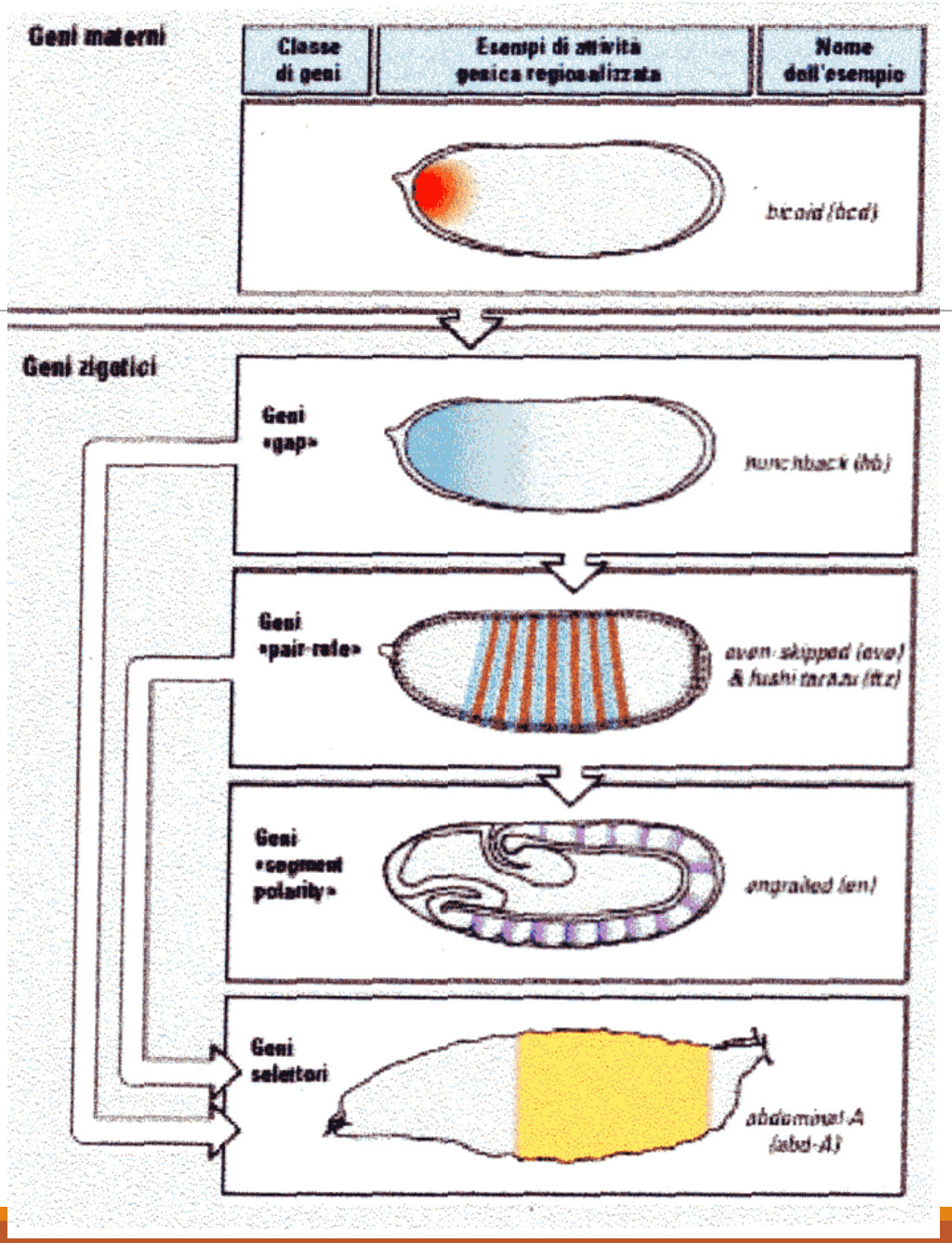
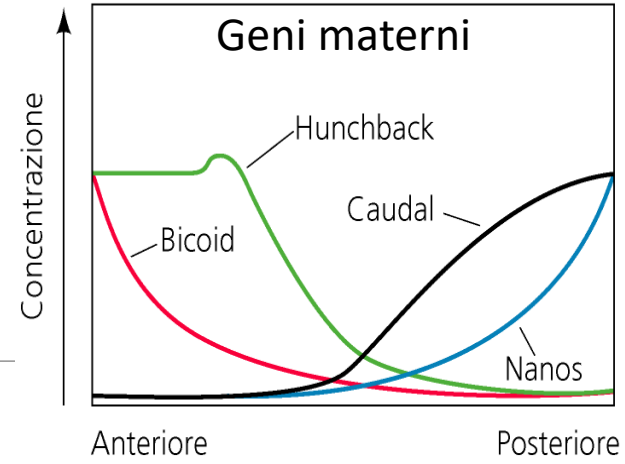
Asse Antero-posteriore

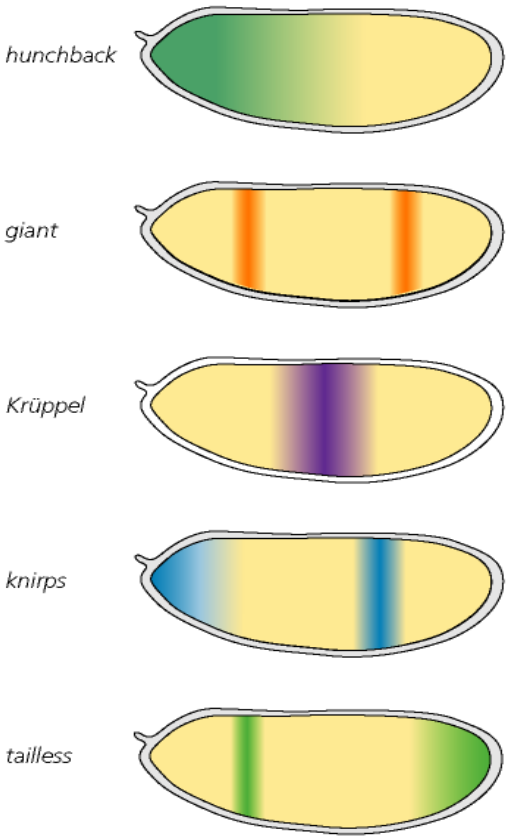
GENI ZIGOTICI

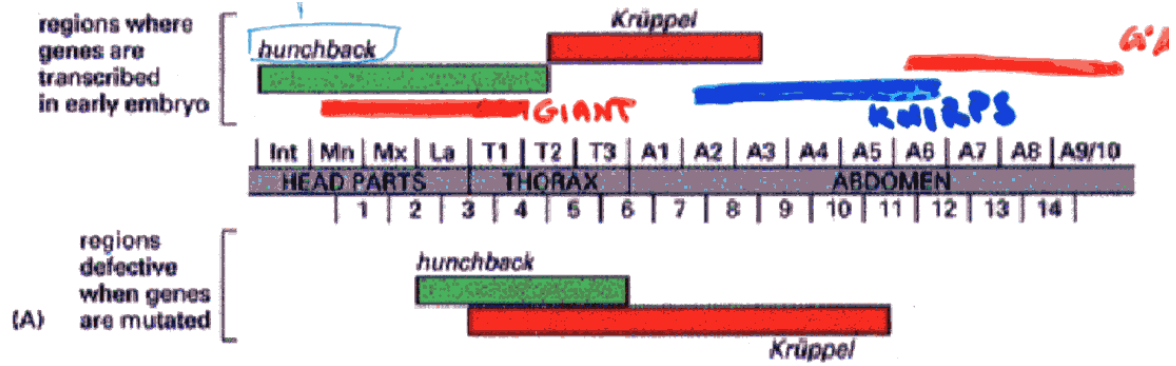

Geni materni
Classe di geni
Esempi di attività genica regionalizzata
Nome dell'esempio
bicoid (bcd)
Geni zigotici
Geni «gap»
hunchback (hb)
Geni «pair-rule»
even-skipped (eve)
& hushi tarazu (ftz)
Geni «segment polarity»
engrailed (en)
Geni selettori
abdominal-A (abd-A)

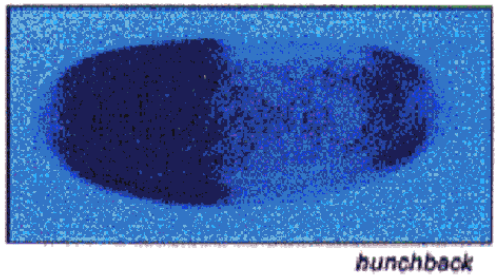
Geni GAP

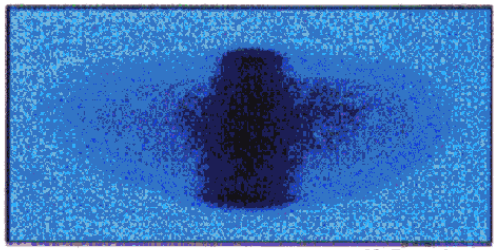


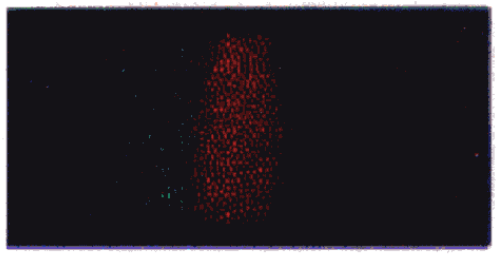
(A) Espressione dei geni gap











Geni pair-rule

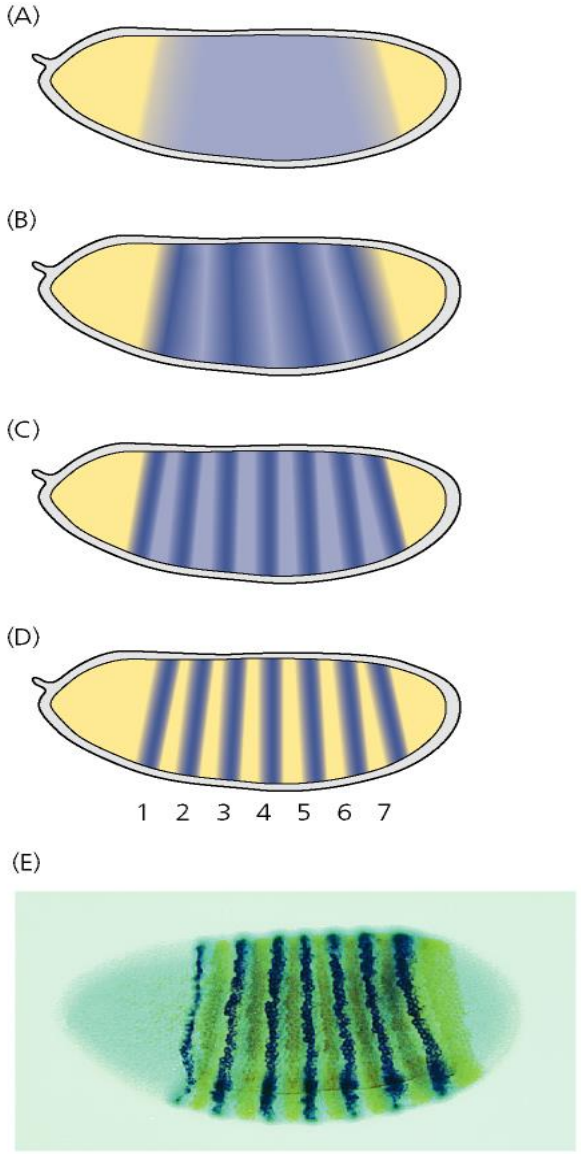
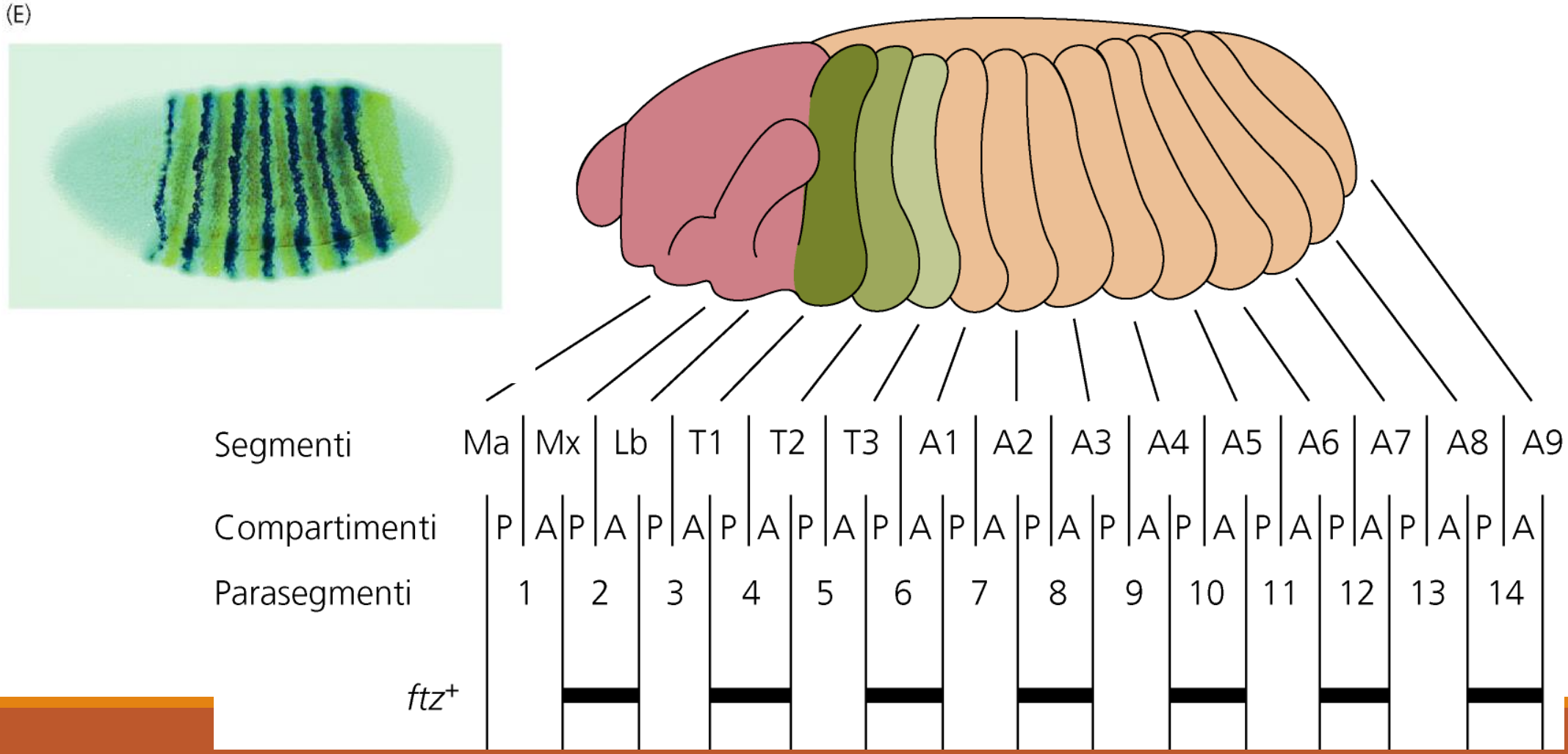


Tabella 9.2 Principali geni che regolano il piano di formazione dei segmenti in *Drosophila*

Categoria	Nome del gene
Geni gap	*Krüppel (Kr)* *knirps (kni)* *hunchback (hb)* *giant (gt)* *tailless (tll)* *huckebein (hkb)* *buttonhead (btd)* *empty spiracles (ems)* *orthodenticle (otd)*
Geni pair-rule primari	*hairy (h)* *even-skipped (eve)* *runt (run)*
Geni pair-rule secondari	*fushi tarazu (ftz)* *odd-paired (opa)* *odd-skipped (odd)* *sloppy-paired (slp)* *paired (prd)*
Geni segment polarity	*engrailed (en)* *wingless (wg)* *cubitus interruptusD (ciD)* *hedgehog (hh)* *fused (fu)* *armadillo (arm)* *patched (ptc)* *gooseberry (gsb)* *pangolin (pan)*

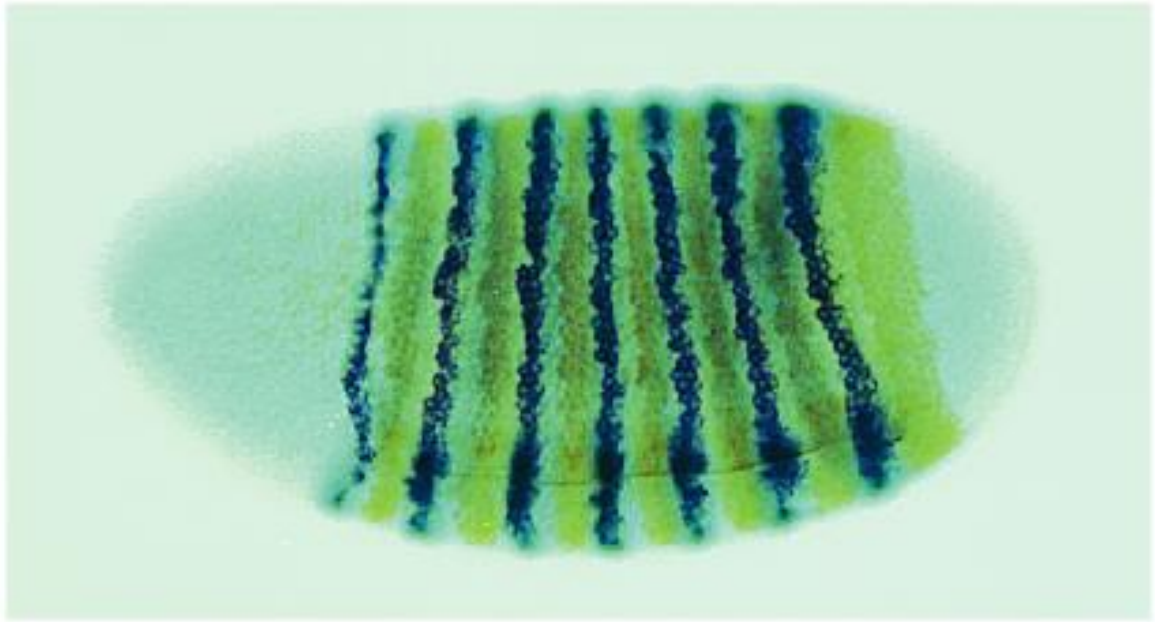
Geni pair-rule e i parasegmenti



Geni segment polarity

I geni della pol segm. definiscono il confine tra i parasegmenti

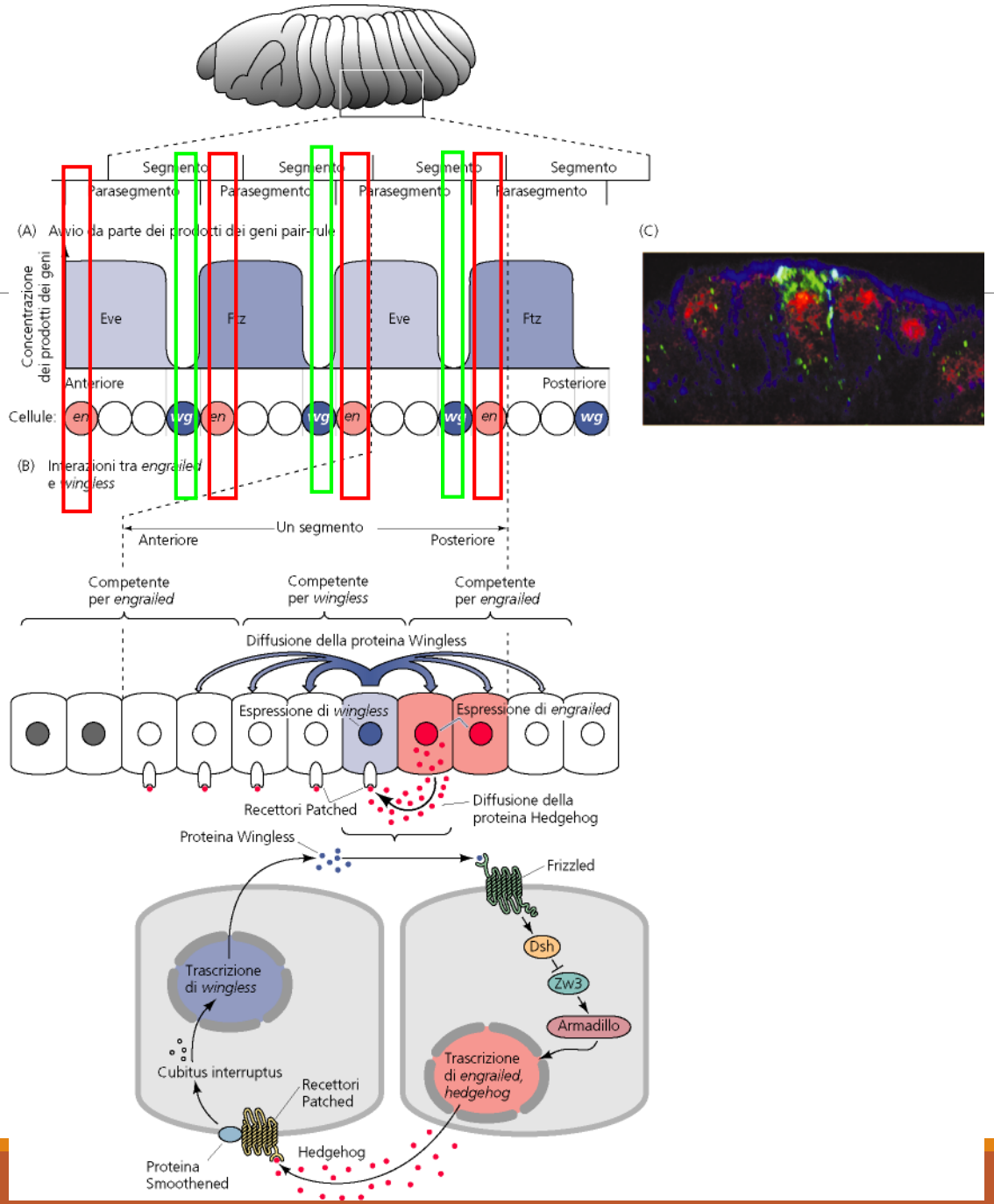
(E)



Even skipped e ***fushi tarazu*** controllano l'espressione di *engrailed*

Odd skipped Cintrolla espressione di *wingless*

Geni polarità segmentale



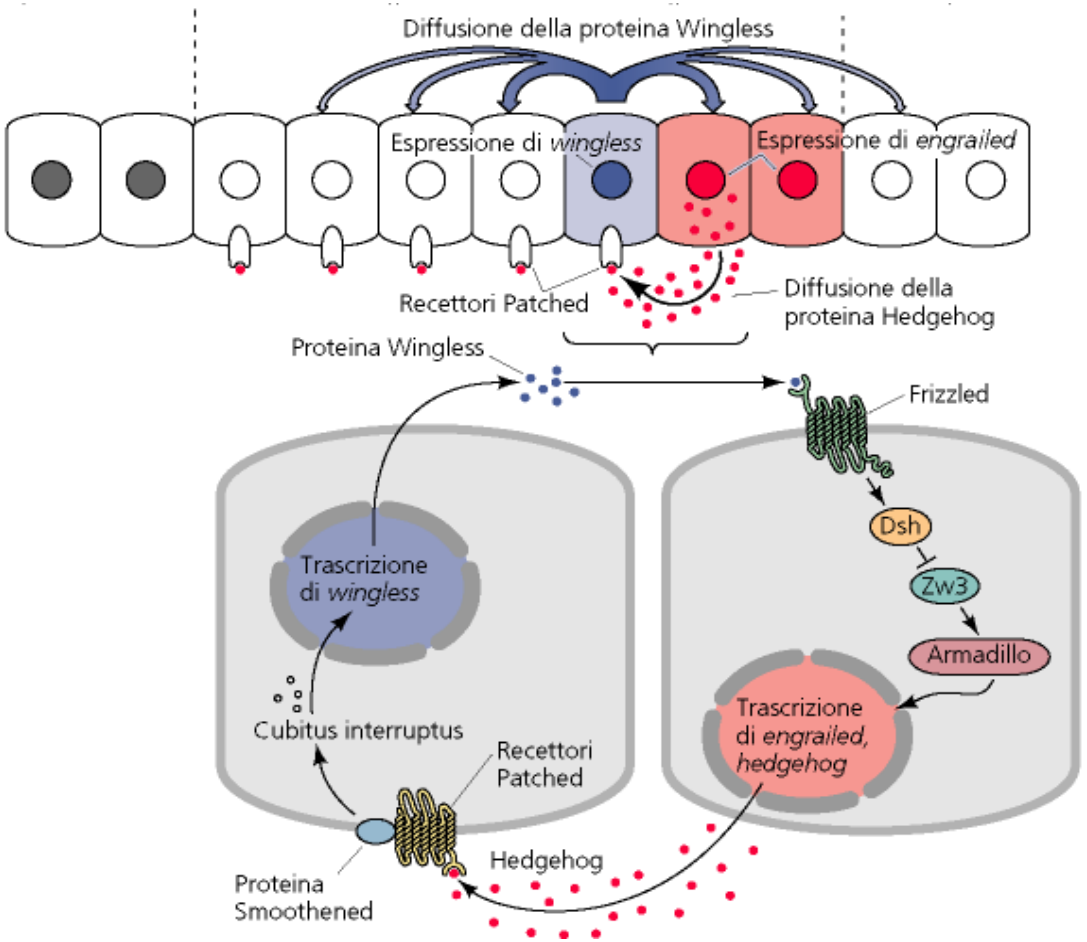
(C)

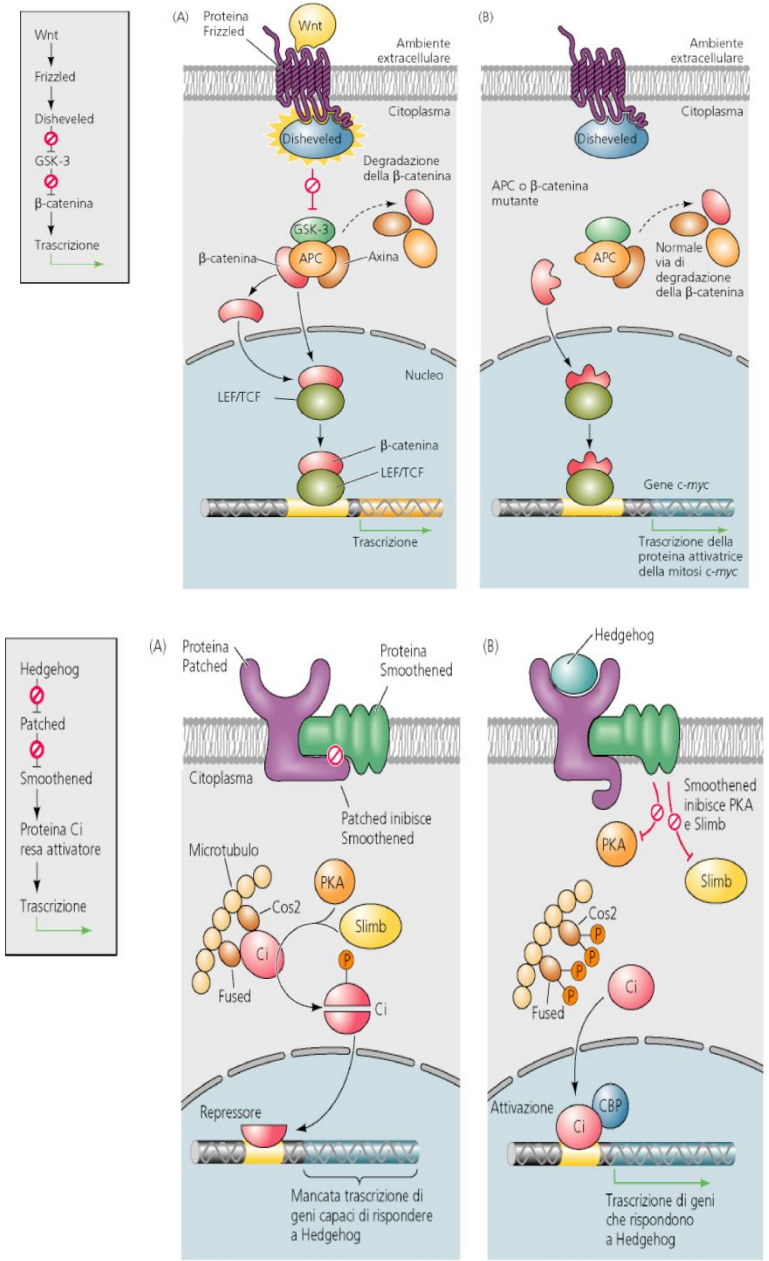
Engrailed
Wingless

Engrailed: fattore di trascrizione

Wingless: fattore diffusibile

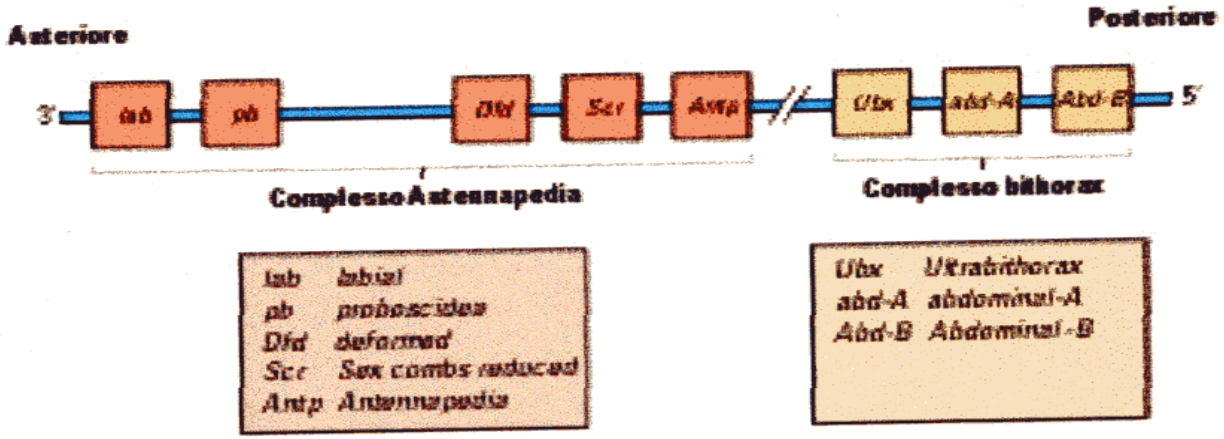
Meccanismo paracrino tra le cellule di confine





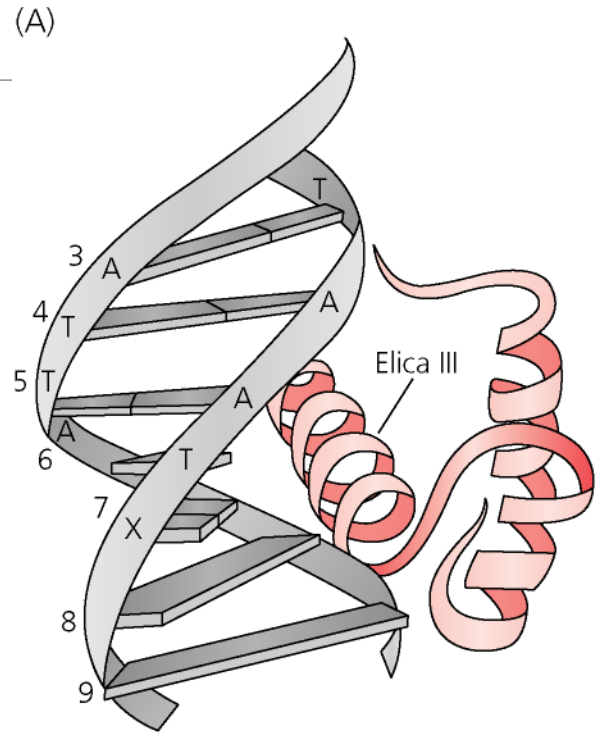
Omeotici propriamente detti

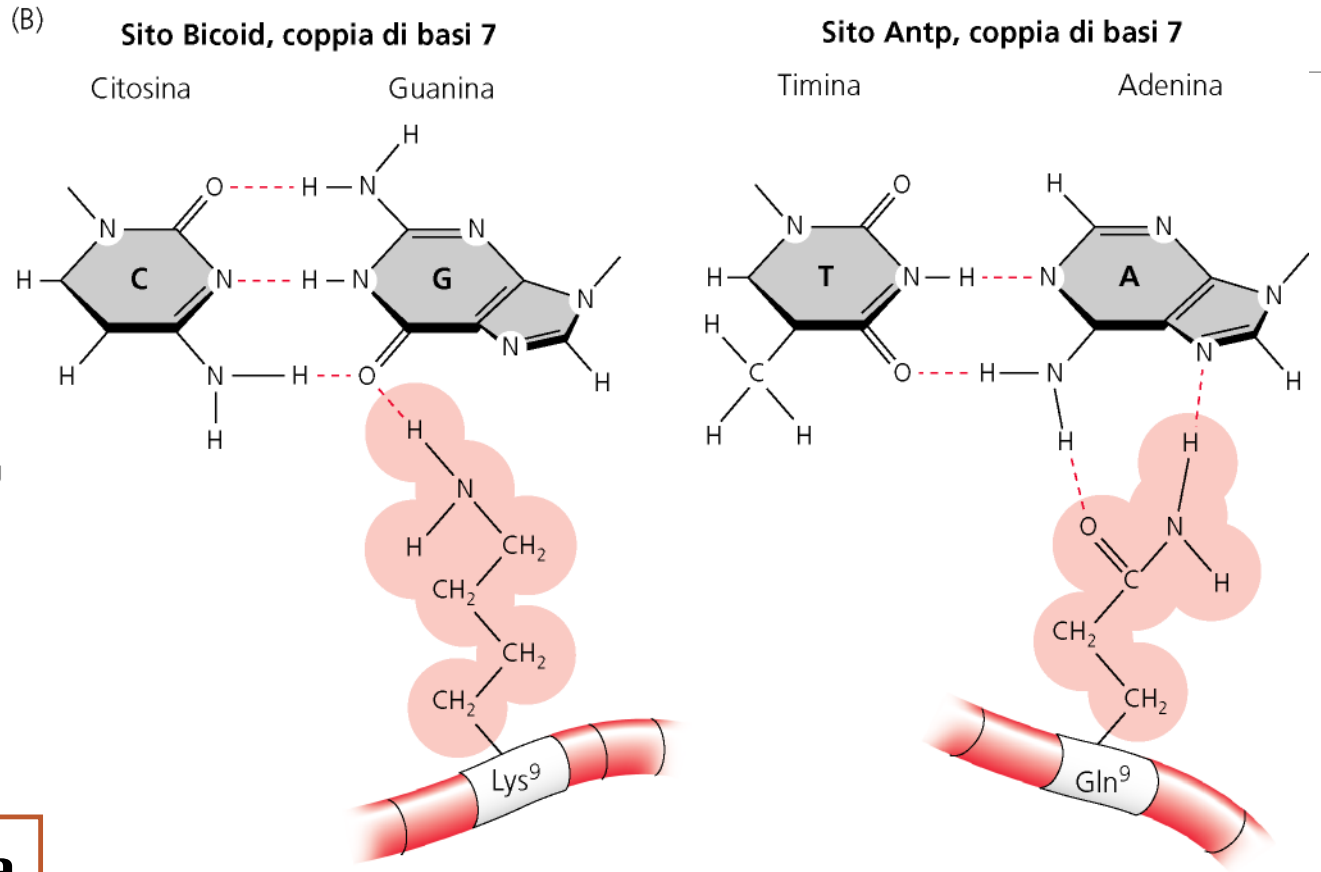
Complesso Hom-C



Cluster genico espresso sul cromosoma 2 di Drosophila

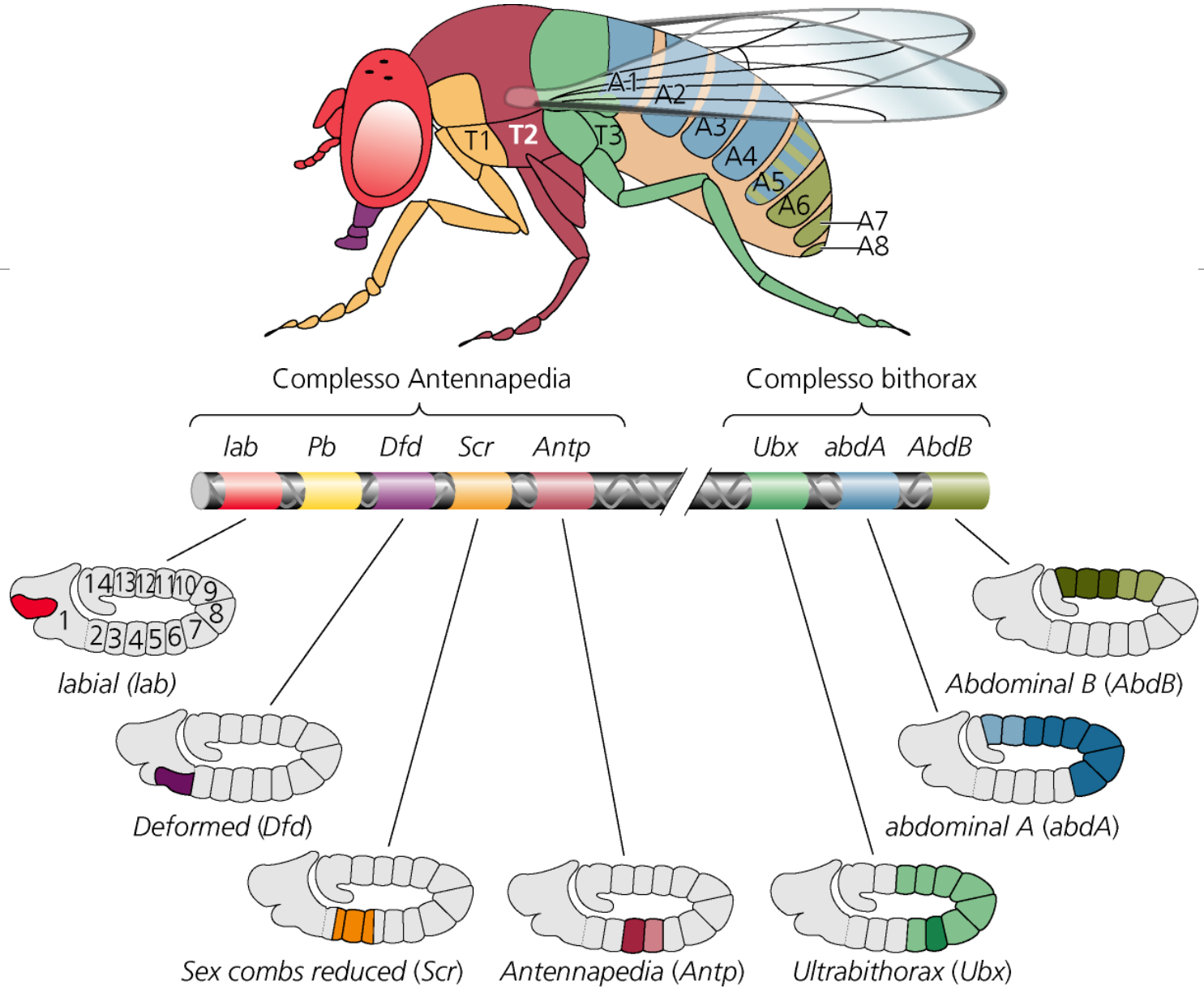
Fattori di trascrizione omeodominio





Omeodominio di 60 aa

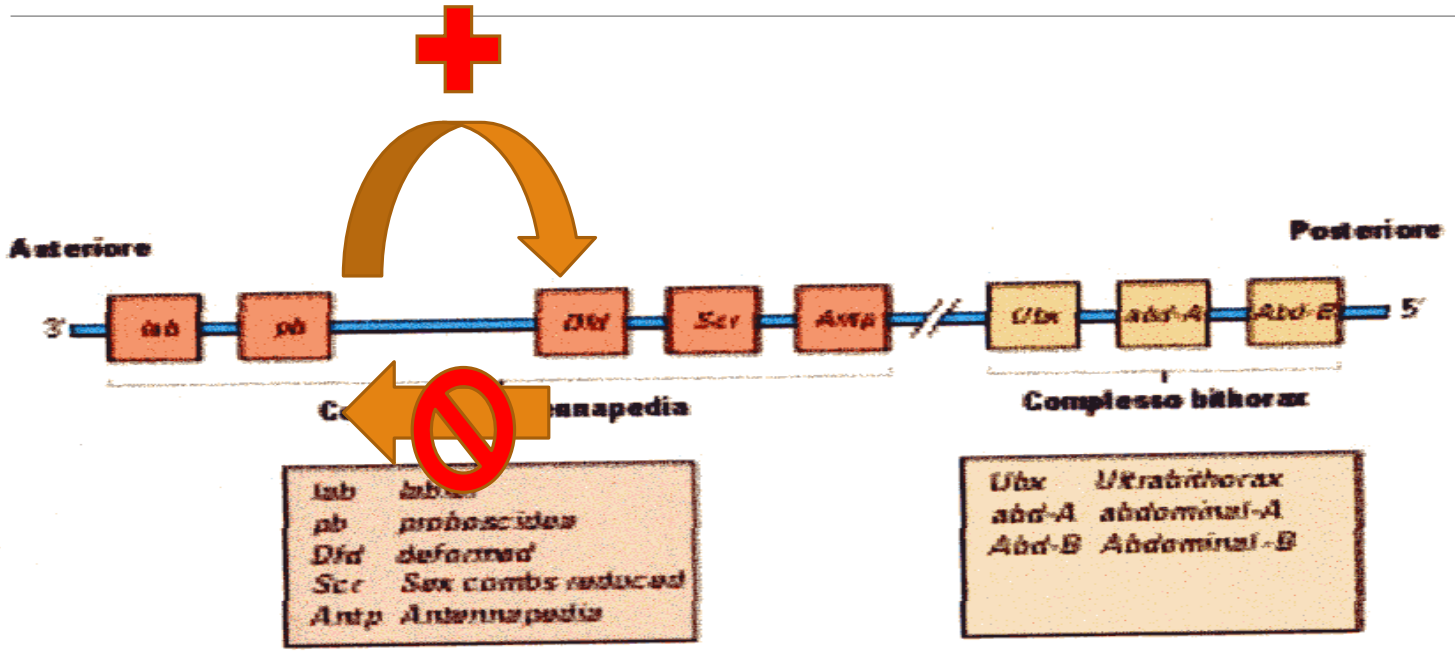
HtH



1.Co-linearità spazio-temporale; 2. identità del segmento

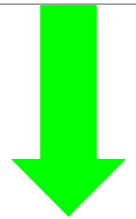
Omeotici propriamente detti

Complesso Hom-C



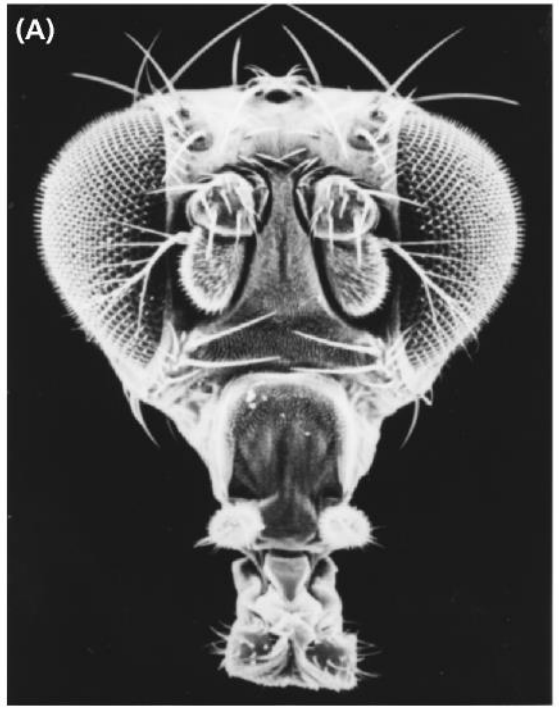
Regolazione positiva dal 3’ al 5’
Regolazione negativa dal 5’al 3’

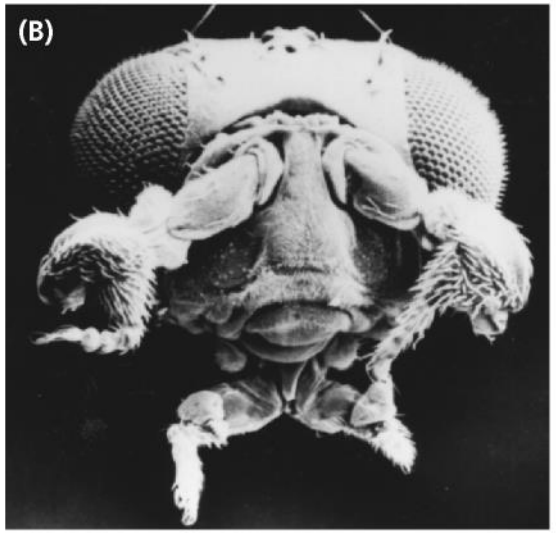
Geni omeotici



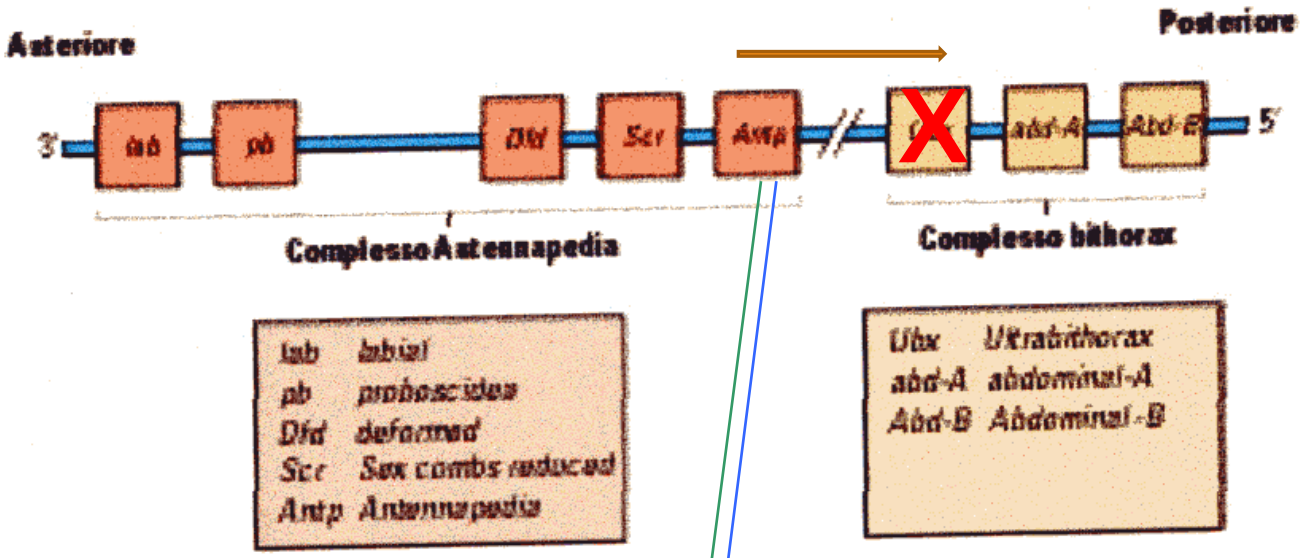
Proteine omeotiche

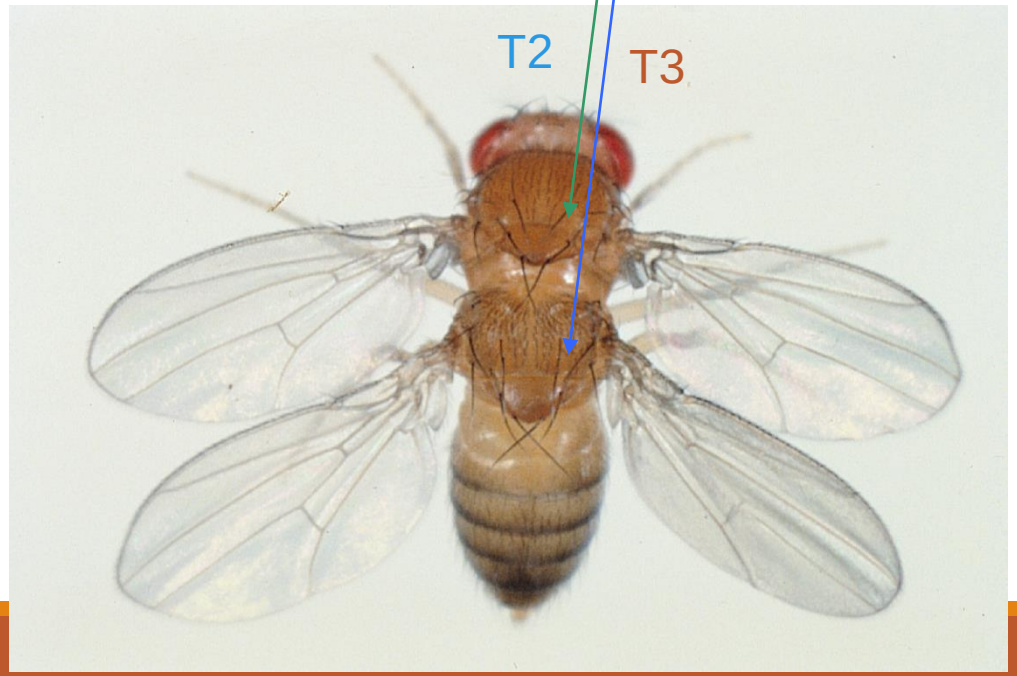
Geni realizzatori





Mutazioni omeotiche


Anteriore
Posteriore
3'
lab
pb
Dfd
Scr
Antp
Ubx
abd-A
Abd-B
5'
Complesso Antennapedia
Complesso bithorax
lab labial
pb proboscidea
Dfd deformed
Scr Sex combs reduced
Antp Antennapedia
Ubx Ultrabithorax
abd-A abdominal-A
Abd-B Abdominal-B


T2
T3

I principali geni coinvolti nella specificazione del «pattern» nell'embrione precoce di *Drosophila*

	Gene	Materno/ zigotico	Natura della proteina	Fattore di trascrizione (T), recettore (R), proteina segnale (S)	Funzione (dove nota)
Sistema antero-posteriore	*bicoid*	M	Omeodominio	T	Morfogeno, attiva *hunchback* zigotico altri geni «gap»
	hunchback	M	Dita di zinco	T	Morfogeno, attiva i geni «gap»
	nanos	M			Inattiva mRNA/proteina di *hunchback* materno; coinvolto nella formazione d gradiente della proteina hunchback materna
	gurken	M	Proteina secreta della famiglia TGF-α	S	Specifica l'asse dell'oocita
	exuperantia	M			Localizzazione di mRNA materni (ad esempio *bicoid*)
	oskar	M			Specificazione del plasma germinale
Sistema terminale	*torso*	M	Recettore tirosina chinasi	R	L'attivazione specifica le regioni term
	torso-like	M		S	Ligando della proteina torso
Geni «gap»	*hunchback*	Z	Dita di zinco	T	Localizzano l'espressione dei geni «p rule»
	Krüppel	Z	Dita di zinco	T	
	knirps	Z	Dita di zinco	T	
	giant	Z	Cerniera di leucine	T	
	tailless	Z	Dita di zinco	T	
Geni «pair-rule»	*even-skipped*	Z	Omeodominio	T	Delimita i parasegmenti dispari
	fushi tarazu	Z	Omeodominio	T	Delimita i parasegmenti pari
	hairy	Z	«Helix-loop-helix»	T	
Geni della polarità segmentale	*engrailed*	Z	Omeodominio	T	Definisce la regione anteriore del parasegmento e la posteriore del segmento
	hedgehog	Z	Secreta o di membrana	S	
	wingless	Z	Secreta	S	
	gooseberry	Z	Omeodominio	T	
	patched	Z	Di membrana	R	
	smoothened	Z	Di membrana	R	
Geni selettori Complesso bithorax	*Ultrabithorax*	Z	Omeodominio	T	L'attività combinatoria dà identità ai parasegmenti 5÷13
	abdominal-A	Z	Omeodominio	T	
	Abdominal-B	Z	Omeodominio	T	