; lungs partially replaced by caseous tissue; spleen normal; tubercles in kidneys; some projecting on surface, and pus pelvis of one.
	,, ,,	10	11th	210	10	sub.	805	1,550	890	D 61	General tuberculosis of organs and lymphatic glands.
17	Urine (through G.P.)	6	6th	76	10	sub.	929	2,200	1,870	D 35	,, ,, ,,
	,, ,,	6	6th	76	10	sub.	930	1,970	1,330	D 39	,, ,, ,,