Lwoff Effect.

January 1, 1951.

A = K12
B = 1485.

Young cultures from YZ. Irradiate 2 ml samples in 10cm plates.

1. Pre-irradiation control.
2. After 120 seconds uv.
3. After 80 minutes incubation in YZ.

Dose 1.10 in YZ
No lysis observed.

A	1	ca 2×10^9 cells.	10^{-7} λ. (1 plaque)	B1	ca 2×10^9 cells
	2	ca 3×10^6 cells	10^{-7} λ (1 plaque)	2	ca 3×10^7 cells
	3	2×10^5 cells	No λ at 10^{-7}	3	

Although K-12 liquid survival appears diminished, no marked lysis or release of λ was detected. Aeration may be minimal, or medium may be unsuitable.

≡ Inconclusive ≡

Test for release of λ on EMB agar
Dilute fresh K12 10^{-6}, spread .1 ml on EMB Lac.
Irradiate uv 50cm. 0, 5 sec, 10, 20, 30, 40, 60, 120., dupl. plates.
A) Just add drop W578 immediately & spread.
B) " incubate ____. spread W578.

Count K-12 as papillae
λ as plaques.

	λ	0 K12	10	20	40	60	180 sec.
A.	11	ca 1000 / 202	± 1000 322	351 / 421	342 / 109	198	14 ± 0 5
B	21	"	255 ± 1000 342	392	ca " do.	118	7 ± 0 7

January 3, 1951.

Compare sensitivity of λ+ and λ^s strains: All loses 30 secs.

~~1.~~ Dilute to 2×10^{-7} each. Mix 1:1.

A K12
B 1485
C 518.

Immediate mixtures

	UV 0		UV 30".	
	Lac+	−	+	−
A+C	109	109	10	61
A+B	186		30	
B+C.	135	108	29	49

$5\lambda^{(+)}_R$ $15\lambda^s$.

K12 and W1485 are both more sensitive to UV than W518.

Test A+B UV for proportion of λ^s.

Repeat 801. K12 40 sec. 2×10^{-7}

	λ	UV 0	K	λ	UV 40.	K.
K12	1	204		54	10±	

90 minutes on agar not long enough for burst!

delay 90 mins in broth spreading 2 271 58 12±

Conditions of uv-λ burst.

January 4, 1951.

Effect of old culture; D(Lac); on uv λ effect.

A. = K12 36 hour culture in Y broth Dilute to ~~2 x~~ 10^{-7}

B = " overnight " " D(Lac). 2×10^{-7}.

B: Immediate plating with W518

	K	λ (min⁻¹)
	126	5
20 sec uv	96	43
40 "	17	45

A) *

	K	λ
uv 0.12 00	100	2
uv 30 (smeared) 12 00	18	70±

uv 30	146.	
no 518	16	
	24	
	17	
uv 30 2 30	179.	

Increase in λ? Uncertain.

Should use ~~good~~ young cells in Y broth + assay super. from time to time.

Crossing non-inactivated cells.

Jan. 4, 1951.

W1269 grown overnight (+) in 50 ml Y2. 12 Xo PM Add sun to 9 ml samples of both culture and incubate at 37.C. Expose 2 hours. To estimate survival: standard loopful:

a. loopful. = L.

b. L/1ml. L.

c. L/1ml : L/10ml : L.

Wash cells 2x. add 1ml to pellets of 1269; 2ml to pellet of W1177. Mix W1177 .4ml with 1ml 1269. Plate. 1ml samples in EMS bac. also streak out mixture on EMB bac.

1000 units give only ca 1-10% survival! Results indeterminate except that sun has poor killing power under these conditions!

Prototrophs seen in each series.

January 3, 1958.

W1490 x W660. on EMS Lac.

1st Run: 28 colonies picked. (Poor differentiation on EMS Mtl. Mostly mucoid).

A) 12, 1, 13, Mtl v
6 acc Mtl −
18, 20 v. pur ... Mtl − Very flat on EMS Lac.
others Mtl +
λ in 19 ?

B) MtlEMS poor differentiation.

Lac: 38 tests: 8 likely Lac v. 25, 33, 35, 24, 32, 13, 18, 12
Reisolate on EMS Lac.

Mtl: 100 tests (not necessarily +!)

1-12 9 Mtl − #5 v ?
13-100 47 − # 26, 33, 47, 66, 71, 72, 77, 85, 87, 98.
(12 on Xyl rather than Mtl).

	Mtl	Lac	Xyl.	
1	−	+	−	
2	−	+	+	
3	v	v	v ?	−
4	− +	− +	− +	
5	−	−	−	
6	+ λ?	−	+	
7	−	−	v	−
8	+	+	+	
9	−	+	+	
10	v	v ?	v	−
11	+ λ?	−	?	

C 1490 x 660 100 isolates from EMS Mtl. Poor differentiation! 17 Mtl+ 6 Mtl v? Remainder −

D 478 x 660 Differentiation v. poor. on Mtl or Lac!

C' Colonies tested on EMB, EMS Mtl before streaking. 27/50. Mtl+. of these: 7 Mtl v.
49/100. +

803 K 33'

	1
	2
	3
	4
1	5
10	6
23	7
26	8
28	9
29	10
30	11
39	12
41	13
42	14
48	15
51	16
52	17
53	18
54	19

45

~~58~~	20
59	21
60	22
61	23
62	24
64	25
66	26
70	27
71	28
72	29
76	30
77	31
79	32
80	33
~~80~~	~~28~~ 34
86	~~29~~ 35
87	~~30~~ 36
91	37
92	38
93	39
94	40
95	41
96	42
97	43
98	44

810

uis . OK!

and studied m

me nayse MHl+ le

39

59 60

80

3	1
6	2
19	3
21	4
22	5
23	6
24	7
26	8
32	9
33	10
35	11
37	12
38	13
44	14
45	

811

esp

9 — 91 92 93 94 95 96 97 98

10 — 101 102 105 107 109 110

11 — 112 115 118 120

12 — 121 122 123 128

13 — 140

See 810
J

See 811
K

Heterozygotes

January 3, 1951

A	1435 ×	1446
B		1449
C		1451

1/6/51.

Lac−	Lac+
22, 35, 27	0, 3, 1
5, 10	1, 0.
11, 10, 7, 53, 6, 0, 3	
0, 1, 0, 0	2, 4, 4, 1

Picks + streak lac+ on EMB, S, Lac.

A). 5 tests. #2 v. ?

B) 12 tests. No v. Some Lac+ are λ^s.

C) #2, 10, 11.

Restreak from D(0) to EMS, EMB lac.

lost in faulty EMS!

1/29/51. Repeat A, C.

A: ca 1% +. 100/plate.

4 Lac+

But #4 apparently Mal v

(mostly Mal−, one clear ✱)

→ This colony → ?! Mal v. Lac+ MH+

From EMS, only one +. Retest.

C. Mostly +. Lac v: ? 2, 53.

130 Lac+ tested

Restreak a, C1, C2

	MH	Mal	Lac
1	−	−	
2	+	+	1, 1

NT dip

Differential uv sensitivity — λ

W811 x W1274.

January 7, 1958.

			Gal+ = λ^-	Gal− = λ^+	Adj. Ratio λ^-	Adj. Ratio λ^+
A	Control	(.05)	45	80	1.	1.
	uv	(.1)	116	155		
B	10	(.05)	48	53	.9	.64
		(.1)	105	99		
	20		80, 84	72, 68	.71	.45
	30		73, 57	34, 57		
	40		67, 56	24, 19		
	60		22, 13	0, 2		
	80.		1, 2	0, 0		0

Young cultures of W811 and W1274 grown in Penassay, diluted ca 10^{-6}; ~~mixed~~; .1ml spread on EMB-Gal. Expose plates to uv lamp.

~~Hour~~. Effect maximal at 40-60 sec. exposure. Effect may not be so pronounced on EMB agar. Cf. mitomit broth.

Dilute H226, H232 to 10^{-7}, spread .1 ml on EMBlac, radiale plates (50 cm.).

H226.

	+	–
0	41	58
10	5	59
20	0	14
30	0	3
40	0	1

H232

	✓	+	–
0	58	1	4
10 s	70		20
20	50		12
30	19	1	8
40 s.	17	1	9

λ^+ seems to be more sensitive than λ^s. However, similar, but less dramatic haploidization effect noted. These effects may be residual, and the experiment should be supplemented by comparison of H232 and unfused H232. See 808

Reinfection of λ^S lysogen

1/16/51. ff.

H232. (= W518 λ^R × W588) cross, streaked with λ on D(0) & EMS lac.
Single colonies picked and tested against λ on EMS lac.
Ca 12/25 were / λ. Restreak thereon EMB, EMS lac, saving latter.
Single EMB colonies restreaked on EMB lac; tested against λ^S (W1321) on EMB-0.

	lac	λ	(518) λ
1	V	R	+
2	V - plagued.	R?	plagued
3	V	R	+
4	V	R	+
5	V very stable!	R	+
6	V	R	− or ±
7	V unstable	R	+
8	? + V	R	+
9	+	R	+
10	V	R	+
11	?	R	+
12.	V	R	+

In fact streaking may be ~~bad~~ segregating? λ^S and λ^+.

all λ+. No sign of λ^S segregants.

"λ" "

(K-12)

From uv experiment, 801 one rather clear plaque noted, distinguishable from λ on W518. Isolate single plaques.
Attempt to induce lysogenicity. Many autolytic colonies.
Streak one of these out: Test non-autolytic colonies on ~~W518~~ 1371.
~~In this streak of W518λ'~~ numerous clear plaques. Basis?

30 tests. 7 autolytic 32 non-lysogenic 1 lysogenic.

Results as W 1516 Lost

λ' OK.

Analysis of 803 J

Strain D(Mtl) or D(Lac)		EMB Mtl	EMB Lac	EMB Mal	EMB Xyl	EMS Mtl	Results single cols.	single col to EMS Mtl
M	1	V	V	–	V			
M	2	V	V	–	+V V			
M	3	V	–	–	V			
M	4	V	V	–	V			
M	5	V	V	+V +	+V +			
~~M~~	~~6~~	~~+~~		~~+~~	~~+~~			
M	7	V	–	–	~~+~~ V			
M	8	V	–	–	V			
M	9	V	V	–	V			
M	10	+V V	V	–	–			
	~~11~~	~~+V +~~	~~–~~	~~+V +~~	~~+V + mucoid~~			
M	12	V	–	–	V			
M	13	V	V	–	– V v?			
M	14	V	V	–	– V	+ –	→ Mtl– Lac+ Mtl+ Lac V.	++ –
M	15	V	V	+ mot +	+V +			
M	16	V	V	–	– V			
M	17	V	V	–	V			
~~M~~	~~18~~	~~+? +~~	~~+~~	~~+? +~~	~~+~~			
M	19	V ? V	–	–	+ ?			
~~M~~	~~20~~	~~+~~	~~+~~		~~–~~			
L	21	V	V	–	V	+ –	Mtl+ Lac V Mtl– Lac – Lac+ are Mtl V ; Lac – Mtl+ or – ∴ subsequent pairing.	all +
M	22	V	+ – V? V	–	V			
L	23	V	V	–	V			
L	24	? +V	V	V ? +	V			
M	25	V	–	–	V	+ –	Mtl+ Xyl V Mtl ~~+~~ Xyl –	++, –
L	26	V	+	+ mot +	+			
L	27	V	V+	V –	V V			
M	28	V	–	+ mot +	+ V			
	~~29~~	~~+~~	~~+~~	~~+~~	~~+~~			
L	30	V	V	–	V			
L	31	V	V	+V +	+V +			
L	32	V	V	–	V			
L	33	V	V	–	V			
M	34	V	–	–	– V			
L	35	V	V	–	V!			
L	36	V	V	–	– , *			
L	37	V	V	–	V)			
L	38	V V	V	+V +	+V +			
	~~39~~	– V	–	–	– V V			
M 11	~~40~~	V	V	–	– V V	+ –		
M 20	~~41~~	V	V	–	V	+ –	Mtl + Lac V Mtl – (Lac –, +) replate original	++, + , –
29	~~42~~	V	V	–	V			
~~M~~ 39	~~43~~	V	–	–	V	+ –	Mtl – : Xyl – Mtl+ Xyl V	++, –
	~~44~~	~~+~~	~~+~~	~~+~~	~~+~~			

No evidence of segregation

all others pure +.

Test – for V mother sng.

{ Mtl – Lac –
Mtl+ Lac V

810 B - refuses to Lac+ revisions

810 C - refuses to Mal+ revisions

2/15ff.

Tests on lac reversants of J Lac – diploids. From papillae on EMS lac. Essentially all from separate colonies.

Lac (6, 7, 8, 12, 19, 20, 28, 34, 39).

		Repuc.	Puc
6:	Reisolate	4	0
7:	"	4	0
8:	2 ✓ 2"	2	2
12		2	2
19		2	2
20		1	3
28		0	4
34		3	1
39		2	2

Lac	Mtl
; ; ; ;	
; ; ; ;	
v v v v	v v v v
v ; v v	v ; v v
v ; v +	v – v –
; ; + v	; ; + v
; + + v	– – – v
v v v v	v v v v
+ ; – +	– – – –
; ; v v	– + v v

; indeterm. owing to virginity

Mal

		Mtl	Mal
1	1	–	+
	1	–	+
	2	–	+
	2	–	+
	3	+	+
	4	–	+
	4	–	+
	4	–	+
	6	–	+
	10	v + v	+ m + v (1)
11	12	–	+
	12	–	+
	11	–	+
	14	–	+
	14	–	v ? or –
	14	–	v ? or –
	14	–	+
	19	v + v	+ not + v (2)
	19	v v	+ " + v (3)
	19	v + v	+ " + v (4)
21	20	–	+, –
	20	–	+
	20	–	+, –
	20	–	–
	30	–	+
	30	–	–
	30	–	+
	30	–	+
	35	–	+
	35	–	+

		Mtl	Mal
31	36	v v	+ m + v (5)
	36	–	+
	37	+	+
	37	+	+
	32	–	+
	33	v v	v ? + v (6)
	33	v v	v ? + (7)
	39	–	+
	~~29~~		

Most strains already segregated, unfortunately.

Lac v preliminary reading on appearance of colony. Should be confirmed.

2/17/51. Restreak single EMS lac colonies to EMB lac; Mtl for verification of Lac v

EMS Mal spots to EMB Mal to verify Mal +

Restreak all Mtl v on Maltose or Lac from single EMS colonies.

2/18/51.

Lac. Plates from 810 a., single colonies from EMS Lac.
Tests showing Lac⁻ → Lac⁺

	Lac	Mtl	
6	– – – –	– – – –	
7	– – – –	v v v v	
8	v + v v		3
12	– + v +	– – v –	1
19	v – + v	v v + v	2
25	v	v	1
28	v v v v	v v v v	4
39	+ v +	+ v –	1

Lac v designations based upon presence of ± and – colonies from single EMS +.

EMS plates faded (owing to storage during Chicago trip), and therefore some were "mispicked".

Test Lac+ for pail sig. Lac.

Recessives. (Mal

810C

2/28/51 ff.

M+	
1-13	39.
14-15	12
16-21	1
21-31	35
32	10
33	8
34-37	3
38-39	7
40-42	34
43-51	25
52-60	6

Check stock cultures from D'(MH) to EMB MH.

Lac −:

(3): Lac v Mal v ✓
6 OK
7 ca ½ Mal v ½
8 OK.
12 OK
19 Mostly MH+, some v
25 " " "
28
34 OK
39 OK

	Lac	Mal
1	−	+
2	−	+ − vv
3	−	+
4	−	+
5	−	|
6	−	|
7	−	|
8	−	
9	−	|
10	−	|
11	−	|
12	−	|
13	−	+
14	−	+
15	−	+
16	−	+
17	−	+
18	−	+
19	−	+
20	−	+
21	−	|
22	+	|
23	+	|
24	+	|
25	+	|
26	+	|
27	+	|
28	+	
29	+	|
30	+	|

	Lac	Mal
31	+	|
32	+	
33	−	|
4	−	|
5	−	|
6	−	
7	−	+
8	−	+
9	−	0
40	−	+
	−	|
	−	|
	−	|
	−	
	−	|
	−	|
	−	|
50	−	|
	−	|
	−	|
	−	|
	−	|
	−	|
	−	|
	−	|
	−	|
60	−	|

Completely n.g. owing to segregation! Note pattern 1.

22-32!

See 823

all Mannitol v.

		Lac	T6	Mal	Xyl	Sm	Type	Repeat T6 on further growth	Tests for homozyosity Lac = (810B)	Mal – / (810C)
1		– (v)	SR°	–	v	S	A	R		·
2	H283	v	SR	–	v	S	A	R		
3		v	SR°	–	v	S	A	R	· lac v !	
4		v	SR	–	v	S	A	R		·
5	v ~ + v	v	SR	+	+ *	R	C	R		
6		–	S	–	v	S	B	R	· ||| 18	·
7		–	S v (circled)	–	v	S	B	S	· ||||	·
8	H282	–	S	–	v	S	B	R	||||| |||	·
9		v	SR	–	v	S	A	R		
10		v	SR	–	–	S	E	R		/
11		v	v°	–	v	S	A	R		·
12		–	S	–	v	S	B	R	||	·
13		v	v	–	v	S	A	R		·
14		v	v	–	v	S	A	R		·
15	v ... v	v	v	+	+ *	R	C	R		
16		v	v	–	v	S	A	SR		·
17		v	v	–	v	S	A	R		·
18		?	R			R	F	R		·
19		–	S	–	v + *	S	B	S	|||||	|||
20		v	v	–	v	S	A	R		·
21		v	v	–	v	S	A	R		·
22		v	v	–	v	S	A	R		·
23		v	v	–	v	S	A	R		·
24		v	v	+	v *	R	I	R		
25		–	v	–	v	S	G	R	/	·
26		+	R	+	+ *	R	J	R		
27		v	v	+	v + *	S	H	R		
28		–	v	+	+ *	R	D	R	||||	
29		v	v	–	v	S	A	R		·
30		v	?*	–	v	S	A	R		·
31		v	v	+	+	S	H	R		
32		v	v	–	v	S	A	R		·
33		v	v	–	v	S	A	R		||
34		–	S	–	v	S	B	R	·	·
35		v	(R)	–	v	S	J	R		·
36		v	v	–	–	S	E	R		/
37		v	v	–	v	S	A	R		·
38		v	v	+	+	R	C	R		
39	H284	–	vv	–	v	S	G	R	||||| ||| ·	·

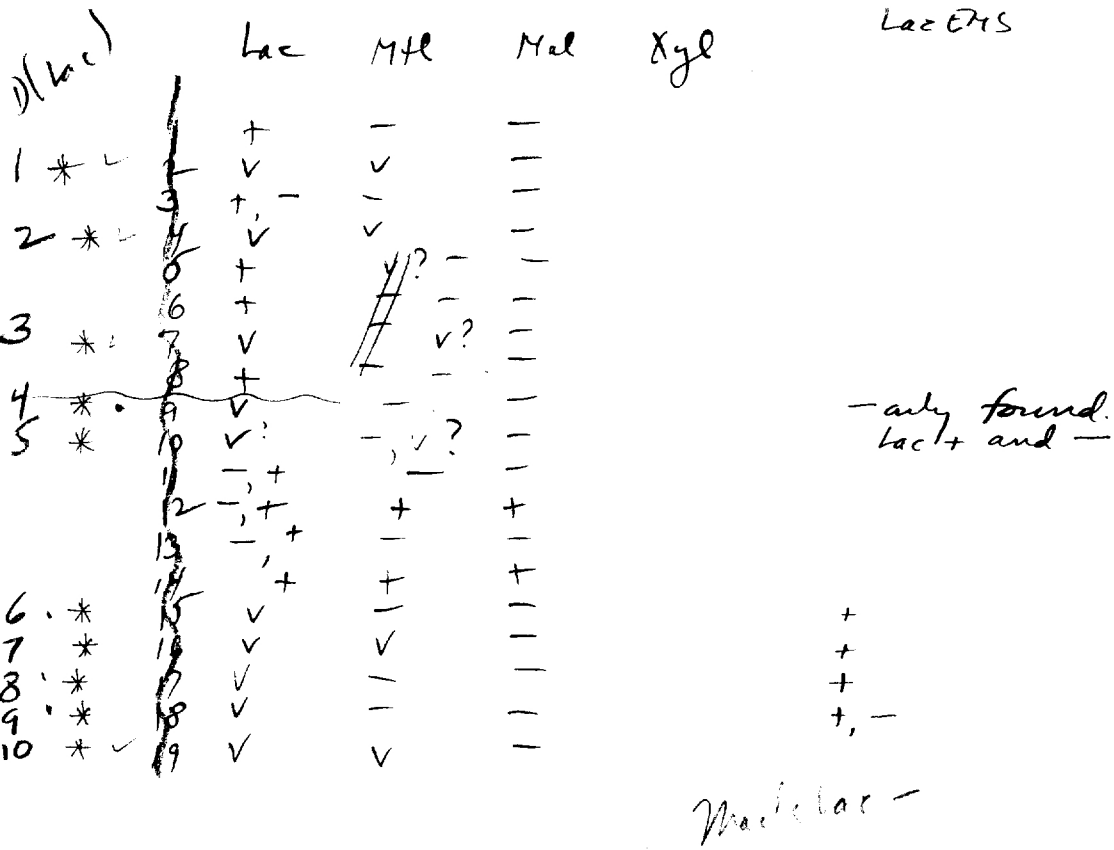
see 833

| Lac v Mtl v Rev.
· Lac + Mtl – (or +) ".

* V_6^R m EMS
V_6^{RS} m EMB.
SR = V

V° might be V_6^S c incomplete lysis.

Analysis of 803K



8/1
K

	Lac v	Mal	Mtl	Xyl	Sm
1	+	—	v	+	s
2	✓	—	v	v	s
3	+	—	v	—	s
4					
5	+	—	v	—	s
6	v	—	—	—	s
7	+	—	v	+	s
8	v	—	—	—	s
9	+	—	—	+, —	s
10	v	—	v	v	s

2/9/51.

A. W1490 × W660 on EMS Mal ; EMS Lac (for sec.)

B. W1490 × W1177 on EMS Mal (for S^R allelism)

C W1435 × W1446 } See 804.

D " × W1451 }

A. About 1% or less are sectored on EMS Mal or Lac.

1-4 Mal
5-8 Lac

A & B & M } Test Mal+ on >14. 2/21 doubtful S^S. Retrieve for Mal+.
3/20 all S^S on EMS; #3 and #7 S^R on EMB. These are
4/20 other Mal++ mixtures of Mal and Mal- on EMB. Restreak on EMS Mal
LA 8/12 AB: 1, 2

B Pick Mal+ and brush on. 12 tests: 3 sensitive!
∴ not allelic?? Purify & streak out; test parents! all 3 are Mal—

D 58 tests: no diploids found. (#38?, 24

C Most colonies appear lac – for first two days on EMS plate, then turn +. 62 tests: #7 only diploid. #16?

	Mal	Lac	Mal
C1	+	+, v? ✓ Isolate to D(Lac)	+
C2	+	+	+
D1	+	+, – v? ✗	+
D2	–	+ (slow)	+

A 1-49 tested: 7 likely Lac v. Restreak on EMB Lac

Duplex protoplasts.

812A.

2/4/51.

Incubator difficulties made scoring on EMB very doubtful

	Lac EMS	Mal EMS	Lac EMB	Mal EMB	Mtl EMB	Xyl EMB	+ − see if any
1		+, −, v?	++, −	+ −	+	+ −	Mal+, Mal−, Mal+ and − Lac+
2		++, −, v?	++, −	+ −	+	+	Mal+ Mal− Lac+ Lac−
3		+, − v?	−	+ −	− +	+ −	Mal+, − + + Lac−
4		+, − v? muc?	−	+ −	+	+	Mal+ Mal− Lac−
5	+ −	+, −	+ −		+, −	−	Lac− Lac+ +, − (v?) Mal−
6	(+) −	+, −	+ −			+	Lac− Lac+ Mal−
7	++	+, −	++			−	Lac− Lac+, +, +, − v?
8	++, −, v?		+, − v?	++	+?		Mal+

Repeats from EMS.

No diploids represented.

812 Asm

Test Mal+ prototrophs from W1490 x W660 for $S^{r/s}$. Retest S^S Mal+ as possible Mal+.

61 tests: 9 S^S. 2 of these S^R on EMB. Retrieve as 812A sm 1-2.

160 tests. 22 apparent Mal+ $S^{\&S}$.

Retrieve: 3 are S^R
19 S^S Mal+. But concordant on EMS, EMB Mal.
Retrieve by streaking out on EMB Mal

Of these 22,
#7: "mostly +" ; #14 "+ and v?" → not +.

See 817

2/2/51.

Hemolytic colonies from W-1 irradiated on blood agar.
9 colonies picked as hemolytic. Streak out; test for λ from single colonies.

	Hem	λ
1a	+	− R
b	+	+
2a+b	+	+
3 ~~2a~~	+	+
4	±	+
5	−	+
6	−	+
7	+	+
8	+	+
9	−	+

Peculiar appearance on EMB Lac.

Restreak single colonies of 1a, b. 2. on EMB lac; Hem; .... remainder on blood agar.
1b is mixed in morphology. Some colonies flat; others mixed.

Restreaks. 1a: each of 10 colonies hemolytic, λ-^{R}.
1b.: flat λ-^{R} hemolytic.
normal λ+ " , possibly less so.

Pick 1a to slant as W-1529 ~~2 as W-1530~~

2nd run:

	Hem.		Lac EMB
1	strongly hemolytic	not coli.	h.f.
2	"		flat mucoid
3	"		" non "
4	v. sl.		normal colony
5	"		" and discolored colonies
6	"		" " " "

None λ^S

Restreak 2 and 3.
Test against λ.

Hemolysis evidently not necessarily correlated with λ reaction

February 12, 1951.

C 1435 × 1446
E " × 1449

C	21	no $\underline{v}$	(Lac)
E	150	"	"

2/16/51

W478 Mal− mutants: Test for Mal$_1$ alleleism

(× W1177). Reisolate from vials: check for purity and mutability.

		Papillation	Prototrophs (2 plates) Mal+
1	W 960	±	2/300?
2	961	+	3/200
3	965	±	0/200
A 4	966	+ gummy	0/100
5	968	+	×
6	969	+	×
7	970	+	×
8	971	±	1 − col
9	972	−	0/100

2/19/51 Repeat where doubtful:

1	W 965	0/60	1/100	3+/100	1/100.	Mal+ ✓	all S^S ‖ EMS and EMB	
2	966	0/50	0/50	0/100				
B 3	970	0/10	0/3	1/5		+ on // ✓	S^R ‖ EMS and EMB	
4	971	2− 0, 0						
5	972	0/150, 0/50	1?/100	0/200		+ on // ✓	loc − S^R ‖ EMS + EMB. Mal+ not ✓.	

Repeats possible # to verify.

W966 is most likely Mal$_2$−. W971 is infertile.

Recheck # 5 for Mal ✓ (tightly linked allele!)

2/21/51 EMS Mal.

C 1. W966 × W660 Not 2? in 12 plates × 250 cols. = 1800 tests.

C 2. W972 × W1177 Picks+, streak out on EMB Mal for Mal ✓ spot on EMS Mal.

C 2:	+	−
	9	99
	10	140
	7	79
	2	69
	9	97

C1. 2 colonies are clear Mal+ (not Mal ✓)

C2. 100 picked: all Mal+ ~~(some)~~ (no Mal ✓)

See 815'

2/26/51

W1177x on EMS Mal for Mal V.

A W960
B W965
C W966
D W972

①. No special treatment ②. Expose uv plates to uv 50cm. 10secs.

A.	1	2 x 200	3 Mal+?	all Mal+ no Mal V ! scoring on EMS Mal very difficult
	2	6 x 300	15 "	
B	1	3 x 200	6 "	
	2	4 x 300	12 "	
C	C1	3 x 200	1200	No Mal+ seen.
	C2	4 x 150		
D	1	2 x 300	No Mal+ seen.	Scoring?

Picks to MALE-4R: 60, all Mal−.

Contradictory results?

Repeat D1. Ca. 1% Mal+ formed. ∴ W972 is not allelic, but close. Scoring of these Mal+ arrangements in absence of Mal is not satisfactory. However, W1532 (from W466 Mal−) should serve the same purpose, if it is truly allelic to Mal.

Suppressor: Lac_3 Lac_1 816

February 12, 1951.

W1531 $\frac{A}{B}$ x W1490 on EMS Lac. Look for Lac − to verify persistence of Lac_1 −.

A ca 600 all Lac+.

B. ca. 700 prototrophs, all Lac+.

Do $SLac_3$+ are alleles of Lac_1?
If so, it should be detectable among Lac_1 − recessions.
Check for a) x Lac_3 −
b) Constitutive release

10 recombinants from A seem to have constitutive lactase! (from DNP Glu plates; spot test)
Recheck from synthetic D(o).:

K-12 Prototrophs 1531 A + B W1490 } are Cst −

W1301 Cst +.

∴ none of these lac+ suppressors are Cst + like SL_3 previously examined!

See 822

2/10/51

Ae : 812B, where $S^R \times S^R \rightarrow S^S$.

Reciprocals parent stocks.

A. W1490 single clones 105 tests : all S^R

B. W1177 " " 100 tests : all S^R

C. Cross again. 160 tests all SR

812B might represent a mixup with A.

W1490 × W660 ctd.

2/18/51

Cross "A" = W1490 × W660

A. Lac EMS 100 + streaked out; 33 retained for recheck.

B Mal EMS 100 Mal+ picked + streaked out. Recheck: 50, 53, 98, 100.

2/20/51. 30 added: all +
2/21/51 16 " " "

	MH	Mal	Lac	
1	+	+, −?	+, − v?	No Mal v.
2	−	++ −?	+	
3	+	++ − ??	+	
4	+	+ − v?	+	

Repeat Cross:

λ in 2?
mMal

Rechecks from 2 single EMS colonies

C (= 812A 2nd). from EMS Mal single + cols.

1 Mal++
2 "

B

1 "
2 "
3 "
4 "

} no Mal v found > 100 tests

A.

	Lac	MH	Xgl	Mal
1	V	−	V	−
2	V	V+?	~~+~~	−
3	V	V	V	−
4	V	V	V	−
(5)	− V, V	~~V?~~	~~V~~ −	+ (hem)
? 6	+ V	V(+?)	+ V	+ V
? 7	+ V	V	V	−
8	V	V	V	−
9	V	−	−	−
10	V	+	+	−
11	V	+	+	−
12	V,	+ V	V	+ V
13	V	+	+ V	+
(14)	V? V	VV	V+	−
15	−+	−+	−+	−
16	+ V	−V	−	−
= 17	V	V	#V	−
~~18~~	~~+~~	~~−~~	~~−~~	~~−~~
19	V?	+	+	+
20	− V	−V	−V	−

	Lac	MH	Xgl	Mal
21	V	+ V	+ (V?)	+
22	V	−	+	+
23	V	−	−	−
~~24~~	~~+~~	~~−~~	~~−~~	~~−~~
25	V	V	V+	−
26	V+?	V	−V	−
27	V	V	V	−
28	V	+ V	+	−
29	+ V	+ V	−	−
30	V	V	V	−
~~31~~	~~+~~	~~+~~	~~+~~	~~+~~
32	V	−	−	−
~~33~~	~~+~~	~~+~~	~~+~~	~~+~~

5: 4 Lac v are Xgl v
14: 8 Lac v are MH v, Xgl v

2/18/51

W1532 (B14 ~~Lac~~ Mal,- het) x Y53 (TLB, Lac,-)
on EMS Lac
(and Mal for +:- ratio).

Mal: + 103 — 17 (Reversed ratio, as expected).

Lac.: 100 picked as "v+" and streaked out on EMB Lac, spot on EMS Lac. About 57 of these scored as probable Lac v. Restreaks on EMB Mal, EMS Lac to detect a) possible Mal v, b) Mal- Lac v for hemizygosity test, and to purify for further study.

(814a)
Conclusion: In reverse cross (for B14 x TLB, Mal-) the Mal- is also hemizygous, [illegible] to the [illegible] that in e.g. 8[illegible] the Mal+ (diff) is also heterozygous.

Query: is Lac- also hemizygous in reverse cross?
~~W1532~~ W466 x W660 Lac+ on EMS Mal.
(W478 Lac-)

See 829.

	Lac V	Mal-	Lac V
1	2	—	+
2	3	+	+
3	4	+	
4	5	+	
	6	+	
6	7	+	
7	8	+	
8	10	+	
9	12	—	
10	13	+	
11	14	—	
12	17	+	
13	18	+	
14	19	+	
15	20	+	
16	21	+	
17	22	+	
18	23	+	
19	24	+	
20	25	—	
21	26	—	
22	27	—	
23	28	+	
24	29	+	
25	30	—	
26	31	+	
27	32	+	
28	34	+	
29	35	+	
30	39	—	
31	41	+	
32	42	—	
33	45	—	
34	46	+	
35	49	— +	
36	50	+	
37	52	+	
38	53	+	
39	54	+	
40	56	+	
41	57	+	
42	58	—	
43	69	+	
44	72	+	
45	73	+	
46	74	+	
47	76	+	
48	77	—	
49	78	+	
50	80		

51	82	+ v
	84	+
	86	—
54	87	+
55	90	+
56	92	+
57	9?	+

Note: 15 ~~16~~ Mal —
41 Mal + .

a) Recheck Mal v possibilities) from EMS lac Brushes
b) Recheck Lac v / Mal — .

Mal Reversions test for hemi zygosity

		Lac v ✓	Mal EMB		
1	1	✓	—	1 Lv M+	
2	~~10~~ 9	✓	—	(1M+L+)	2 Lv M+
3	11	—	—		
4	20	✓	—		
5	21	✓	—		
6	22	✓	—		
7	25	✓	—	(1)	1 Lv M+
8	30	✓	—		3 Lv M+
9	32	✓	—		2 Lv M+
10	~~35~~ 33	+	—		
11	~~42~~ 35	✓	—	1M+Lv. (3)	
12	~~48~~ 42	✓	—	1M+Lv	
13	~~53~~ 48	✓	+		
14	~~(15)~~ 53	+ v ?			

n.g. ~~15 45~~
~~16~~

Total 11 Mal Reversions still diploid: each Mal ++ (not Mal v)

15	12	Mal ++
16	52	Mal ++

Recheck 819-78! Mal — Lac [illegible]
probably mis picked.
But do not remove!

Those which ✓ above are available for further work as Lac v Mal —
Reversions on Mal tested: ↗

Save 819-68 as Lac v Mal —
and 819-15 as Lac v Mal +

Irradiation of λ+ and λs diploids

February 20, 1951.

A) H232 B) H278.

Dilute 10^{-6}. Irradiate at 50 cm. Plate .1 ml on EMB Lac, EMS Lac.
0, 20, 40 sec.

For 60 sec, dilute 10^{-4}, plate .1 ml.

	UV	Lac +	−	v	Gal +	−	v	Σ
A:	0	2 4 7	7 8 4	65 70 59	2	7	55	64
EMS Lac	20	3 24	mc⁻ 17 6 3	6	1 (14-v)	8	3	18
	40	3? 1?	6 10	~~0~~ 1	3	6	0	9
	60 (100x)	35 48 121	49 ~~134~~ 25	4 13 16	14	101	mc⁻ 46	161
B	0	1 3? 170	18 21 22 0	189 146 112	1	11	129	141
	20	1 5 66	70 83 3	18 22	6	34	57	97
	40	2 19	23 6	11	2	20	8	30
	60	~	~	60 Σ 291	14	187	119	3.32

Gal-Lac- simulates Lac+ exp. Gal-Lac+

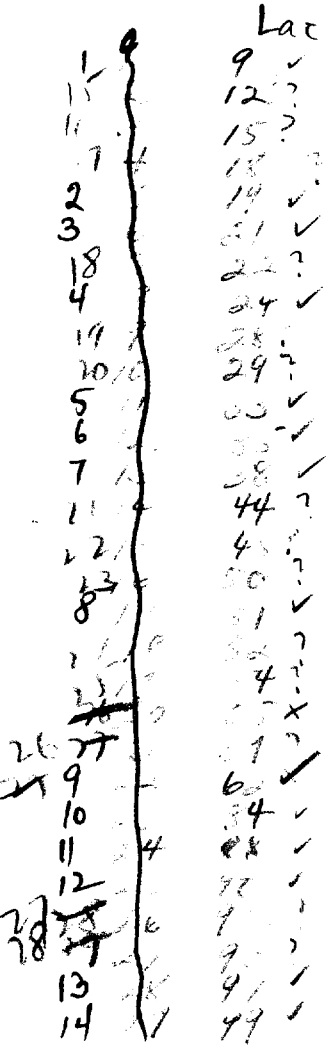
If anything, λ+ seems more sensitive than λs!
Recheck! (use more)

Heterozygosity 1ea. A, B.

February 20, 1951.

W1502 (478 λ^s) × W660

100 Lac+ picked from EMS Lac and streaked on EMB Lac for Lac v.



2/23/51. 1-14: all λ^+ λ^R.

~~Repeat~~ Repeat 2/26/51. 100 Lac+ streaked EMB Lac. ~~no~~ λ^s diploids.

Cotton provided H285 - but this proved not to be heterozygous, although peculiar mottling was observed on Mtl and Xyl.

February 23, 1951.

See 816.

W1510 (gram⁻ NB+Kgma) × W1301 on EMS Lac 14 Glu
Cat+ Lac,+
= Lac,- Glu-

to verify: purity of Lac,-
suppression by Cat+.

W1510 checked on Lac Glu OK
from suspension used
in cross.

a) Picks singly from plates. (may be impure)

Lac	Glu	L	S	L	S	L	S
±	-+	-+	-+	±	+	-	-+
±	-	-+	-+	±	+	-	-+
+	+	±	-+	±	+	-	+
++	+	±	-+	+..	-	-	-
-	+	±	-+	-	-	-	-
+	+	±	-+	-	-	-	-
..+	+	+	+.	±	-	-	-
-+	+	±	-+	±	-	-	-
+	+	±	-+	-	-	-	-
±	-+	±	-+	±	-	-	-

(2)

±	-+	±	-	-	-	-	-
±	+	±	-	-	-	-	-
+	+	±	-	-	-	-	+
+	+	±	-	-	-	-	+
+	+	+	+	-	-	-	-
+	+	±	+	±	-	-	-
+	+	+	+	±	-	+	+
+	+	±	-	-	-	-	+
±	-	+	+ -	-	-	-	-
+	+	±	-	-	+ -	-	-+

(2)

+	+	+	+	# -	+	-	+
+	+	±	-	-	-	-	-
+	+	±	-	-	-	-	-
±	-+	-	-	-	-	-	-
±	-+	-	-	-	+	-?	+
±	-+	±	-	-	+	-	-
+	+	+	-	-	+	-	-
±	-+	-	+	-	-	-	-
±	-+	-	-	-	-	-	-
±	+	-	-+			-	-

(1)

Pick possible +- (A) and -+ (B) types and retrack on EMB Glu or Lac resp.

(See over)

Y87 and Y53 Lac+ revertants selected to test for constitutive lactase:

1-8 Y87
9-15 Y53.

5 9 14 15 maybe Cat+ ??
7 11 12 —.

Recheck!

Photographs picked at random + purified. Strokes test on EMB Glu, Lac.

G	L	G	L	G	L	G	L	G	L	G	L
−	+	−	−	−	+	−	+	−	−	−	+
−	−	−	−	−	−	+	++	−	−	−	+
−	−	−	−	−	−	−	−	−	−	+	++
−	+	+	+?	+	±	−	−	−	−	−	−
−	±	−	+	−	±	−	+	−	−	−	+
−	±	−	−	−	±	+	−	−	−	−	−
−	±	−	+	−	+	−	+	−	+	+	++
+	++	−	+	−	+	−	−	+	++	−	+
−	−	−	+	−	−	+	++	−	−	−	−
+	++	−	−	+	−	−	−	−	−	+	++

Mostly G−L− ; G+L+. Pick possible well marked recombinations.
Restreak G−L+ on EMB glu; G+L− on EMB Lac
Streak Lac+Glu+ on D(0)

Partial segregation and coupling of Lac v reversions from Lac- (810B)

March 2, 1951.

a). 810B cultures purified + grown in D(Lac), stored at 37 C. ca 10 hr.
Plate out on EMS Lac to look for Lac - MH v partial segregants.

	Lac	
B8-1	Few cols: repeat:	6/200+
B12-1	Ca 1/2 Lac-	54 : all MH - ! Also 24 duskies: do. → 78: all -
B19-1	no cols	
B25-1	49+ : 3 -	6 Lac - all MH -
B28-1	0 - : 50+	
B39-1	0 - : 100+	

Results summarized on 810.

b) Coupling. Streak out 810B8-1 (H282L+) and compare c H283.

Streak out 8 Lac v, test +, - segregants on T6. All are T6^{S}! Retest Lac- cultures!

	V_6
7	S
34	S
39	SR
17	S
6	S
19	S
8	S

∴ (39) = H284 is sole Lac- culture warranting use in coupling-repulsion tests of Lac+ reversions. ~~Verify by streaking out and Lac~~ (Also recheck #1). All these diploids should be retested against T6

March 10, 1951.

+S = cis
+R = trans

M284 independent lac+ reversions.

(# 5 is lac++). Streak out single Lac V colonies. Test on V_6.

	R	Lac+ S	R	Lac− S		Type
1	0	4	3	0	/	cis
2	3	1	0	4	/	trans
3	4	0	0	4	/	"
4	0	4	3	0	/	cis
~~5~~						
6	0	4	3	0	/	cis
7	4	0	0	4	/	trans
8	4	0	0	4	/	trans.

TOTALS

cis	TRANS
𝍸	𝍸
𝍸 𝍸	𝍸
1	𝍸
	1111
15	20

Save 823-1 and 823-2 as type cis; trans respectively: M286 · M287

9 (3)	4	0	0	4	/	trans
10 (10)	0	4	3	0	/	cis
11 (12)	0	4	2	0	/	cis

L+ : MH− V_6^R 3− 1+ V_1 $_6P$ 3MH− 1MH+ V_1^P

L− 1 MH+ V_1^P 2 MH− V_1^R 1 " V_1 MH− V_1^R 2 MH− V_1^R

(9 others were lac+ (1 lac−) MH−)

almost all MH−!

12 (8) 16 others were lac+ Xyl− gave a 2 2 2 2 arrangement.

Resolate single EMS lac+ and retest.

cis cultures segregate lac+ lac−	12A	0	4	3	0	/	cis	Lac+ predominant
	12B	0	3	4	0	/	"	
trans	13	3	1	0	4	/	trans	Lac− "
	14	4	0	0	4	/	trans	Lac− "
	15	0	4	2	0	/	cis	Lac+
	16	3	0	0	4	/	trans	−
	17	0	4	2	0	/	cis	+
	18	0	4	4	0	/	cis	?
	19	2	0	0	4	/	trans	−
	~~20~~	3	0	0	4	/	trans	−
	21	4	0	0	3	/	trans	+ (−)
	22	0	4	4	0	/	cis	+
	23	2	0	0	3	/	trans	− (+)
	24	~~4~~ 0	~~4~~ 0	~~2~~ 2	0	/	cis	+
	25	3	1	0	4	/	trans	−
	26	4	0	0	4	/	trans	−
	27	~~4~~	0	0	4	/	trans	−
	28	~~4~~ 0	~~4~~ 0	~~2~~ 2	0	/	cis	+
	29	~~4~~ 2	~~4~~ 0	~~2~~ 2	1	/	~~cis~~ trans	+ −
	30	1	3	3	0	/	cis	± +
	31	3	1	0	4	/	trans	−
	32	3	0	0	4	/	"	−
	33	0	4	0	4	/	cis	+
	34	2	2	0	4	/	trans	−
	35	0	4	1	1	/	cis	+

20 reversions 5 Lac V

37 reversions 6 Lac V MH− others lac+ MH−

Resolate 5 lac V!

Recheck 29, 30

April 2, 1951

Resolate lac v from streakings of 29, and 30 for verification. Score lac +, − from individual lac v.

29.

b	4 − S	3 + R	(1 lac v)
a	3 − S	2 + R	(2 lac v)
c	4 − S	2 + R	2 lac v
d	4 − S	3 + R	1 lac v
	15 − S	10 + R	

(poor destruction of lac +, lac v → lac + less frequent.)

30

a	4 − S	3 + R	1 v
b	4 − S	0	2 v
c	4 − S	2 + R	2 v
d	4 − S	4 + R	0
	16 − S	9 + R	

both are trans

Resolate and compare with 1, 2.

13

Totals 15 cis

20 trans

$\chi^2 = \frac{25}{35} = 5/7$ $\quad p = .4$

March 7, 1951.

W466 × W1577 mEMS Xyl, Mtl for Lac⁻ (mouse cross)

~~36~~ Mtl; 48 Xyl+.

84 tested all streaked on Mtl.

a: 10 possible Mtl v. Restreak from EMB:

a	Mtl	Xyl	Lac	Mal
1	++	++	+	++
2	v	v	v	++
	++	+ v	+ v	++
3	v	v	+	-+ v
4	v	+ v	v	—
	v	v	+ v	—
	v	v	+ v	—
7	v	+ v	+ v	+
8	~~+~~ (v?)	+ (v?)	—	~~+~~ —
	—	+	—	—

~~Robs Mtl test.~~ v Mal v H285

Restreak possible v from EMS.

37 addnl. tests from Xyl (17) and Mtl (20)

9	—	—	—	—
	v	-+ v?	v	—
11	v	v	v	+ v
12	v	—	v	—
	v	+ v	v	—
	v	+ v	v	—
	v	+ v	v	+ v
	v	+ v	v	—
17	+ v	v	v	—

not to carefully streak Mal, Xyl.

Restreak: "3", "8". 824-8 still mountain. 2 clones have somewhat mottled character EMB Mtl. Restreak on Mtl: Mtl v Xyl+ Lac- Mal- H285

3: although apparently clean single cols. from EMB Mal gave +, - and ?v, colonies from EMS Mtl gave pure Mal+ and Mal- (Xyl v)

Replate ~~Restreak~~ from gross streak to EMB, EMS Mal.

18 Mtl Xyl Lac v Mal -

~~19~~ 20 " " " "

	Lac	Mtl	Xyl	Mal
1-	V	V	V	—
2	V	V	V	-
3	+	V	V	-
4	V	V	V	-
5	+	V	V	-
6	+	V	V	—
7	+	V	V	—
8	V	V	V	-
9.	V	V	V	-

65

no lac - like as required!

3/19/51. ~~42~~ addnl. tests. 2 possible MtlV? : 824-30-31

100 addnl. " 30 " "

?

Typing mouse coli pairs (CP Miller) 825

March 8, 1951 HK

(All numbers represent 776 – designations.) q.v.

1	A+B	H F 22 - 23	Both suc± Ck-
2	A+B	F H 335 - 36	Suc±Ck+ ; Suc++ Ck-
3	A+B	H F 346 - 47	Suc ++ Ck- (3B maybe Ck+).
4	A+B	H N ! 348 - 49	Suc- ; Suc-^{P} CK+

a. Streak out on EMB Sucrose.

3/8/51. 1. A+B indistinguishable on EMB, Sucrose. Both Sucr±.

2. A. Sucr ± (dist. from 1A+B – somewhat lighter). B Sucr ++ Obviously distinct

3. A } Indistinguishable Not separable from 2A.
B } Sucr++. a few slow colonies.

4. A Sucr ± with ± wedges
B " or. " colonies.
Restreak single ± colonies to compare stability.

Each of these is resistant to phages T1 – T7, and P, except for indecisive reaction to T4, T2 Also Ck^{R} (Ck_{V}, Ck_{B}).
also all Ck^{R} (DAEFCHI) 3A?/CkG

Typing coli

8234

April 2, 1951.

" Rolenhoff # 41-46 A B 49-50 C 61-62 for comparisons.

= 776-457-8
776-468-9.

A 1-6 Identical on EMB sucrose, faint ± colo with darker centers.

B 1-2 1: Su − Ch ± 2: Su ± Ch −

C 1-2 Su − Ch +++

Recheck Ch, Su, character, and response to Q, Ch.

A: 1-6 show identical Su ± Ch +. characteristic on 2618.

B 1 resembles A 1-6. B2 Ch? Su ±
but # Ch ÷

C Inhibited on EMB Mannitol!
Ch ++