

Synthesis of β -Galactosidase and Permease in Haploid and Heterozygous Diploid Operator Mutants

Table 11-1 Synthesis of β -Galactosidase and Permease in Haploid and Heterozygous Diploid Operator Mutants

Strain	Genotype	β -Galactosidase (Z)		Permease (Y)		Conclusion
		Noninduced	Induced	Noninduced	Induced	
1	$O^+ Z^+ Y^+$	-	+	-	+	Wild type is inducible
2	$O^+ Z^+ Y^+ / F' O^+ Z^- Y^+$	-	+	-	+	Z^+ is dominant to Z^-
3	$O^c Z^+ Y^+$	+	+	+	+	O^c is constitutive
4	$O^+ Z^- Y^+ / F' O^c Z^+ Y^-$	+	+	-	+	Operator is cis-acting

Note: Bacteria were grown in glycerol (no glucose present) with and without the inducer IPTG. The presence or absence of enzyme is indicated by + or -, respectively.

Table 11-1

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Operators are cis-acting

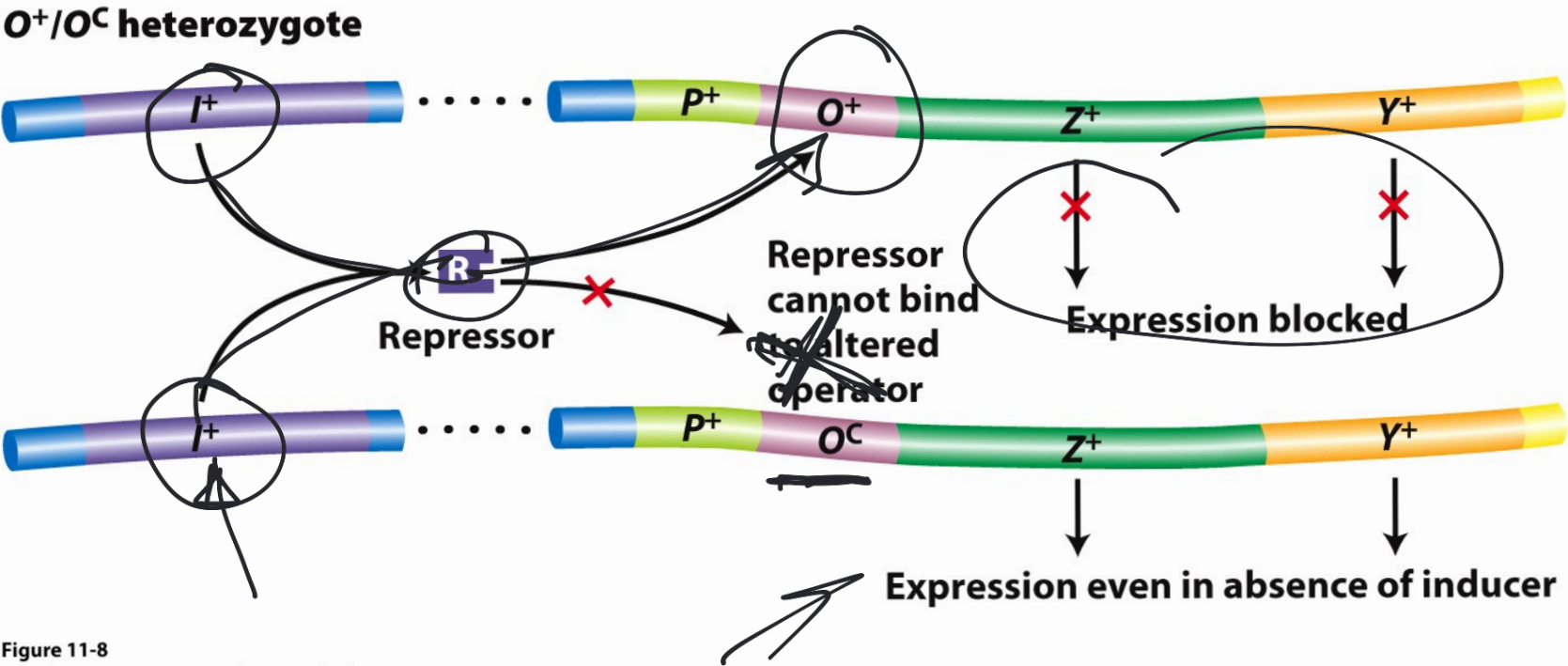


Figure 11-8
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An “operator” is a specific DNA sequence in the genome

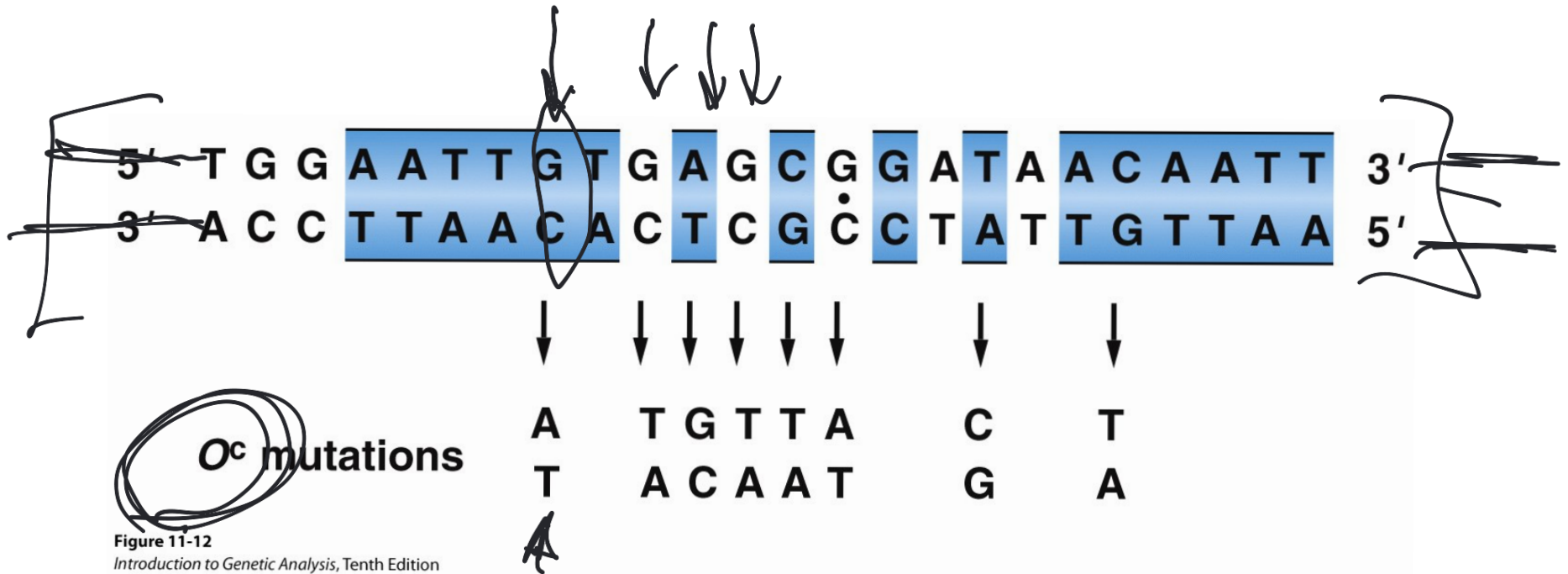


Figure 11-12
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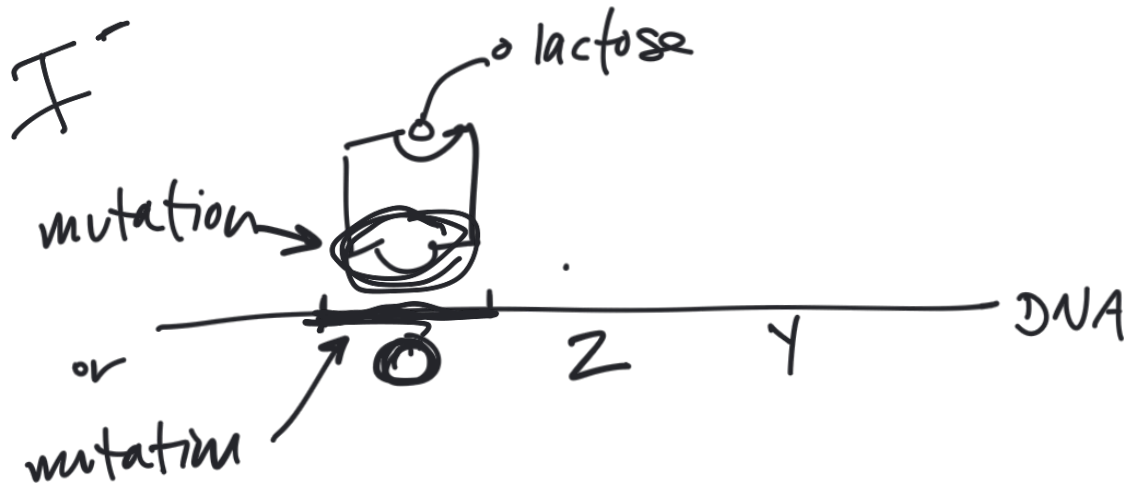
- I^- = incapable of repressing expression
- O^c = incapable of repressing expression

- I^+ can "rescue" I^- trans-acting
- O^+ cannot rescue O^c cis-acting

P O Z Y DNA P (O^c) Z Y DNA

wild type operator

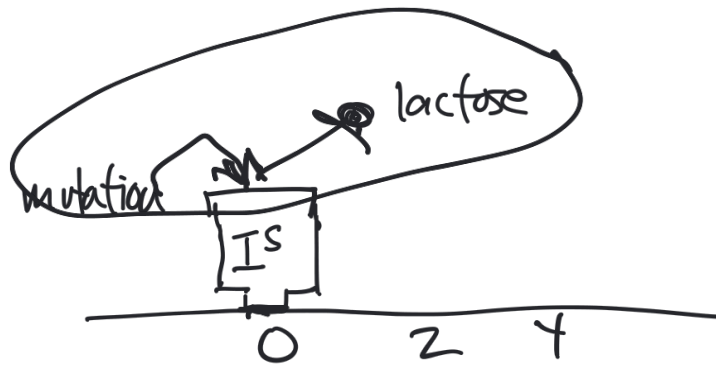
Bgal always + permease



Another, final, class

I^s = super repressor

= cannot respond to inducer
(lactose)



Genotype	βgal		permease	
	-	+	-	+
1. $I^+ Z^+ Y^+$	-	+	-	+
2. $I^s Z^+ Y^+$	-	-	-	-
3. $I^s Z^+ Y^+ / F' I^+ Z^+ Y^+$	-	-	-	-