

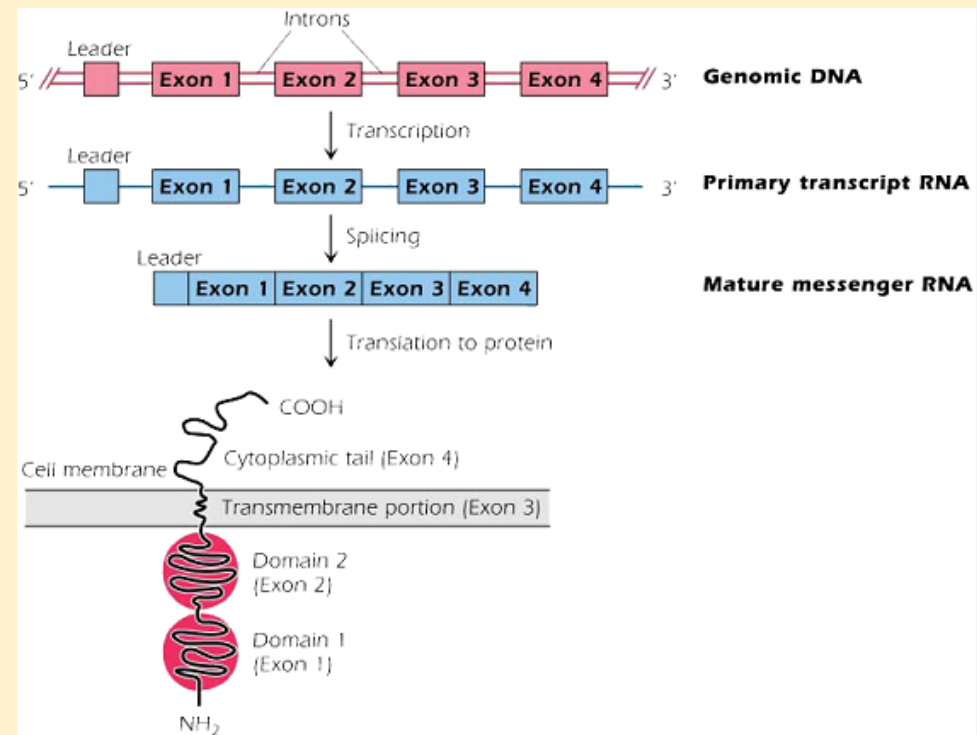


# IMUNOLOGIA

## GENES DAS IMUNOGLOBULINAS



# Expressão de uma proteína





# Número de genes

*Número de antígenos*

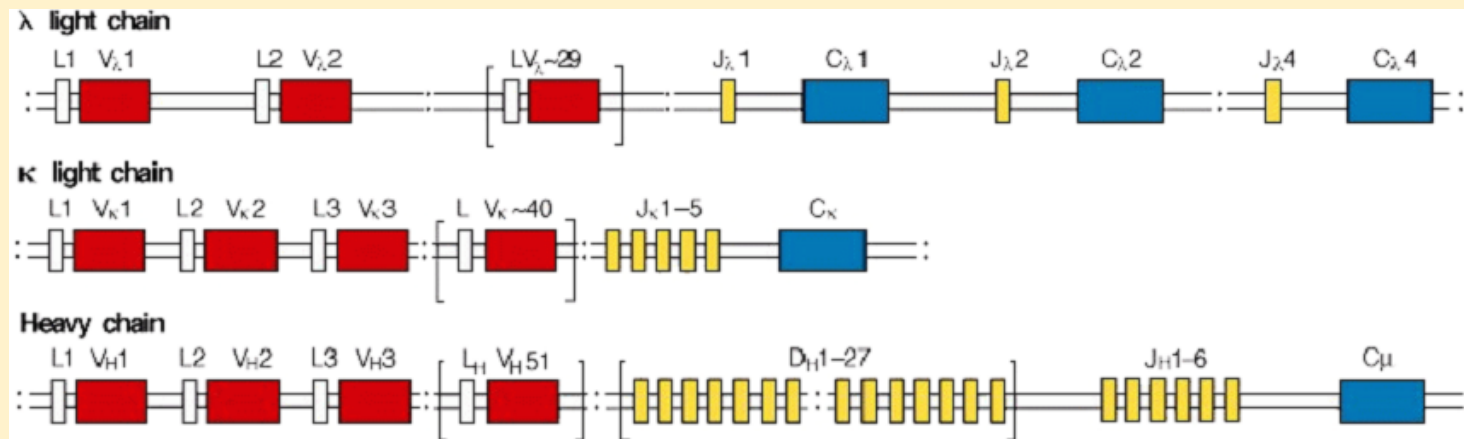
$\infty$

	<i>Quantidade de DNA (bp)</i>	<i>Número de genes (estimativa)</i>
E. coli	$4.5 \times 10^6$	4 000
S. cerevisiae	$1.5 \times 10^7$	5 000 - 10 000
C. elegans	$5.0 \times 10^6$	10 000
Drosophila	$1.5 \times 10^8$	20 000
Homem	$4.0 \times 10^9$	100 000 - 500 000

25 000 a 35 000



# Genoma germinal





# Localização dos genes das Ig's

Gene	Cromosoma	
	Homem	Murganho
Cadeia Pesada (H)	14	12
Cadeia Leve (k)	2	6
Cadeia leve ( $\lambda$ )	22	16



# Segmentos no genoma humano

Segment	Light chains		Heavy chain
	$\kappa$	$\lambda$	H
Variable (V)	40	29	51
Diversity (D)	0	0	27
Joining (J)	5	4	6



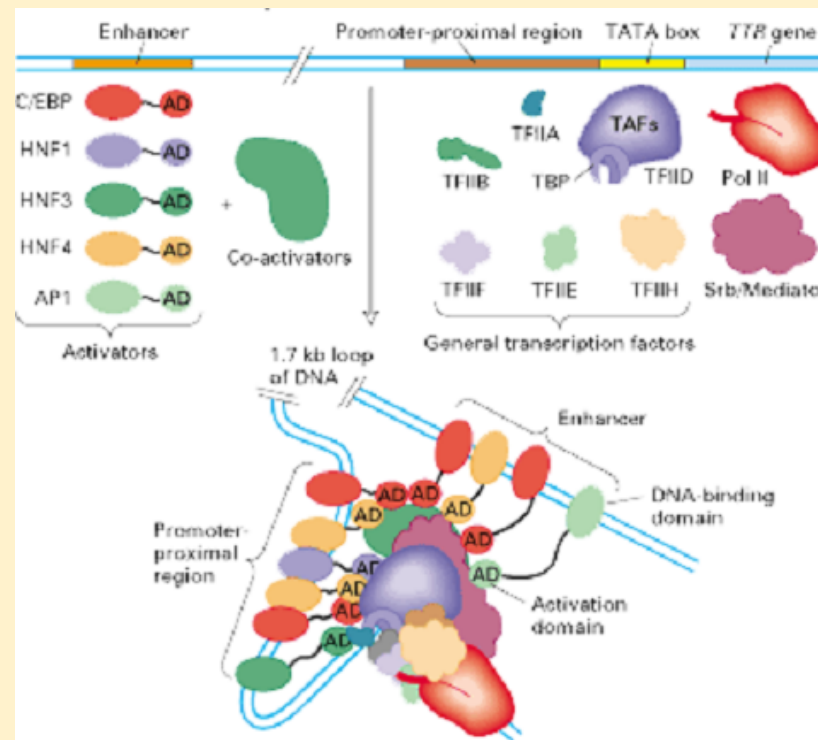
# Diversidade combinatória

<i>Murganho</i>			
<i>Segmentos genéticos</i>	<i>Cadeia pesada</i>	<i>Cadeia leve</i>	
	<i>H</i>	$\kappa$	$\lambda$
V	134	85	2
D	13	-	-
J	4	4	3
V-D-J / V-J	$134 \times 13 \times 4 = 6968$	$85 \times 4 = 340$	$2 \times 3 = 6$
<b>Global</b>	$6968 \times (340 + 6) = 2.4 \times 10^6$		

<i>Homem</i>			
<i>Segmentos genéticos</i>	<i>Cadeia pesada</i>	<i>Cadeia leve</i>	
	<i>H</i>	$\kappa$	$\lambda$
V	51	40	30
D	27	-	-
J	6	5	4
V-D-J / V-J	$51 \times 27 \times 6 = 8262$	$40 \times 5 = 200$	$30 \times 4 = 120$
<b>Global</b>	$862 \times (200 + 120) = 2.6 \times 10^6$		

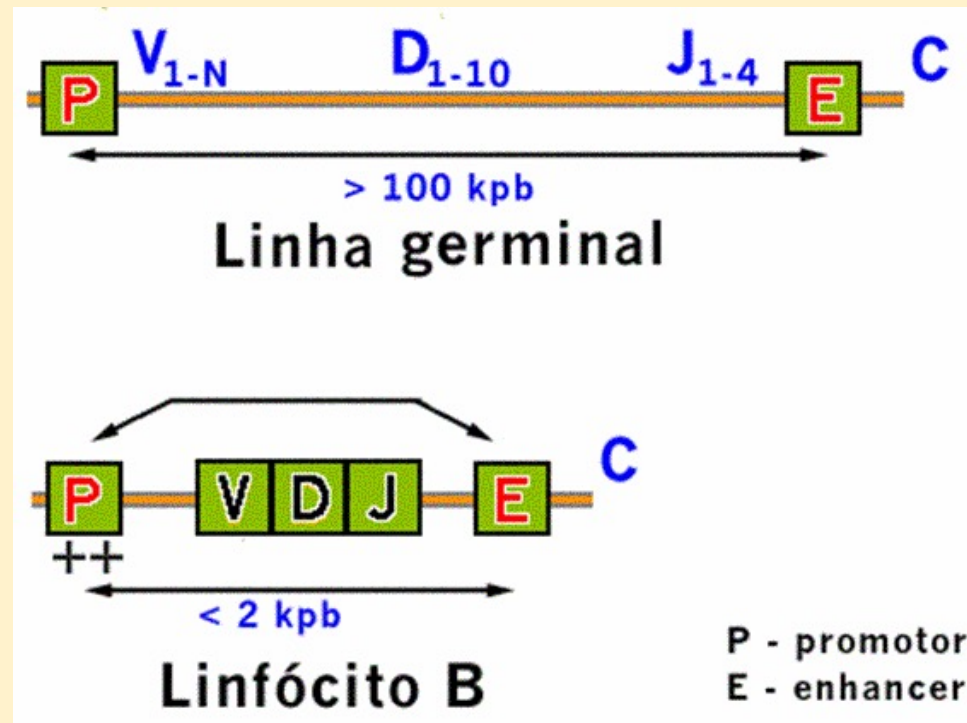


# Enhanciosoma



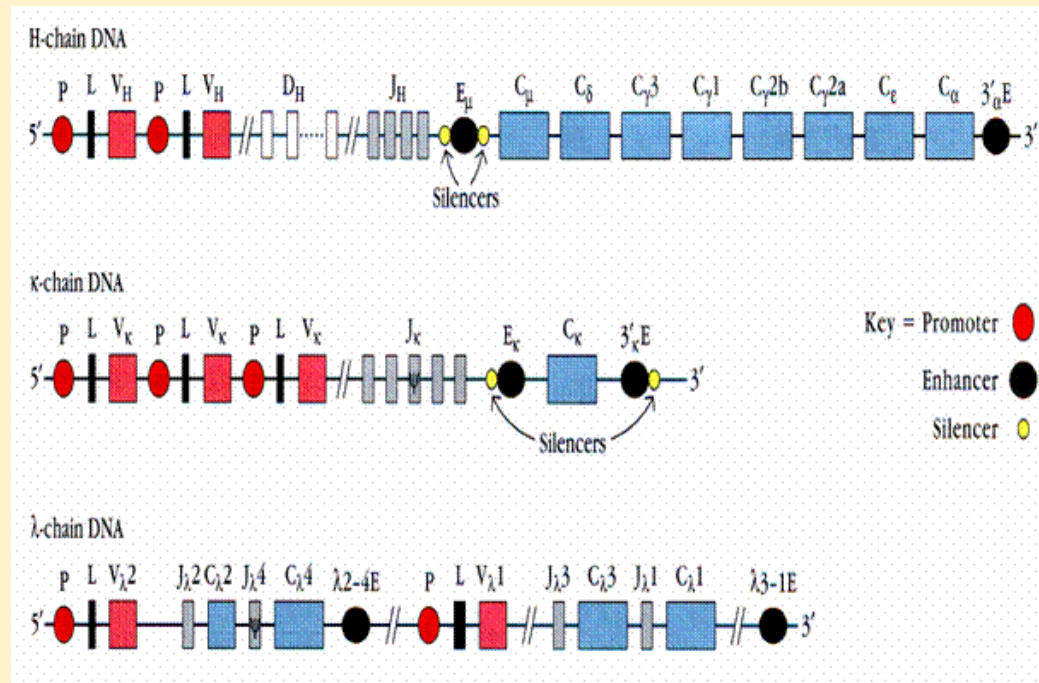


# Promotor vs. enhancer



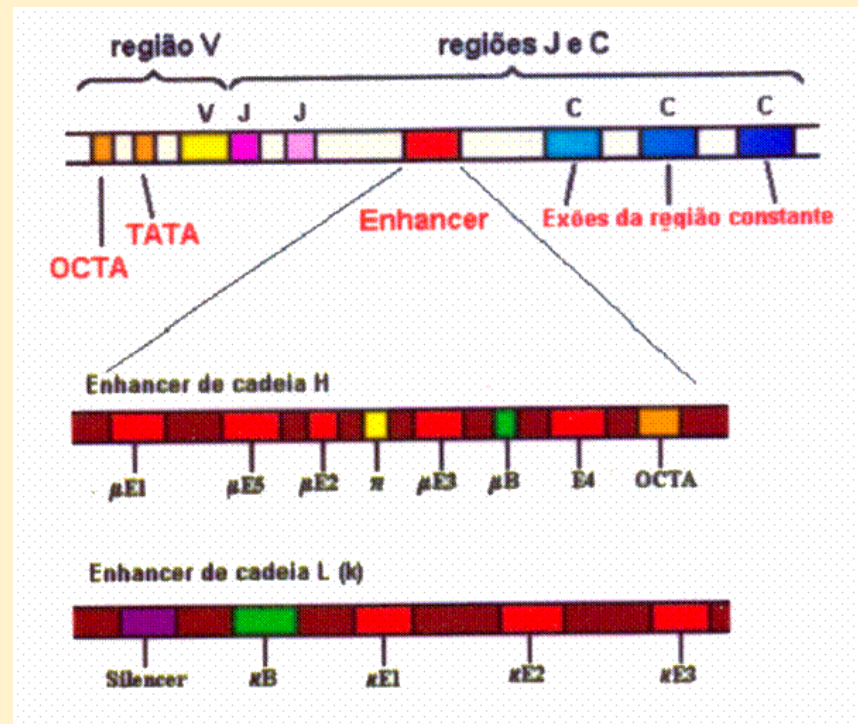


# Promotores, *enhancers* e *silencers*





# Elementos de controlo da transcrição





# Recombinação de cadeia leve

