

December 1, 1949.

Dr. M. Demerec,  
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Dear Dr. Demerec:

Thank you for sending the draft of your nomenclatural proposals which, I think, are very constructive. The Bulletin might well be a semi-official repository for notations, as eventually some sort of conflict over priority is bound to arise.

It might be pointed out that any designation of mutations is perfectly arbitrary, and that it is more important that a given symbol be carefully defined, than that the symbol itself be descriptive in detail. In special circumstances, a departure from the rule that the symbol incorporate the initial of the phenotypic designation may be desirable, since we are very soon going to run into synonymies.

I am not sure that I concur with your objections to the symbols + and -, except insofar as they may be typographically less desirable than f and n. In most instances the + allele is that which is physiologically competent (e.g. able to make biotin, or able to ferment lactose.) A second exception that I would plead is the retention of three-letter symbols for sugars. The abbreviations Lac, Gal, Xyl, etc. are liable to be slightly more familiar to bacteriological specialists who may wander into genetic articles. To incorporate such an exception, I would revise the rule so that any combination of 3 letters or less would be an acceptable symbol, but stress the desirability of brief symbols.

The superscript notation for alleles is, of course essential. However, with respect to mimics, I wonder if the use of subscripts could not be mitigated. This would simplify typography, as well as the preparation of manuscripts, etc. Since there really is no fundamental difference between mimics and groups of similar characters, why not avoid subscripts altogether, and use additional letters or numbers written on the same line in both instances, i.e.,  $S_2^x$  rather than  $S_2^x$ . One has the additional option of italicizing the differentiating symbol, but even this is unnecessary.

Ideally, ~~the~~ the listing of symbols should be in the linkage order, but I have the feeling that the formal statement of this recommendation is still premature. I am willing to compromise on the specification ~~of~~

An alphabetical arrangement of other symbols is not necessarily desirable; for technical reasons, I usually prefer to give the nutritional requirements first.

If I may, I would like to list some of the symbols we have used in publications, and around the laboratory. They are, of course, subject to critical revision.

A) Nutritional requirements. Allels are +, - for independence and dependence resp.

A	arginine	Ad	adenine	An	anthranilic ac
Al	alpha-alanine *	Ady	yeast adenylic ac	Akg	alpha-ketoglutaric ac
As	aspartic acid	Adm	muscle adenylic acid*		
B	biotin	Gl	glycine or serine	H	histidine
Bal	beta-alanine	G	glutamic ac	Hx	hypoxanthine
B1	thiamin	Ga	guanine	Hp	hydroxyproline *
B12	Vitamin B-12			M	methionine
B2	riboflavin *	Ins	inositol *		
B6	pyridoxine	In	indole		
		Il	isoleucine	Nic	niacin
Ch	choline	Ilv	isoleucine + valine		
C	cystine			P	proline
Cy	cytosine *	L	leucine	Pa	phenylalanine
Ci	citrulline	Ly	lysine	Pab (or Pb)	pab
		Lym	lysine + methionine	Pga	pteroylglutamic ac*
Dpn	"Coenzyme I"	K	menadione *	Pyr	BI-pyrimidine
				Pnt	panthothenic ac
S	sulfide	U	uracil	Pnl	panthoic lactone
Ser	serine	V	valine		
T	threonine				
Tr	tryptophan	X	xanthine		
Ty	tyrosine				
Thy	thymine				

B) Sugar fermentations. Allels are +, fermenter; -, nonfermenter; s slow fermenter; and t, temperature sensitive.

Lac	lactose	Glu	glucose	Fru	fructose
Mal	maltose	Ar	l-arabinose	Man	mannose
Xyl	xyllose	Mtl	mannitol	Sor	sorbose
Gal	galactose	Stl	sorbitol	Suc	sucrose
Gen	gentiobiose	Cel	cellobiose	Mel	melibiose
Amg	alpha-methyl glucoside	Gly	glycerol	Ltl	lactitol
Lba	lactobionic ac	Hex	hexoses	Sal	salicin
Mba	maltobionic ac	Muc	mucic acid	<del>Rhypo</del>	
Gur	glucuronic ac	Dxr	dextrin	Nlc	neolactose
Gar	galacturonic ac	Amy	amylose		
		Amp	amylopectine		

C) ~~Resistance~~

in E. coli

The above list does not imply that a specific mutant has been isolated which calls for the designation. This applies particularly to starred items.

Resistance mutations

Chemicals r, s, or d....

As	azide	Bg	brilliant green
Cl <sub>a</sub>	chloroacetate	Pfl	proflavine
I <sub>a</sub>	Iodoacetate	As	arsenate
C	streptomycin		
V <sub>a</sub>	valine	Hg	mercuric
Pc	penicillin	Cu	cupric
Sr	streptothricin		
Cmy	chloromycetin		
<del>Am</del>			
Am	aureomycin		

Phages r, s, or p

V1<sup>s</sup> formerly V<sub>1</sub> (= /1,5)  
V15<sup>D</sup> formerly V<sub>1c</sub>, now ~~shown~~ shown allelic to V15<sup>R</sup>  
V1 formerly V<sub>1a</sub> (= /1)  
V1<sub>a</sub> formerly V<sub>1b</sub>, mucoid resistant

other numbers are obvious. V1<sub>t</sub> (= /1,t) has not been found in K-12.

I submit this list with some trepidation, and wonder if it would not be well to submit it for discussion to a group in N.Y., for later inclusion in the Bulletin as a joint effort. Tatum and Beadle should also be consulted, if they will not be in NY.

Thank you for sending /S22. Some other matters have come up, and I have had to interrupt crosses with it. However, I noted that it does not grow luxuriantly on EMB. Does it have a partial streptomycin-requirement?

Sincerely,

Joshua Lederberg