

Boone, D. M. and D. R. Stadler. Reciprocal and non-reciprocal recombination between closely linked markers.

suggested that the increase was mainly in the RR class, with NRR remaining constant. This report deals with a similar analysis of recombination between closely linked genes of unrelated phenotype. All crosses were his+2; col-4, arg-2 $\times$ his+2; pdx-1 mtr A of the fwr linked loci (with approximate map distances) is $\frac{\text{pdx-1}}{\text{erg-2}} = (2) = \frac{\text{mtr}}{\text{col-4}} = (1) = \frac{\text{col-4}}{\text{erg-2}} = (0.2) =$

Random ascospores were plated on minimal sorbose medium supplemented with histidine, pyridoxine and an excess of arginine. This medium was selective for mtr⁺, because the uptake of the required histidine depended upon the function of this gene. The mtr⁺ colonies were counted, and the 1-2% which were non-colonial (col-4⁺) were selected visually, counted, isolated and scored for the unselected markers.

No tetrad analyses were included, but an attempt was made to distinguish RR between mtr and col-4 from NRR at either of these sites by the marker combinations accompanying them. It was assumed that the marked intervals were so short that progeny which were double exchange types for adjacent intervals could only arise by NRR.

The first five crosses differed only in their mtr alleles. All of these alleles had been inserted by mutation into the same his+2; pdx-1 A strain, so the genetic background was identical in these crosses. As expected, the results show relatively constant frequencies of RR and of NRR at the col-4 locus. The fluctuations in NRR rates at mtr are presumed to represent the different conversion frequencies for the different mutant alleles.

From the cross involving mtr-119, four progeny of the genotype his+2; pdx-1, mtr A (designated 119-1, 119-2, 119-3 and 119-4 in the table below) were isolated and back-crossed to their his+2; col-4, arg-2 A parent. Two his+2; pdx-1, mtr A progeny (designated 119-1-1 and 119-1-2 in the table below) from one of these back-crosses were back-crossed to the same parent. The results from the back-crosses do not reveal any simple trends. Some show an increase in RR, but

Reciprocal recombination (RR) may result from a different kind of event from non-reciprocal recombination (NRR; also called gene conversion). Stadler and Towe (1968 Genetics 58:327) found that inbreeding raised the frequency of recombinants between two closely linked but non-allelic cysteine mutants of *Neurospora*, and the marker combinations

one shows a pronounced decrease (although the number analyzed was small in this cross). The expected uniformity of conversion rates is not observed, and the fluctuations represent both increases and decreases.

<u>mtr</u> parent	total <u>mtr</u> ⁺ colonies	RR <u>pdx</u> ⁺ <u>mtr</u> ⁺ <u>col</u> ⁺ <u>arg</u> ⁺	NRR at <u>mtr</u> ⁺ <u>pdx</u> <u>mtr</u> ⁺ <u>col</u> ⁺ <u>arg</u> ⁺	NRR at <u>col</u> ⁺ <u>pdx</u> ⁺ <u>mtr</u> ⁺ <u>col</u> ⁺ <u>arg</u> ⁺
<u>mtr</u> 112	15,670	152 (9.7)	4 (0.26)	27 (1.7)
<u>mtr</u> 116	13,400	127 (9.5)	10 (0.75)	29* (2.2)
<u>mtr</u> 117	11,630	142 (12.2)	16 (1.4)	30* (2.6)
<u>mtr</u> 119	14,530	201 (13.8)	6 (0.41)	25* (1.7)
<u>mtr</u> 121	12,420	145 (11.7)	9 (0.72)	32* (2.6)
<u>mtr</u> 119-1	8,770	168 (19.2)	11 (1.3)	32** (3.6)
<u>mtr</u> 119-2	1,720	17 (9.9)	0	1 (0.58)
<u>mtr</u> 119-3	1,390	60 (43.1)	3 (2.2)	6 (4.3)
<u>mtr</u> 119-4	1,010	5 (5.0)	0	3 (3.0)
<u>mtr</u> 119-1-1	5,490	75 (13.7)	1 (0.18)	4 (0.73)
<u>mtr</u> 119-1-Z	3,540	62 (17.5)	1 (0.28)	3 (0.85)

Numbers in parentheses are frequencies per thousand mtr⁺ colonies.

• One of there was pdx mtr⁺ col⁺ arg.

** Three of there were pdx mtr⁺ col⁺ arg.

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