

Multiple heterozygotes

321

Oct 2, 1948

1. W477 x W67 (Lac,- x Lac,-). 15 plates.
2. W125 x W478 466 10
3. W133 x W478 466 10
4. W125 x Y87 5
5. W133 x Y87. 5

1. + and - colonies, variegation? }
 → 2. Variegated, c small - sectors. } Results on EMS Lac.
 W73,74

1. 10 colonies! Later 2 + noted? ■
2. Numerous +. 64 plated to EMB. 11/64.
3. 1+ in 10 x 200 tests. = 327-3-1 True ++
4. Ca 20% +.
5. 0 or 1? + in ca 5 x 200 = 1000 tests.

59, 51, 47, 48 heterozygotes ~ 6, 1, 61, 20 streaks on EMS Lac

60, 43? ? 48h. (EMB).

H	75	1	small cols.	Many small + colonies. occ. ○
	76	2	" "	Numerous ○
	77	3	good growth; +; var	Nearly +
	78	4	" "	" "
	79	5	not heterozygote.	All +; sedover
	80	6	small cols	+ and ○ colonies. Also ○
	81	7	small cols	○ and ● do.
	82	8	mostly s. small +, - colonies.	do. ○
	83.	9	to and L., +, - growth.	● ○
		10		● ○

Oct. 6, 1948.

all in lac.

①. W~~478~~ × WS 83

Plates marked 1 in black (Xyl; lac) are repeat

② " W584.

10/7/48.

(3). W477 × W45

(4). ~~W477~~ × W186.

②. 40 tested; 11 selected for further test. S.O. EMStac

③ No yield

1. xylose: 72 tested

5, 6, 7, 8, 12, 35, 43, 48, 49, 60

65, 66, 67, 71

1. Lactose: 44 tested.

16, 19, 23 are Var. on lac 1713

Mandragora Mandragora
EMStac EMStac ~~11~~ ~~11~~ → 48h.

H.

1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	✓?
9	-
10	-
11	-
12	-
13	-
14	-
15	✓
16	✓
17	+

-
-
-
○
✓
✓?
○
-
○
-
-
-
-
-
-
-
-
-
-
-

V.

-

{ on EMStac, ○

at this reading, - colonies
show rather peculiar appearance.
darkish center, but no well-defined

October 13, 1978.

Test 330-1 isolates on Lac, Xyl, H-

Lac Xyl EMS Lac EMS Xyl

1	Var	-		85
2	Var	-		
3	Var	-	-	76
4	Var	-	-	82
5	Var.	+	++	
6	++ ?	+	++	
7	Var.	-	+±	73
8	Var.	-	-	70
9	++	-	-	Not heterogeneous?
10	Var	-	-	
11	Var	-	-	77
12	Var	-	-	75
13	Var	Var	-	76
14	Var	Var	-	77
15	Var	++	++	78
16	Var	++	++	79
17	++	++	++	Not heterogeneous

cultures variable on E 45 Xyl.

Prick to T(0) slants from Xyl EMS. Incubate Lac EMS further.

Test 330-2 isolates on all media available.

	Lac	Mal	Gal	Xgal	Aerob.	H	
1	+, - v?	-	++	v	++		56
2	++	-	++	++	++		
3	v	-	++	++	++	161	57
4	++; -	-	++	++	++	162	58
5	++	+	++	v	++	163	59
6	+, -	-	++	++	++	164	60
7	v	-	++	v	++	165	61
8	v	-	++	++	++	166	62
9	≠ v	+	++	-?	v	167	63
10	++; -	-	++	(-?)	++	168	64
11					++		65

Study additional isolates from 2 and 11 for study

- 2

-11 1 ++
 2 ++
 3 +,
 4 +, v, - H65.

Oct. 16, 1948.

Struck out H85-88, 91-97 as Lac Ears. Pick papillae & ~~lacs.~~ ^{papillae} EYS ^{lacs.}

	1	2	3	4	
1 H85	+	+	+	+	
2 86	+	+	+	+	
3 81	-	-	-	-	
4 89	-	-	-	-	
5 91	+	+	+	+	
6 92	+	+	+	+	
7 93	-	-	-	-	
8 94	+	+	+	(+)	
9 96	+	+	+	+	
10 97	-	-	-	-	

-1 definitely suggesting for Lac +/- + ² (+) ³ (+) ⁴ (+) *

* semipapilla. Hold 3, 4, 10 for papillae.

EYES:

	1 v. wld, app. segs. 2 wld, full +	3 do + 2 4 sectored cols. 5 sectoring weak + 6 sectoring weak + 7 (v) * 8 bullseye cols some sectoring 9 ++	4 (v) (v) (v) ++	4 ++ flat cols. (v) (v) ++	Notes
					H110
					H111
					H112
					H113
					H114
					H115
					H116.

~~Also choose *~~ for preservation in T/0)

Compare H93 (\rightarrow v) and H96 (\rightarrow v) in detail. Strike both out as Lac Ears for further papillae. See 3-15-11 d-22

Oct 5+, 1948.

A). Stake out single variegated colonies and pure colonies to heterologous + homologous media.

An original test plates, V colonies only were seen on xylose, but 3 lac - colonies seen in H72. Pick these as 333A:1-3 and stake on xylose EMB.

P7.B) Stake 5 var. colonies each from Xyl. plates H70, H72 to Xyl + Lac

H			
70	A	++ , -	Pure +
	B	+ , - , + var.	almost pure +.
	C	+ , - , var.	measurable.
	D	"	almost pure +.
	E	+ , - , var.	" "
72	A	+ , - , var.	Mostly - , +.
	B	+ , - , var.	+ , - , var.
	C	+ , var. -	- , + , var.
	D	+ , - , "	++ "
	E	+ , - , "	"

Series 70, especially, seems to show loss of lac variability within Xyl segregant. Pick var. colonies from Xyl plates to lac + Xyl EMB.

70B-(1-3), not for isolated on - media
done

P7. A). 2,3 are pure xylose - . (1) Contains predominantly - but some + or variable. Pick these to Xyl EMB ^{but} and to lac EMS. [No isolated colonies.]

1. + ; var on xylose. ! Pick to lac EMS
2. + ; var on xylose. ! and lac EMB.
3. Pure +
(0) to EMS. See 333a.

333A: 1-6.

	Xyl.	Lac
1	+	±
2	+	±
3	±	±
4	±	±
5	+	+
6	±	±

No partial seg -
negative var.

1. H. + ... - when ... i. l.

333A₀ is a plate of EMS Lac streaked ultimately from a ~~H~~ = "lac - " colony of H72. About 50% are lac - . Test them on XylEMB. Kupsas Lac EMS.

c). Streak out H72 on Xyl + Lac to look for - colonies.

P10

1-3 lac - ?
4-8 xyl - ?

	lac	xyl.	
1	-	-	(1)
2	-	-	(2)
3	-	-	(3)
4	-	-	(4)
5	-	-	(5)
6	-	-	(6)
7	±	±	(7)
8	-	-	

Refer to lac + Xyl EMS for papillae, except (7).

No papillae on Xyl! Also H72: no papillae.

P18. Papillae tested on EMB Lac. ∴ These lac - prototrophs are monogenic for lac -

	1	2	3	4
1	++	++	++	
2	++	++	++	
3	++	++	++	
4	++	++	++	
5	++	+	++	
6	++	++		

333a.

P10. B)

70 B'

lac Xyl.

1	++;	-	-+V
2	++;	-	-;+V
3	+++		-;+

c'

1	++	-	-+V
2	++	V	-+V
3	++	-	-+V
4	++(=)	-	-+V

E'

1. ++ mig. Ver.

72. Ax

1.	-;V	=	=
2.	+,-,V	=	=

B_L

1		+ - V	D ₁
2		+ - V	1
3		+ - V	2
4		+ - V	3

B_X

1	+ - V	D ₂
2	+ - V	1
3	+ - V	2
4	+ - V	3

C_L

1		V - +
2		V - +

C_X

1	- V	D ₃
2	- V	1
3	- V	2
4	- V	3

=

D_L

1		++
2		++

D_X

1	- +	D ₄
2	- +	1

E_L

1		++
2		++

E_X

1	- V	E ₁
2	- V	*

Except for H72 D_L, and doubtfully for series I, the segregation of lac and Xyl is strictly co-oral. Picks colonies and mass of D_L to confirm segregations.

D₁ lac Xyl

1		-
2		-
3		+
4		-
5		+
6		-
7		-
8		-
(0)		±

} should all be
xylose +.

Note a deviation
from typical behavior
of H72.

→ 333B1 + 2.

Picks var. colonies from ~~D₂₃~~ and D₂₆ and

- test nutrition:
- starch on EMB lac:
- s.o. on EMB lac + Xyl to verify g.m.

(1) : Variegated, +, - both on lac and Xyl
(2) :

The error was based on the
use of GalEMB as Xyl EMB.
No partial segregations here!

H Crosses.

335

October 12, 1948.

①. W108 x W466	Mostly - !	From Lac EMS to La
② W327 x W466	Mostly + !	From Lac EMS to H
③ W252 x W466	Mostly -	100+ picked. Lac EMS to L
④ W108 x W478	Mostly - .	H Lac EMS. fo.

① 24 tested. 10, 12, 18, 73, 3, 4. = 1-6

②. 48 tests. No heterozygotes noted.

③ 79, 64, 82, 49, 52, ⑨7, ⑨9, ⑨6, 2 7-15 Chard lighter
appearance on EMS.

④. 20; others?) 16.

Ritests:	rec	blue	H	
			Var	100
1	?	++		
2	?	v?		
3	v	++		
4	v	++		
5	++	++		
6	v	v?		
7	v	++	104	
8	v	++	105	
9	++	++		
10	++	++		
11	v	++		
12	v	++	106	
13	++	++	107	
14	v	v?		
15	v	v?	108	
16	?	++?	109	

Ritest colonies from 16. None segregating.

10/16+, 1948.

- A) Grow H72 in Y2 broth overnight to allow segregation, and plate on Lac; Xyl EMBS. Compted by N.Z.
+ calculated!

			Var. Σ
	+	-	
a.	20	274	6
b.	25	345	8
c.	16	196	5
	61	815	19
			895.

$$-:+ = \frac{815}{61} = 13.3 : 1 = \alpha$$

$$\chi^2_4 = 0.15$$

$$\rho = .99!$$

fructose

29	228	9	266
15	178	4	197
32	248	10	290
—	654	23	753

$$-:+ = \frac{654}{76} = 7.5 : 1 = \beta.$$

$$\chi^2_4 = 3.17 \quad \rho = .53.$$

This gives linkages as $Xyl-\text{Af} = \cancel{25} 7.0$
 $Lac-\text{Af} = \cancel{125} 11.8$

- B). Lac - and + colonies and test on heterologous medium:

	Lac-	Lac+	Σ	$Lac-\text{Af} = 16/125 = \cancel{16} 16.6$	Interference?
Xyl-	109	16	125		
Xyl+	69	0			
	38				

	Xyl-	Xyl+	
Lac-	101	7	
Lac+	182	1	

$$Xyl-\text{Af} = 7/118 = \underline{\quad} 1.2$$

+ colonies from 336a retested in both media.

1-16 "Xyl - Lac+

17-23 Lac - Xyl+

24 Lac+ Xyl+.

EMB Xyl Lac

1	-	+
2	-	+
3	-	+
4	-	+
5	-	+
6	-	+
7	-	+
8	-	+
9	-	+
10	-	+
"	-	+
12	-	+
13	-	+
14	-	+
15	-	+
16	-	+
17	-	?
18	+	-
19	+	-
20	+	-
21	+	-
22	+	-
23	+	-
24	+, -	+, -

24-	Xyl	Lac
1	+	+
2	-	+
3	-	-
4	+	-
5	-	-
6	+	+
7	+	-

not segregated for either lac or xyl test isolat
 and a mixture of
 Xyl+Lac- and Xyl-Lac+.
 Sure -- (4) was also
 found, the culture may have
 a merozoite.

+	Df	+
xyl		lac
-	x	y

Xyl-lac-	$(1-x)(1-y)$
Xyl+Lac-	$x(1-y)$
Xyl-Lac+	$y(1-x)$
Xyl+Lac+	xy .

Q. Interference: In A, $\frac{x-L+}{x-L-}$ should = $\frac{x+L+}{x+L-}$. $\chi^2_1 =$

Expectations in some columns are < 5.

Q. Linkage. Use only single crossover data.

$$\text{Lac-} \frac{xyl-}{xyl+} = \frac{1-x}{x} = \frac{1}{r_b + 1} . \quad x = \frac{1}{r_b + 1}$$

(.2b).

336. $r_b = 17 \quad x = .055$

336a. $r_b = \frac{104}{7} = \quad x = .077.$

mean: $r_b = \frac{111}{36} \quad x = .061$

$\chi^2_1:$

34	2	36
$104 \frac{104}{7}$	7	111
138	9	147

$$Xyl - \frac{Lac-}{Lac+} = r_a.$$

336: $r_a = \frac{33}{6}$

$$y = 15.4$$

$$\bar{y} = 13.4$$

$$r_b = \frac{109}{16}$$

$$y = 12.8.$$

$\frac{108}{109}$	$\frac{17}{5}$	$\frac{16}{6}$	$\frac{125}{39}$
$\frac{33}{34}$			
$\underline{142}$	$\underline{22}$	$\underline{16}$	$\underline{4}$

$$\chi^2_1 = \frac{1}{5} + \frac{1}{17} + \frac{1}{34} + \frac{1}{108} = .01 \\ .20 \\ .06 \\ .03 \\ \underline{.30}$$

$P = .0660$

Summed data 336...

Lac-	$Xyl -$
34	$\frac{34}{104}$
$\underline{104}$	$\underline{9}$
$138.$	

Lac-	$Xyl -$
$\frac{34}{104}$	$\frac{34}{104}$
$\underline{104}$	$\underline{9}$
$138.$	

$Xyl -$	$\frac{33}{109}$	$\frac{6}{16}$	$\frac{174}{22}$
$\underline{109}$			
$\underline{142}$			

336 a. Random plating. defined from absence of X+L+ class.

$X - L -$	1328	gives $x = 7.7$
$X - L +$	167	$y = 11.2$
$X + L -$	$\underline{122}$	
$1606.$		

Oct. 15, 1948.

W58 3x58-161.

low yields: abandon exp.

1) EMS Lac

October 19, 1948. Repeat.

ca 30:1 - : +

EMS Xyl B ₁	Σ	+	-	EMS Xyl:	Σ	+	Σ	+
ca 3% +	32	2		54	4		201	2
	136	1		339	1		120	2
	41	1		147	3		162	1
	41	1		277	3		178	1
	31	3		96	0			
	28	1		199	1		2218	23
	309	9	300	170	3			
				92	1			
				183	1			

1) EMS Lac B₁. Colonies picked indiscriminately to homologous medium.Classified by presumptive test original score + B₁ in plates:

1. Xyl + B₁
2. - B₁
3. Xyl + 0
4. Xyl - 0
5. Lac - 0
6. + 0
7. - B₁
8. + B₁

This experiment unsuccessful as two count

- (1) Tests were not decisive, most suspensions felt being apparently mixtures.
- (2). Confusion of classes.

22

49.

3yo.

~~Group B.~~ Lac Mal Gal Xyl Arab

+++-+--+-

Xyl Arab

— + — + — + — + — +

"+"
-
"+"

三

三

—
—
—

十一

十一

—
—
—
—
—
+

++
++
++
++
++

— — — — +

十一

" χ_{eff} "
 $T(0)$

$$\frac{K}{\log -\pi(0)} \cdot \begin{matrix} + \\ - \\ + \end{matrix}$$

VI
val⁺ T(0)

3yo a

good reading! —

7

bar	Mal	Kal	Xyl	Hab	bar	Mal	Kal	Xyl	Hab
	+ + + + +	-	+ + + + +	- + + + +	-	-	-	-	-
	+ + + + + +		+ + + + +	+ + + + +		+ + + +		+ + +	+ + +
	+ + + + + +		+ + + + +	+ + + + +		+ + + +		+ + +	+ + +
	+ + + + + +		+ + + + +	+ + + + +		+ + + +		+ + +	+ + +

四

8a

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

~~Healt~~

Sal

Re

C 2 - hardly worth
scoring.

31

6

October 18, 1948.

Resuscitate H72 fairly heavily into T(0) + T(B₁). Shakes.

P19. No growth A20. Heavy growth in T(B₁); none in T(0).

ds H72 B,
" more

- ①. Streak out H72 on LacEMB, EHS, EMS'.
- ②. Plate out T(B₁) tubes on Lac EMS'; Xyl EMS'.

P21. ① on LacEMB: almost all Lac - (2). Do. on xylose EMBS.
(i.e. most of the stock culture is segregated.).
A few + noted on EMS.

②. 2 plates on Lac EMB. 140 colonies. All Lac -
EHS' too small to read

A22. - only noted on all plates, ~~Lac~~, EMS'Lac + Xyl'

A22. Pick single + colonies of H72 from ~~Lac~~ EMS'Lac to T(0) tubes to -
a) resuscitate H72 and b) continue cyc. Streak out on LacEMB for
T(0) suspensions. Use #6.

LacEMB. (OK).

1 ✓
2 ✓
3 ✓
4 ✓
5 ✓
6 ✓

See 348.

Segregation of Mal, Gal, Ar.

346

Oct 21, 1948.

~~W56~~ W478 + W583 in Mal, Gal, Ar EMS.

Low yields!!

101-120 Gal+ } test on EM B Galactose + Arabinose
 121-123 Arabinose. }
 1-100 ~~Mal~~ Maltose. test on EM B Maltose. 6.
 D.

100 colonies picked from Mal, not readily scored. Only 39 Mal+
 Reckless: 16, 25, 31, 50, 59, 87, 95, 99.

20 Gal+ colonies: All Gal+ Arab+. No heterozygotes.

3 Ar+. 2 Ar+ Gal+. 1 Gal- Ar+,-? Reckless 121.
 1-8 on Mal EMS 9 on Ar EMS.

ENS.

1	16	++	++
2	25	++	++
3	31		Hold.
4	50	++	++
5	59	no +'	
6	87	no +'	
7	95	++	++
8	99	++	++
9	121.	++	++

2 cols from EMS listed.

Radiation - induced Chromosome Losses.

34.

Oct. 23, 1998

Spread H72 grown on T/0 (see 348) on EMS Lac + Xyl and expose for 5-15 secs. Cf 348 for control.

App. n.g. Controls inviable NG

"Autogamy, etc.

348

October 23, 1948.

Growth 472 on T/0) — see 340. — dilute $5/10^{-7}$ and plate on EMB; EMS Lac; Xyl for colonies.

n.g. Culture visible.

Verification

34,

October 23, 1948.

See 345.

streak out streaks on media indicated

	EHS Xyl. EMFLac
H93	v.small + v.small + cols.
H96.	n.g.
H58	n.g.
60	n.g.
62	+ - cols. EHS Ar(B ₁)
H85	+ cols?
86	n.g.
88	1 - col.
93	v.small + cols on EMF
94	numerous + and - cols.
	EMBA. EHS Xyl.
95	a few + and - cols.
96.	n.g.

Hal -

93 → XylEMB, LacEMB, LacEMS. ~~Lac~~ Xyl V; Ar - "Lac -"

85 XylEMB, LacEMB, ArEMB.

94 .. Xyl V
95 .. Lac - (slow??)

62 LacEMB; ArEMB Lac V Ar +

H52 Stock. Lac V OK

H1 S. OK

Resuscitation and prediction of H. pylori
Reactivities.

	EMR histology		
	V	++	+++
H72S			
H72n	mostly -		
H93	V	-	
H62	V; +, -		++
H85	(V) ^{slow} +, -	het +; - ?	+ character here?
H22	++,- (probably).		
H94	-	+ ^{weak?}	
H95	+,- V	-	
H88		-	signified // sterility or bacteriostatic.
H70	++, -	+	
H1	V, +, -	++, -	
H52	(+), -, (V)		
H71	(V), ++, -	-	

311.

Sept 24, 1948.

W478 x W583

Ar, Mal + Gal EMS.

Fructose: 24 + colonies. All ++

Galactose: 28 + colonies All ++. ~~#55~~

Maltose: 50 + " All ++ Checks 4, 5, 18, 19, 43 (N2)

O₂ 605% T 2%
N.A.

test on Lac +/
(350)

58-161 glu (-)

Oct 29

I inoculated to Pem. assay.

Oct 30 I irradiated > secs on Q.M.B. glu. plate

Oct 31 16 colonies picked singly glu (-)
checked on C.M.Bgl.

Nov 1 Some (4) apparently glu (-) streaked again on Q.M.Bgl.
(*)

Nov 2 2 glu (-) streaked on T₁. with T₁
4 days.

Nov 3	Inoculated on:			15 hrs.	4 days.
		"N"	"Z"		
	Glu	Ney	Ney		
	Lac	Ney	Ney		
	MAl	Ney	Ney		
	Fru	Ney	Ney		
	MP mouse	I	I		
	RNA M	Ney	Ney		
	arab	Ney	Ney		
	Gal	Ney	Ney		
	Xylo		+		
	Treh	Ney	Ney		

Nov. 8 Tested on K glucose

"N" "Z" 15 hrs
± slow slow ±