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Translocations between SM1 and Ubx^{130}.

For an experiment which was being planned, it was convenient to have the two autosomal balancer chromosomes SM1 and Ubx^{130} linked together. An irradiation was therefore carried out for the purpose of inducing translocations between them. Males of the genotype SM1/B1; Ubx^{130}/Vno were irradiated with 4000r of X-rays and mated to normal females. F_1 Cy Ubx females or males were tested for linkage. 184 fertile cultures yielded 14 translocations, all of which were confirmed by 2 different outcrossings. Most of the translocations are viable (though detrimental) and fertile in heterozygous condition in males and females, but 1 is male sterile, 1 is male lethal and 2 were so inviable in both sexes that the stocks could not be maintained. It has not been possible to determine salivary chromosome break points. All of these stocks will be available for a limited time to anyone who requests them, but eventually all will be discarded except the one chosen for our purpose.

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An $X \cdot Y^{S}Y^{L}$ Chromosome.

A new attached XY chromosome has been synthesized which carries a normally arranged X chromosome on one side of the centromere and a complete Y chromosome on the other. This chromosome was derived in the following way. Prepupal males carrying an $X \cdot Y^{S}$ chromosome marked with y and w and FR-2, $y+Y^{L}$. were irradiated with 1000r. Upon eclosion the w males were mated and daily transferred to 3 new y w^{a} bb $\hat{X}\hat{X}$ virgin females without a free Y for 4 broods.

An exchange distal to the fertility factors on Y^{S} and proximal to those on Y^{L} generates a y w $\cdot$ $Y^{S}Y^{L}y^{+}$ chromosome which will be recoverable as a fertile w male. Should such an exchange delete one or more of the fertility factors on Y^{S} or Y^{L} the resulting w male will be sterile. Fertile w males may also arise through nondisjunction.

Of 26 w males recovered, three were fertile and two of these proved to be cases of primary nondisjunction. The remaining fertile male gave only y w^{a} bb females and w males in the subsequent generation. Cytological examination of a few Metaphase II spermatocytes confirms the expectation that the attached XY is a metacentric-like chromosome.

A comparative crossover test was carried out by mating the $X \cdot Y^{S}Y^{L}$ and Ore-R males to females of a stock bearing the markers y(o,o), cv(13.7), ct(20.0), oc(23.1), v(33.0), f(56.7), and car(62.5). The F_1 virgin females of each mating were then back-crossed to males of the marked stock. The crossover values for each region of the $X \cdot Y^{S}Y^{L}$ and Ore-R chromosomes are presented in the table. Crossing over between car and the centromere of the $X \cdot Y^{S}Y^{L}$ was measurable because of the presence of y^{+} on Y^{L}. There appears to be a significant decrease in crossingover beginning at v and progressively increasing toward the centromere. This may be caused by interference of Y heterochromatin on crossingover at the proximal end of $X \cdot Y^{S}Y^{L}$.

Observe Differences Between Markers

	R_1 y-cv	R_2 cv-ct	R_3 ct-oc	R_4 oc-v	R_5 v-f	R_6 f-car	R_7 car-spa	N
$X.Y^{S}Y^{L}$	11.7	7.8	3.1	9.4	16.6	2.1	1.6	3390
Ore-R	9.6	6.0	3.1	9.1	22.3	4.7	(--)	2784
Bridges & Brehme	13.7	6.3	3.1	9.9	23.7	5.8	3.5	

The chromosome has been carried with $\hat{X}$X/o females for ten generations with no observed breakdown of the newly derived chromosome. However, the frequency of w males was observed to be somewhat lower than expected, and so w males were individually mated with virgin free X y females and y w^{a} bb $\hat{X}$X/o females to test for a semilethal effect. The results of the free X cross were 481 + ♀ : 1618 y♂, and the frequency of $X \cdot Y^{S}Y^{L}$ (481/N) is only 22.9% instead of the expected 50%. In the attached X cross, there were 828♀: 395♂ or a 32.3% recovery of the attached XY.

The results of the free X cross cannot be interpreted in terms of a semilethal effect of the attached XY. Instead, these preliminary results would appear to be compatible with an interpretation of meiotic drive even though a detailed cytological analysis and tests of attached XY females heterozygous for a suitable inversion have not been carried out.