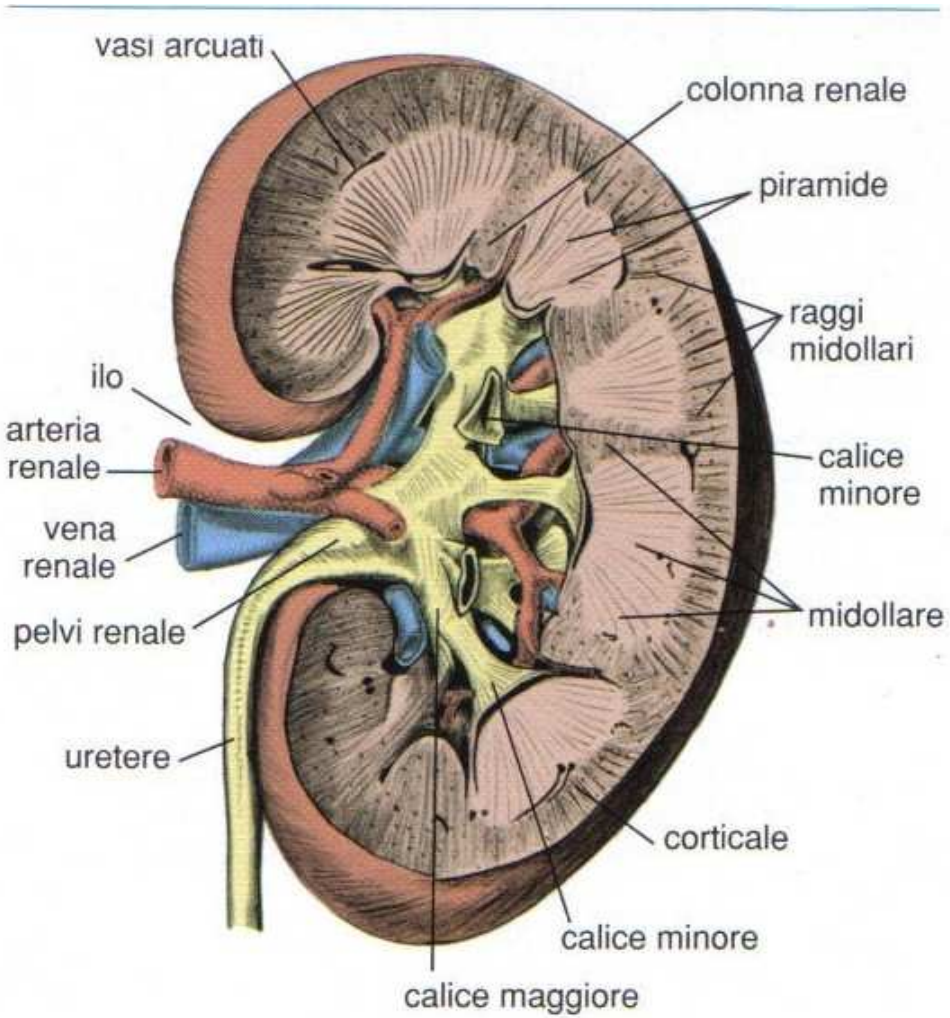
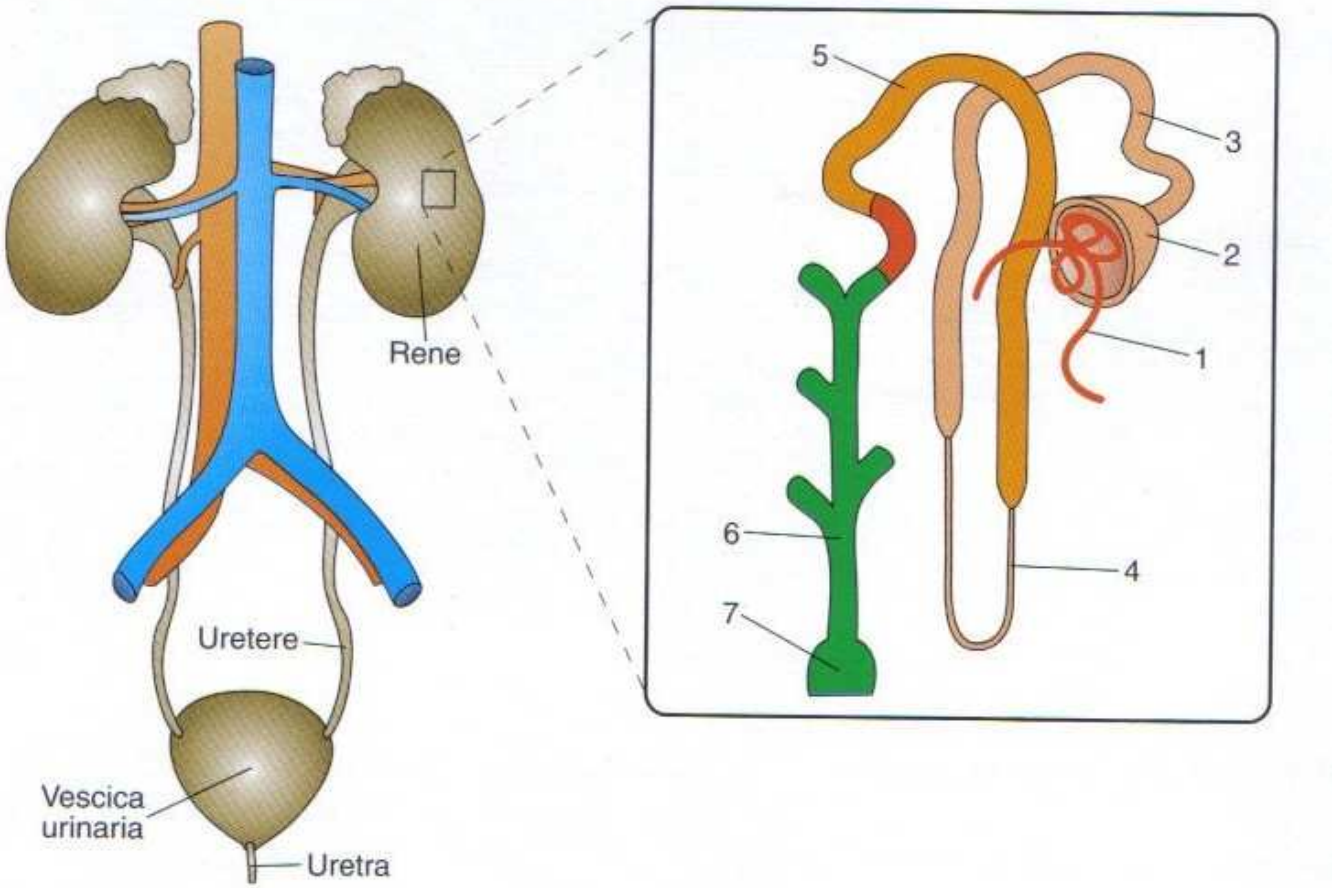
Sviluppo del rene

Struttura del rene



Apparato urinario



Rene fetale (lobi) e nefrone

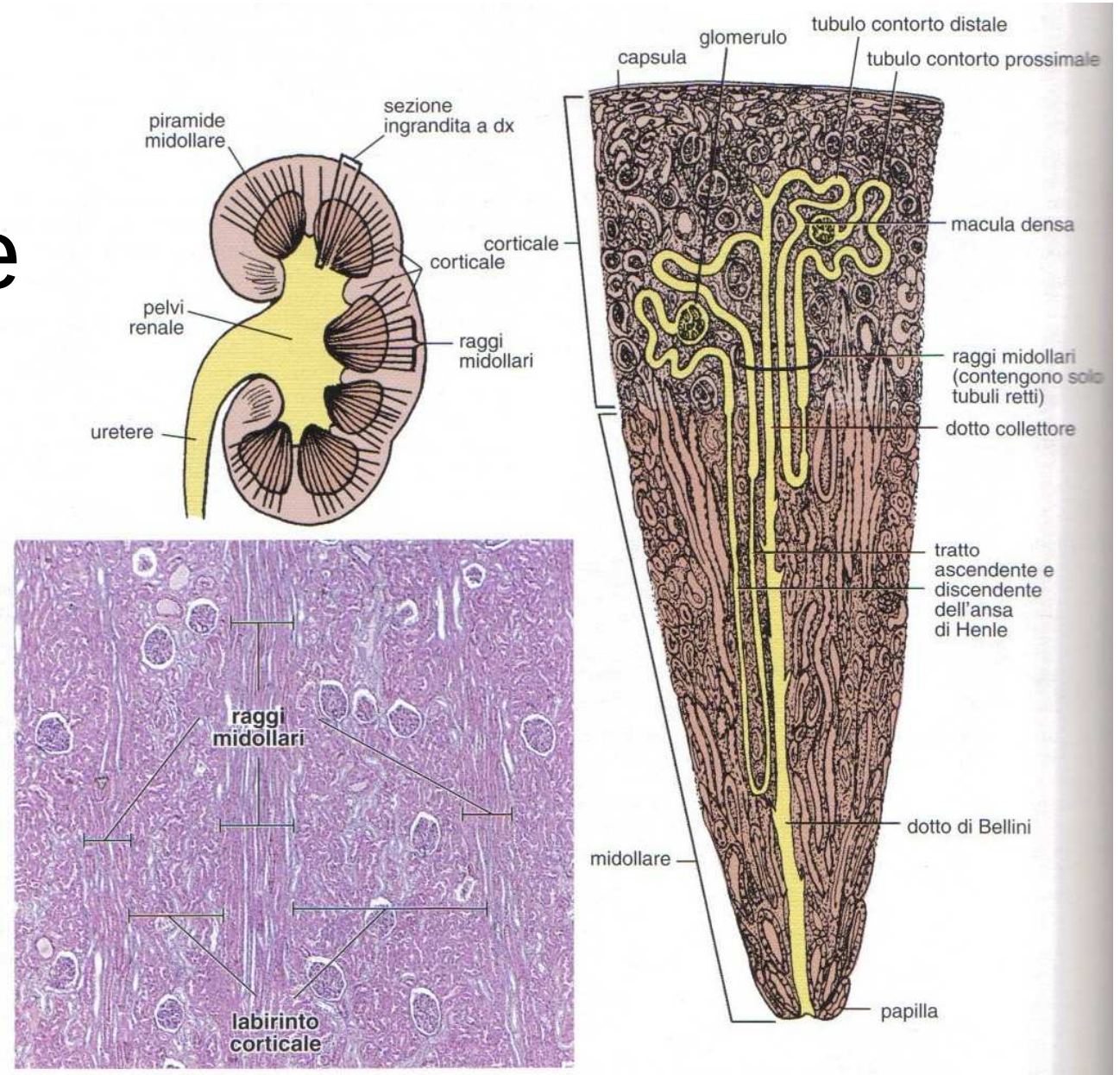
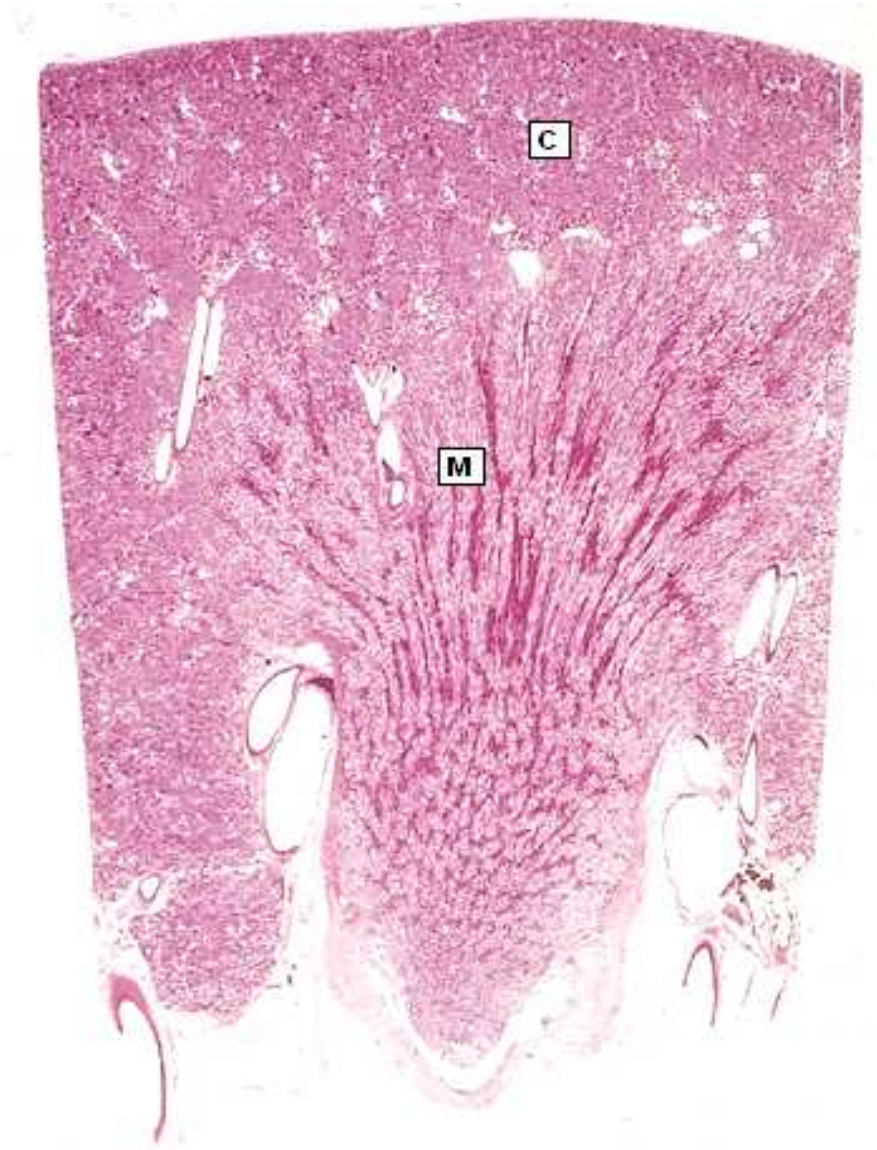
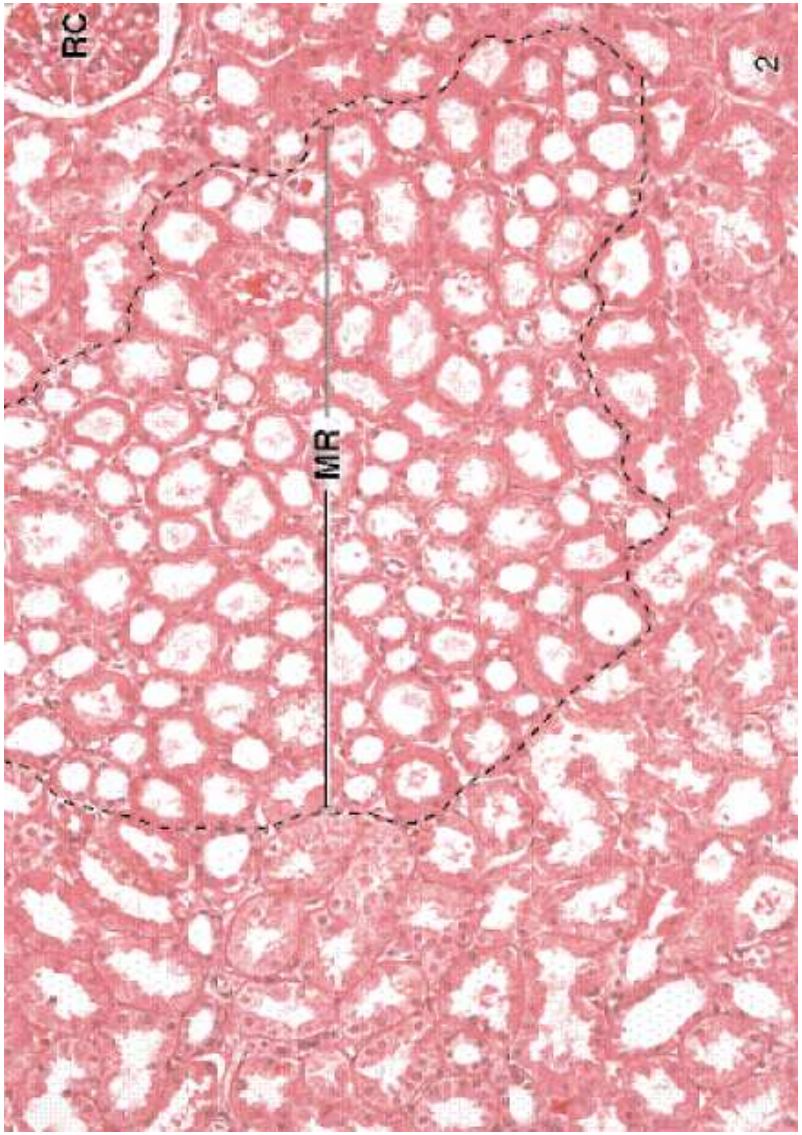


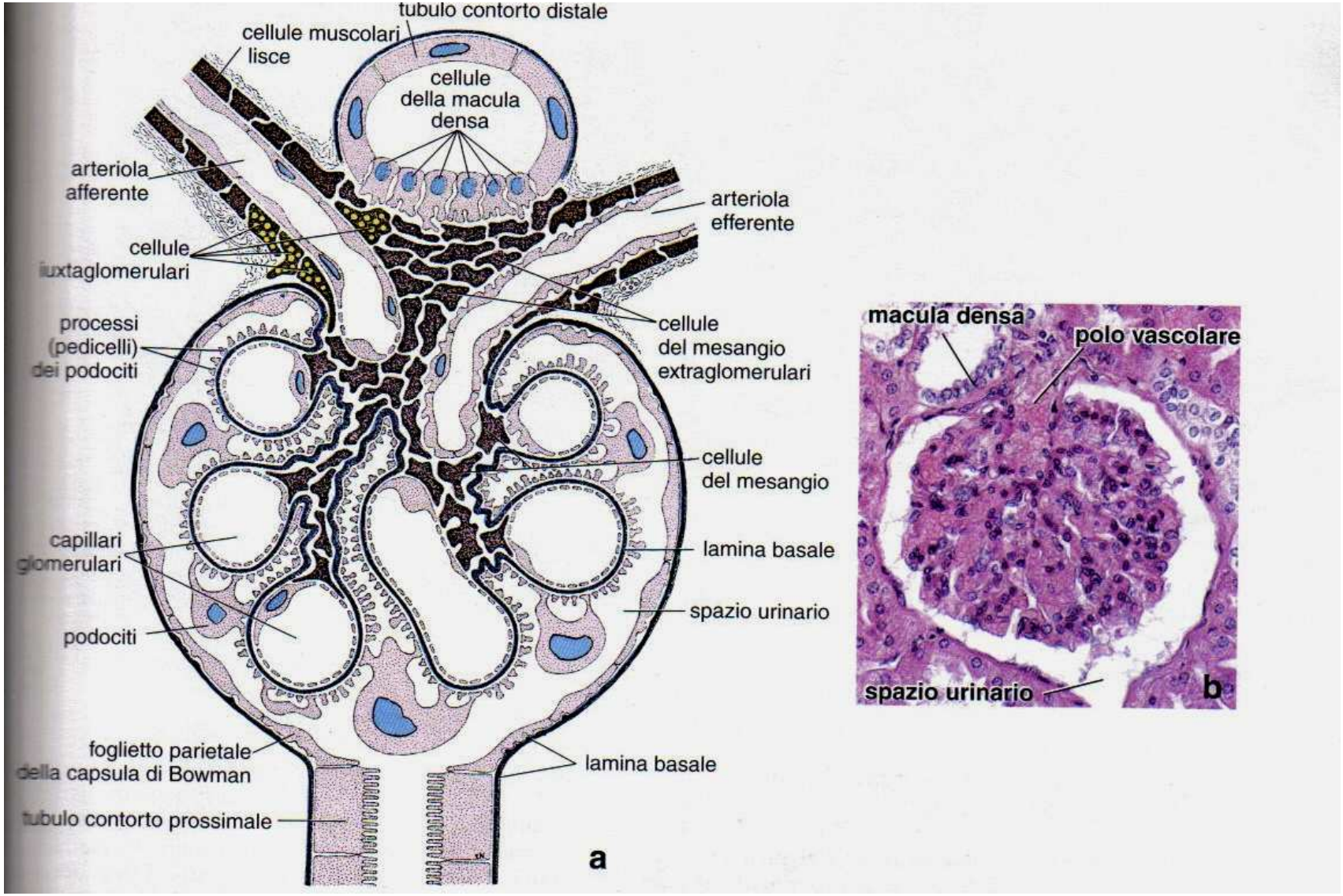
FIGURA 20.6. Schemi e fotografia al microscopio ottico di un rene umano adulto. Il diagramma in alto a sinistra rappresenta una

Struttura del rene

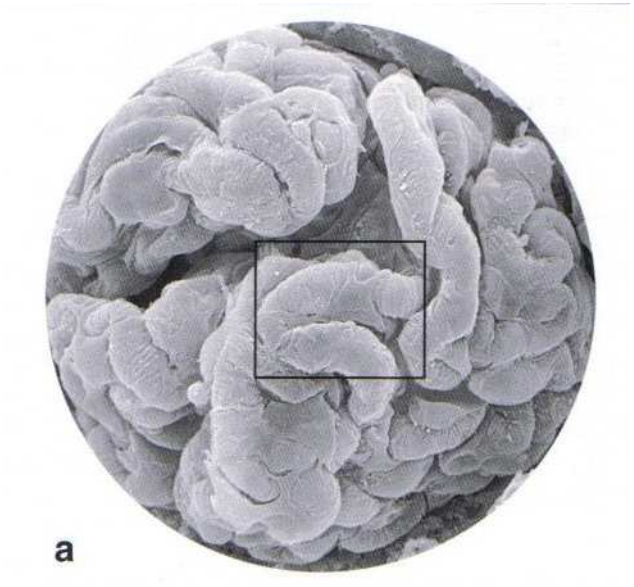


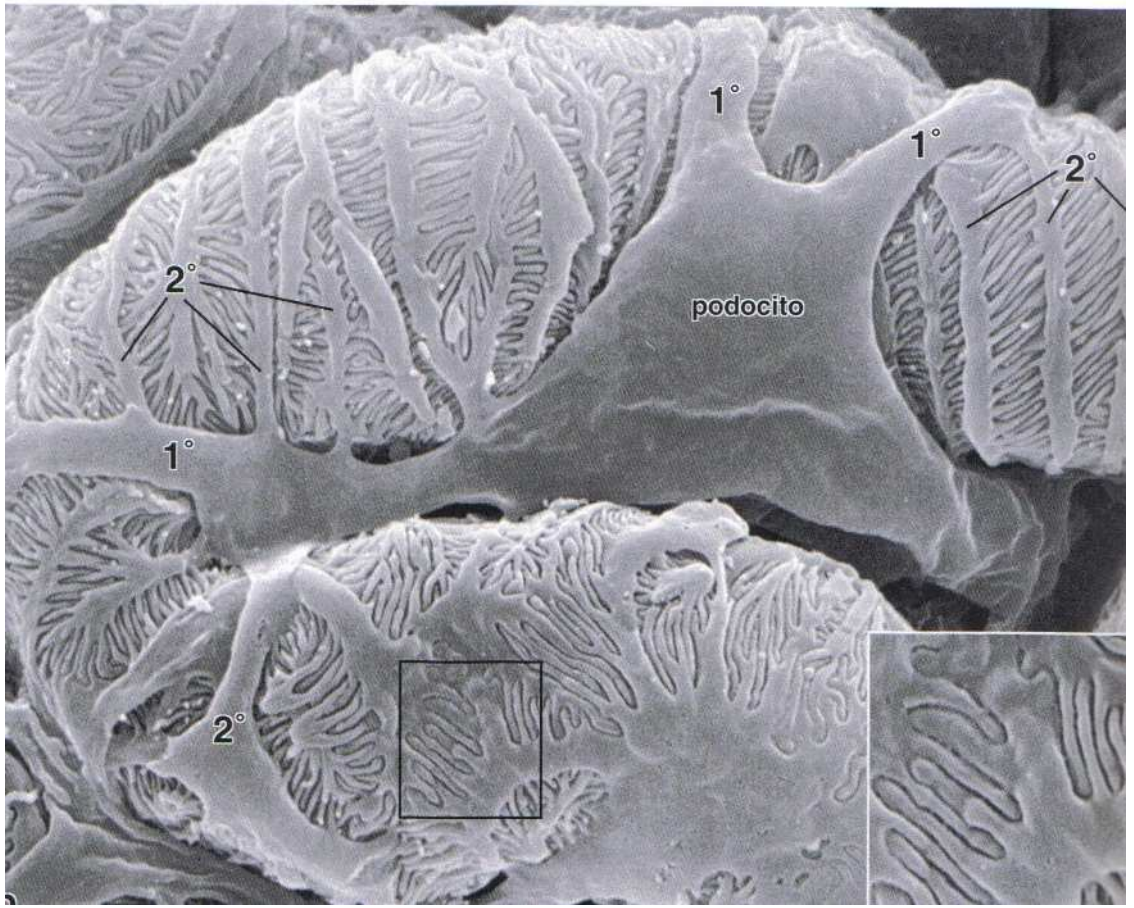


Corpuscolo renale



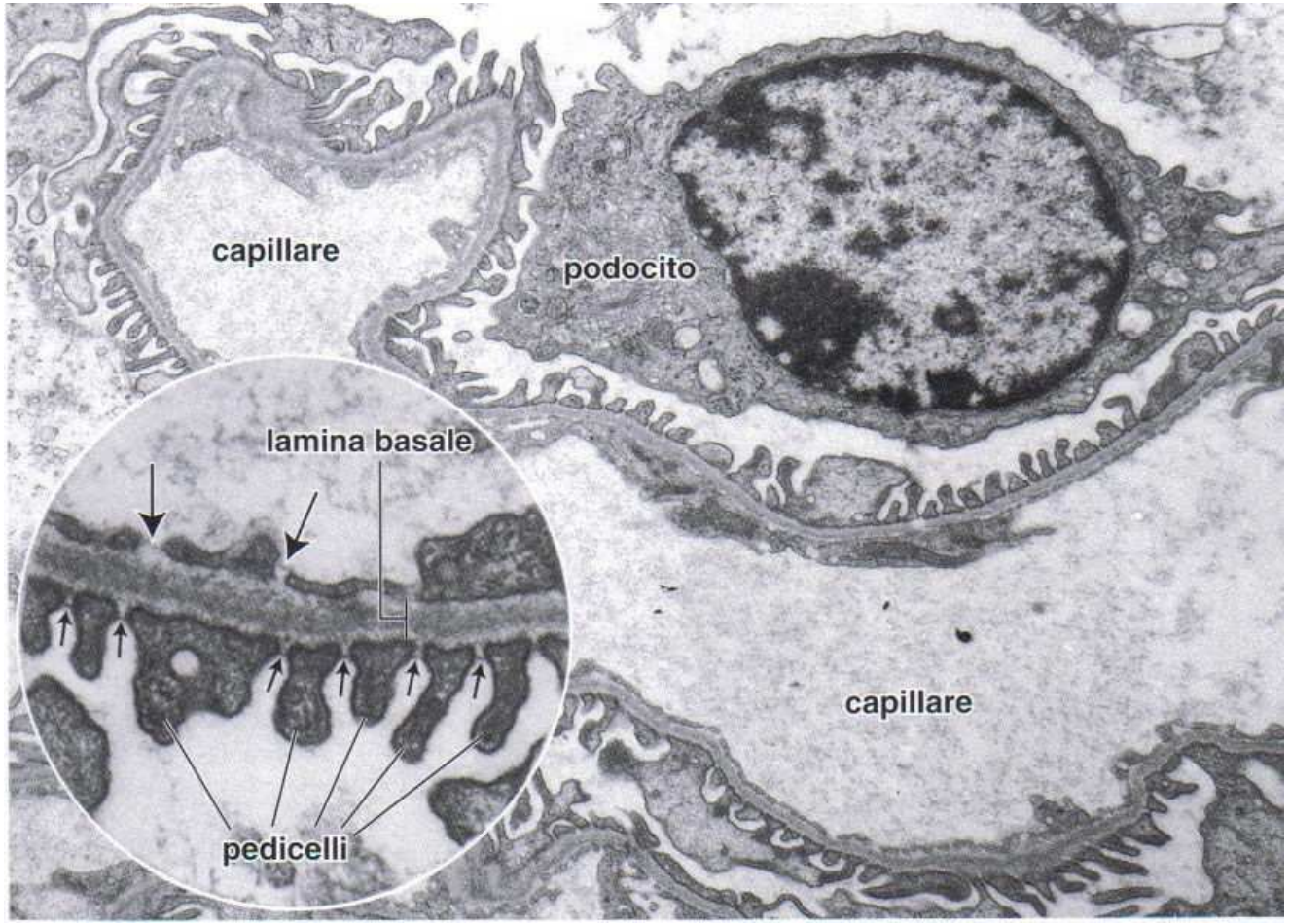
Capillari glomerulari e podociti





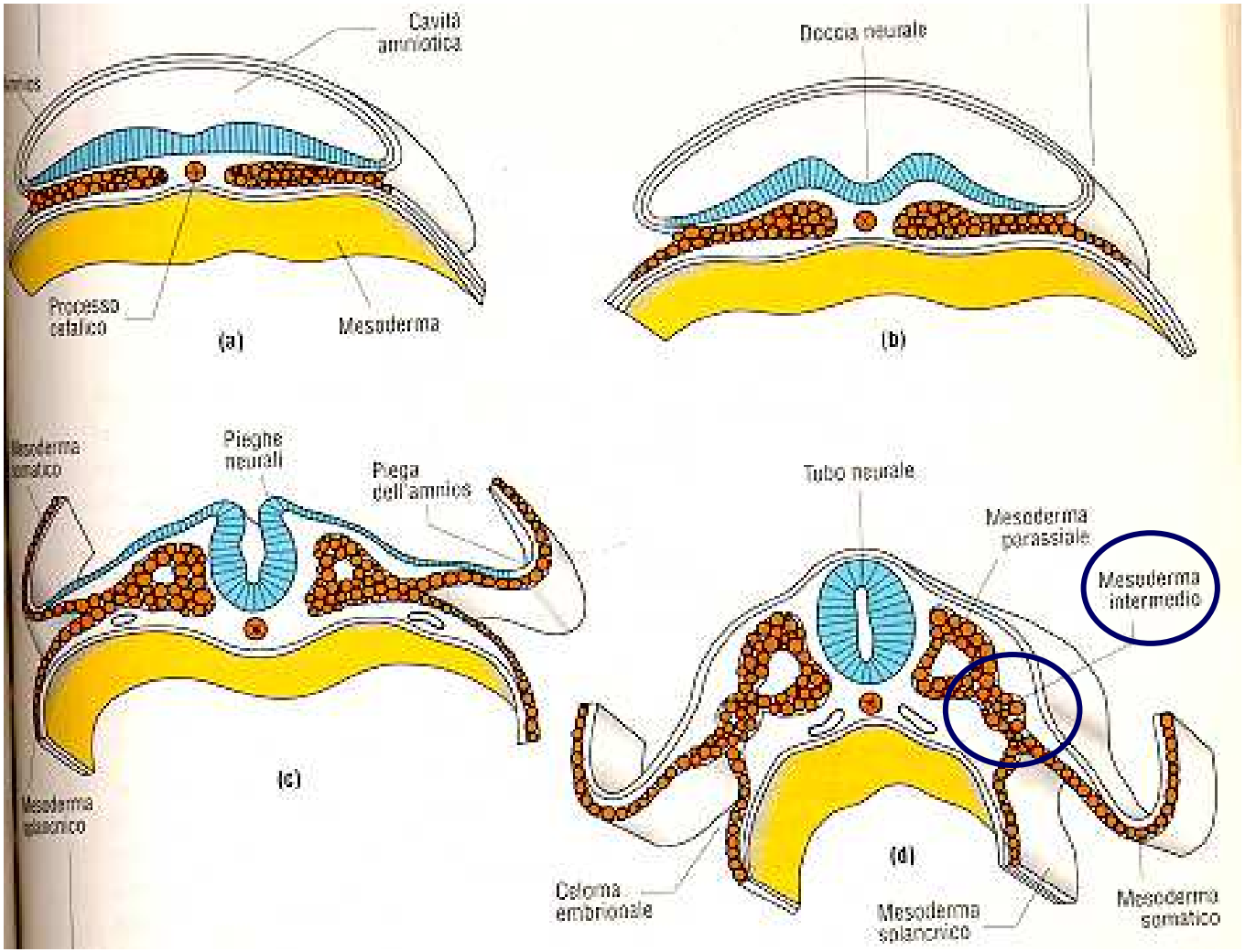
SEM

Capillari glomerulari e podociti

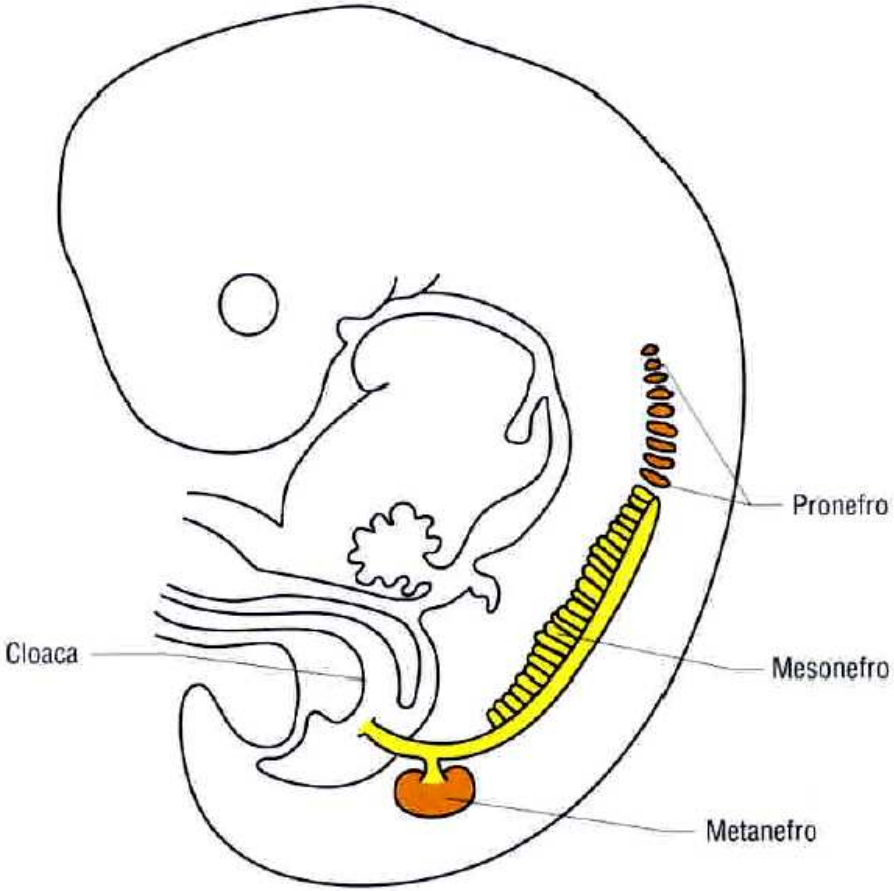


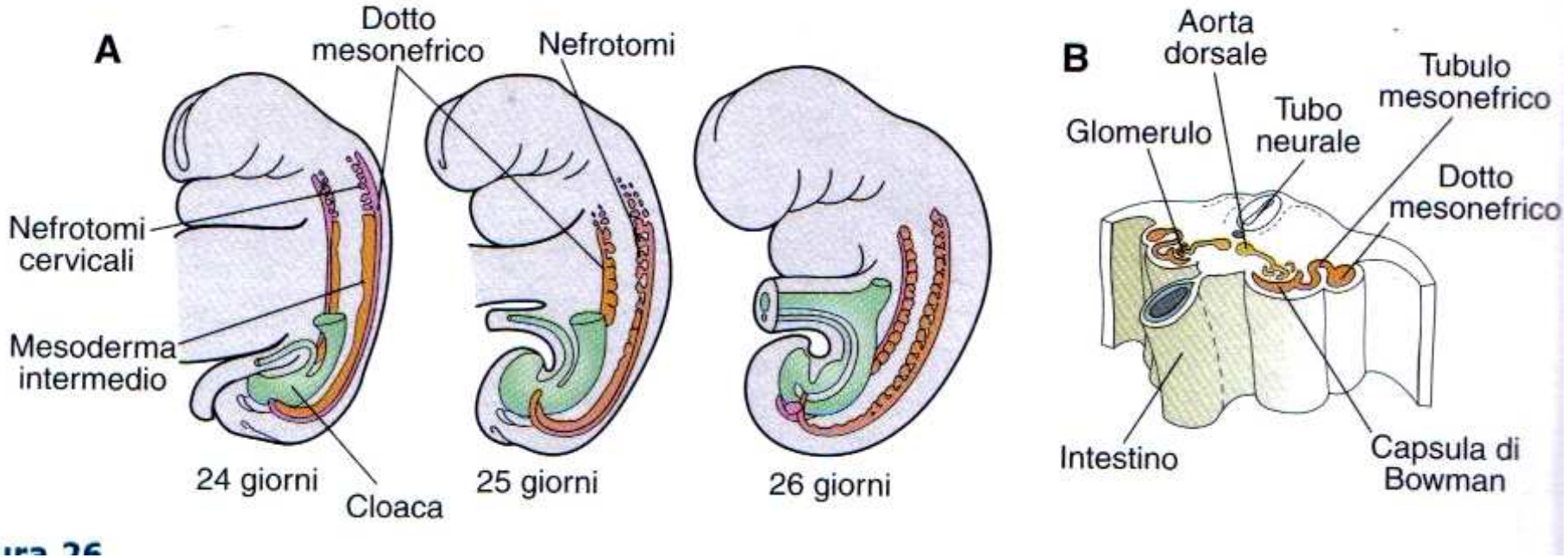
TEM

L’apparato uro-genitale deriva dal mesoderma intermedio

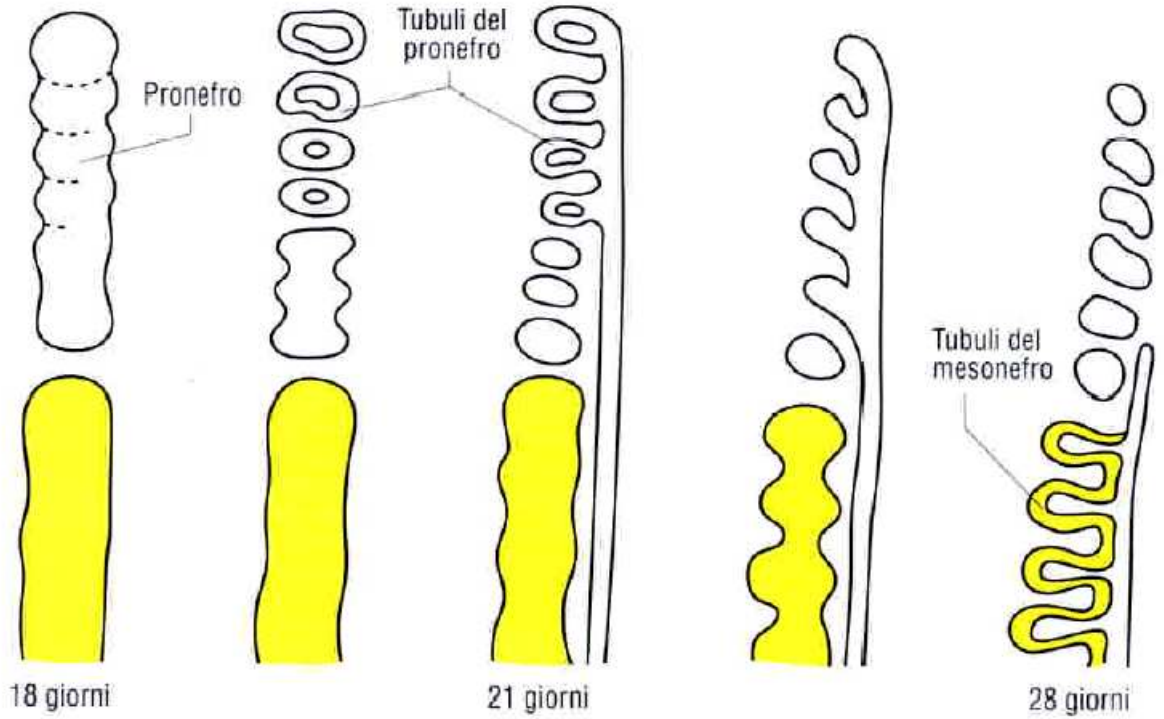


Apparato urinario primitivo

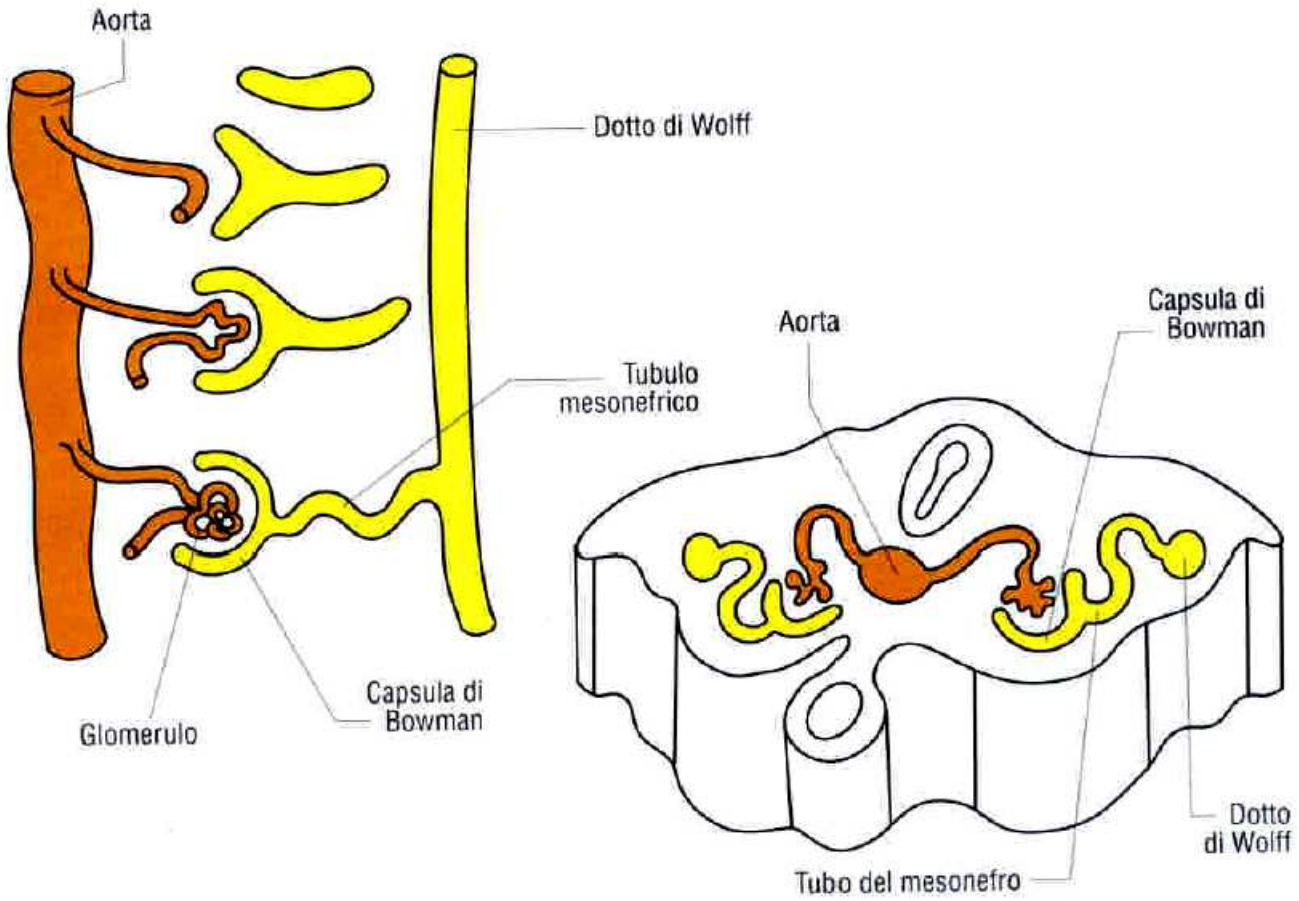



A
Dotto mesonefrico
Nefrotomi
Nefrotomi cervicali
Mesoderma intermedio
24 giorni
Cloaca
25 giorni
26 giorni
B
Aorta dorsale
Tubulo mesonefrico
Tubo neurale
Glomerulo
Dotto mesonefrico
Intestino
Capsula di Bowman

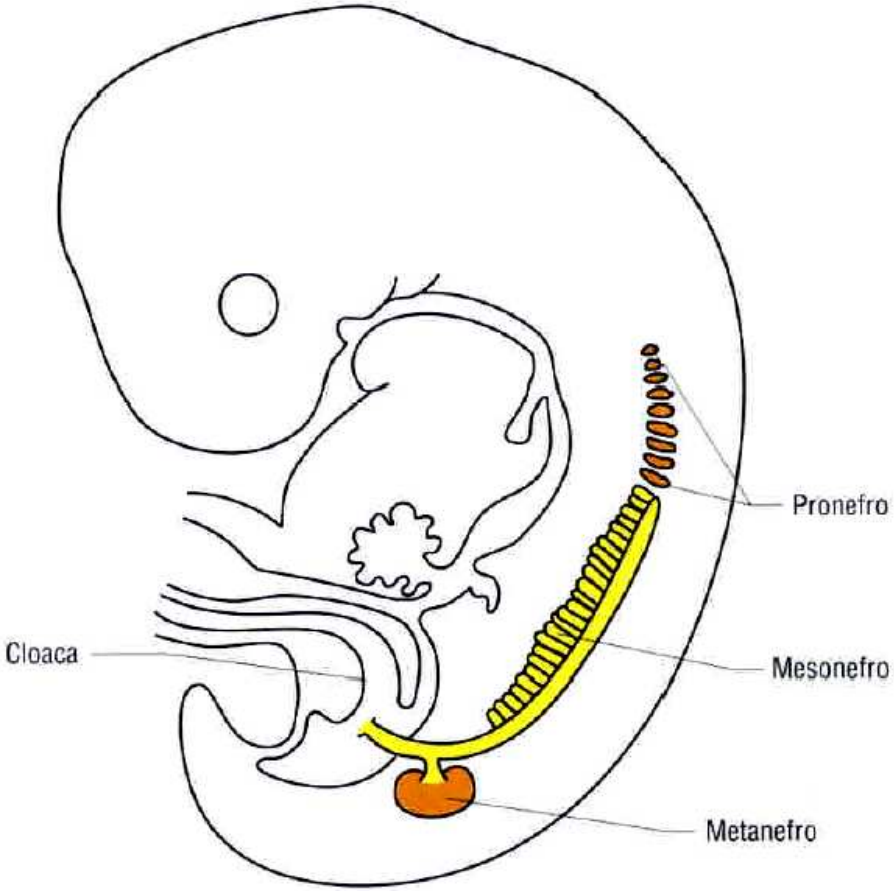
Sviluppo dei tubuli del pronefro e mesonefro



Glomerulo primitivo (tubulo mesonefrico)

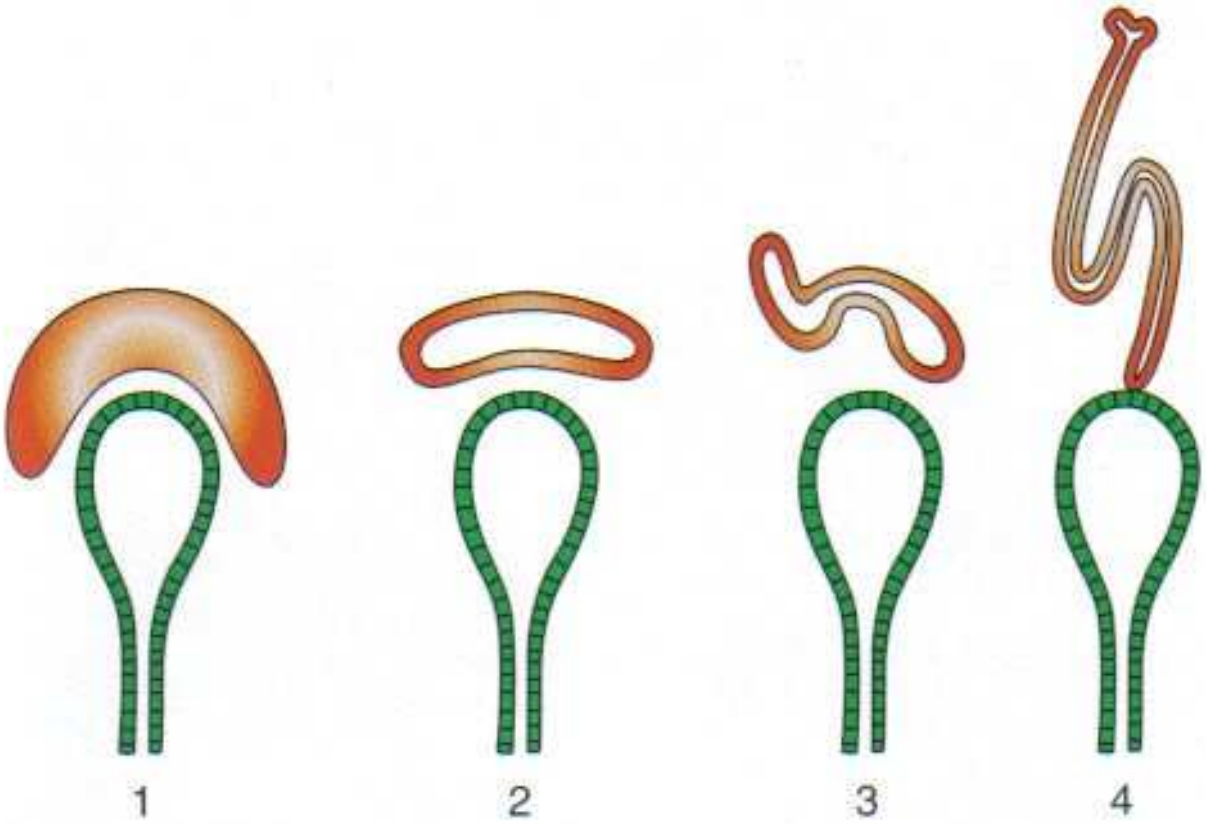


Evoluzione dell’apparato urinario: mesonefro e metanefro

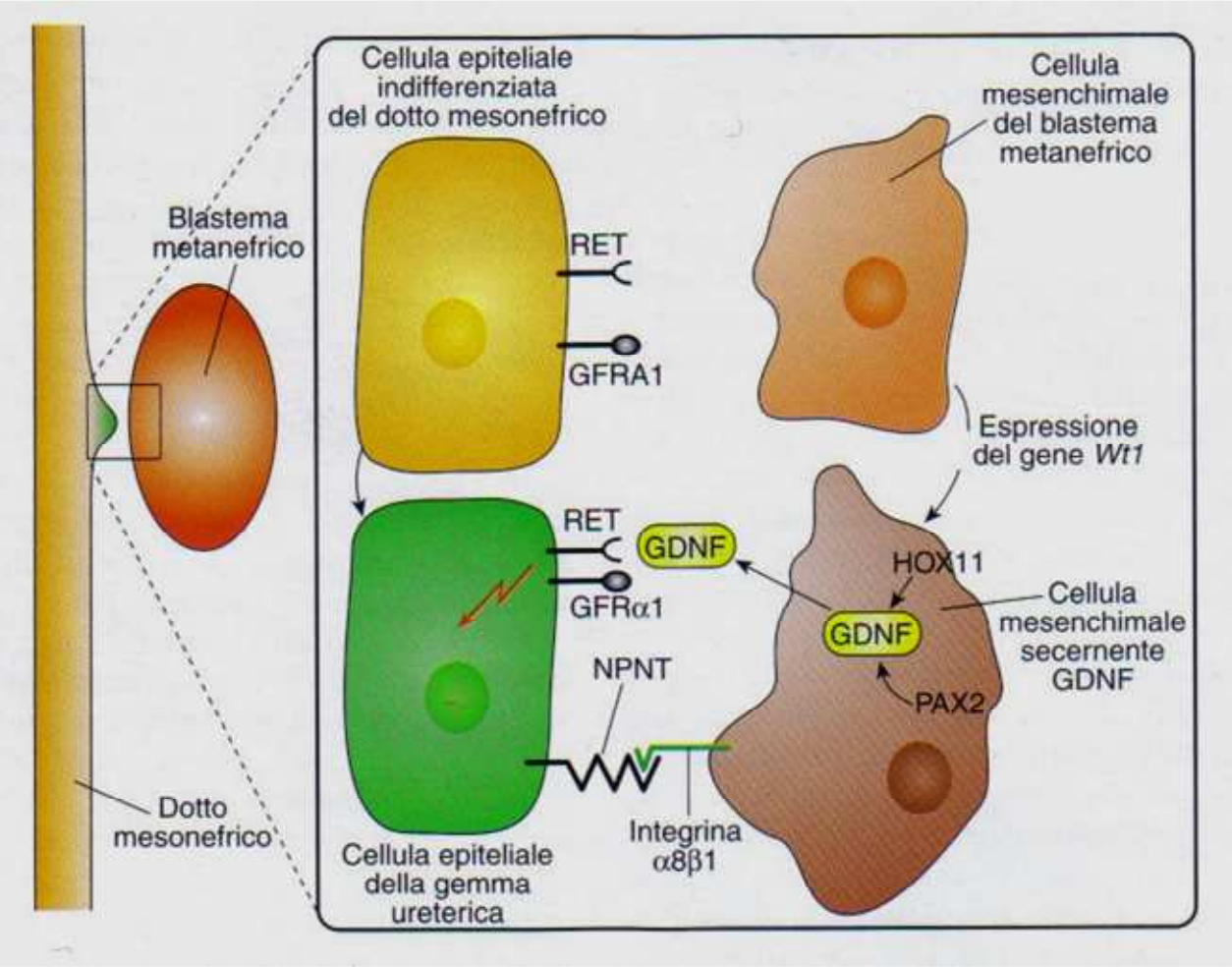


Gemma ureterica e blastema metanefrico:

(transizione mesenchima-epiteliale)



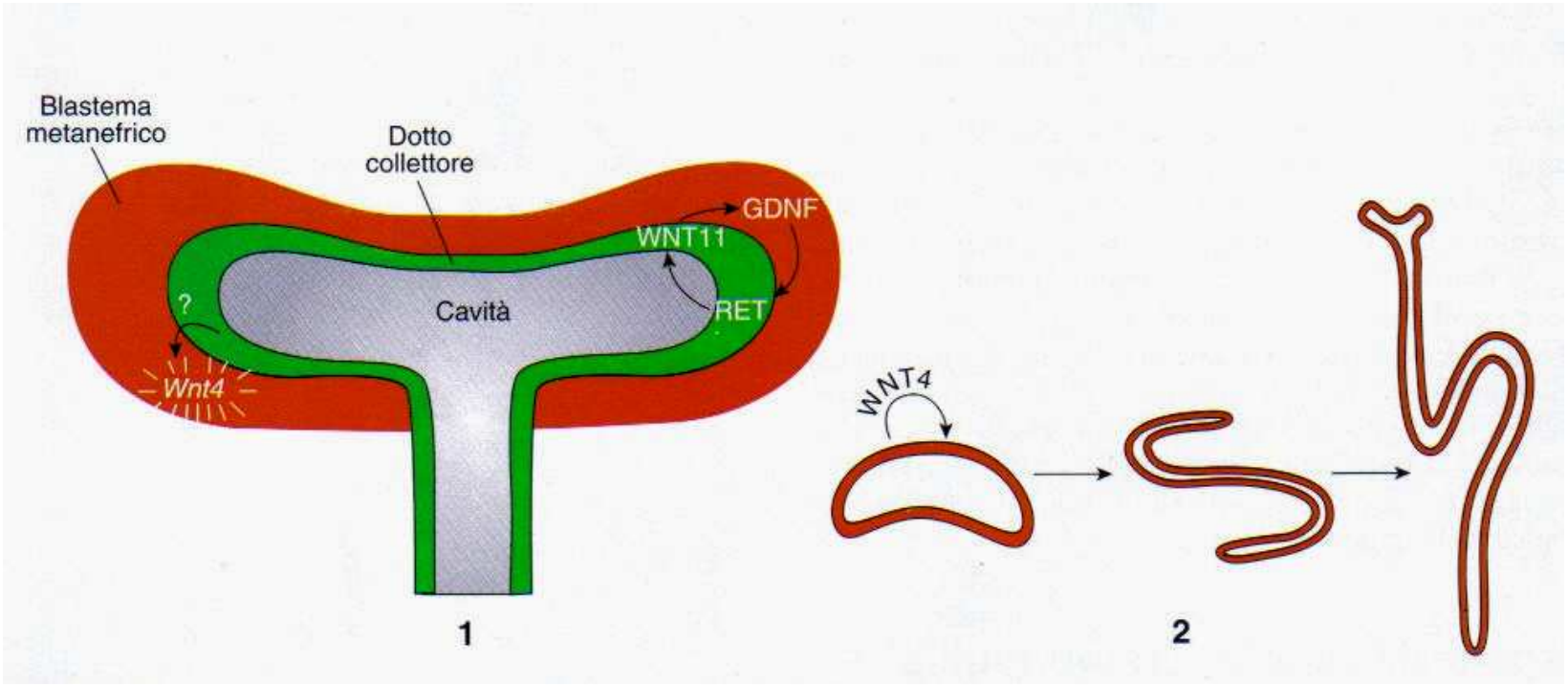
Interazioni blastema metanefrico-gemma ureterica



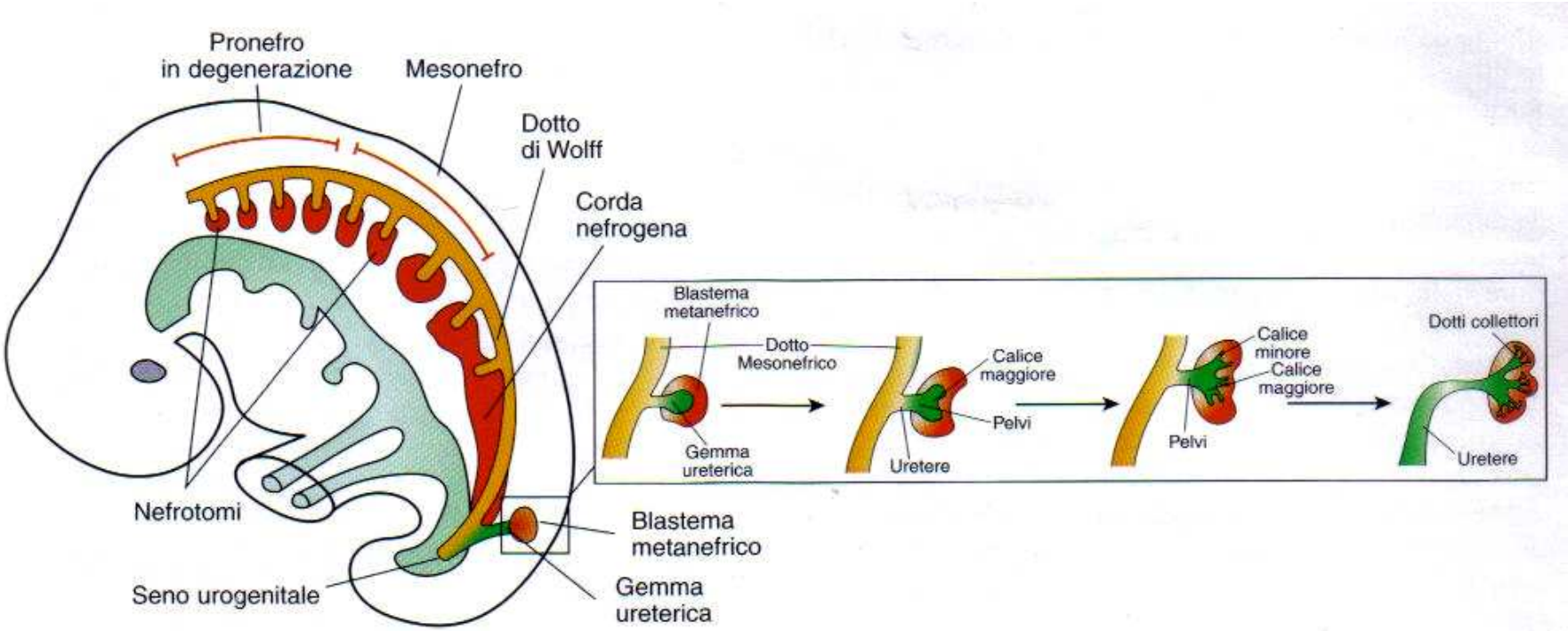
Blastema metanefrico
induce cellule del
dotto mesonefrico
(gemma ureterica) →
Dotti collettori

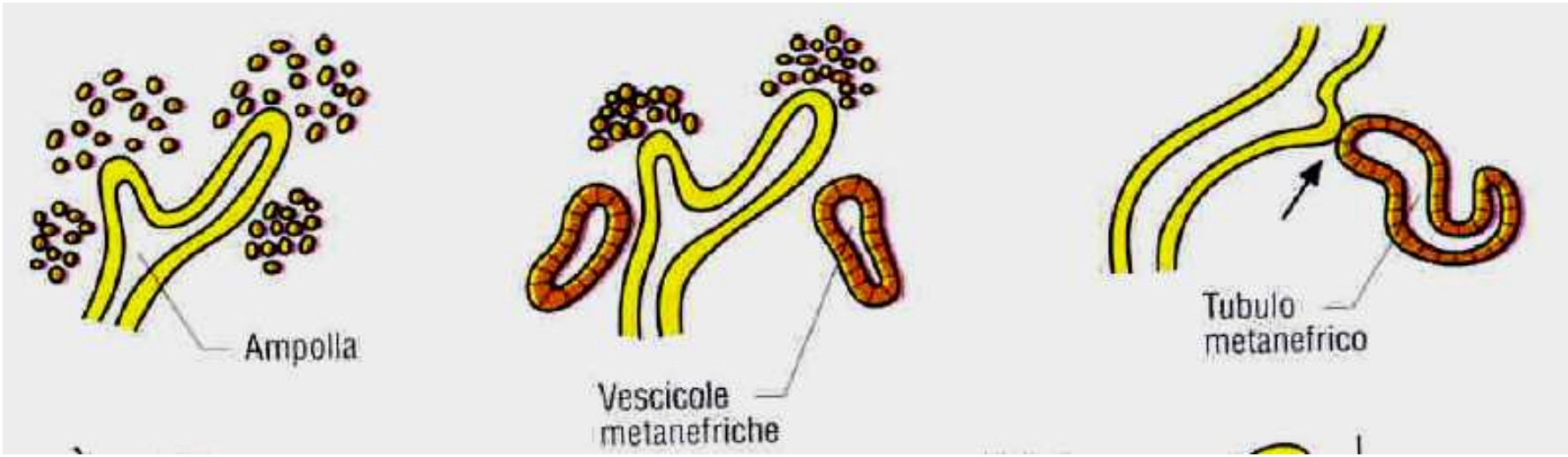
Ruolo di GDNF
→induce ramificazione
→futuri dotti
→collettori

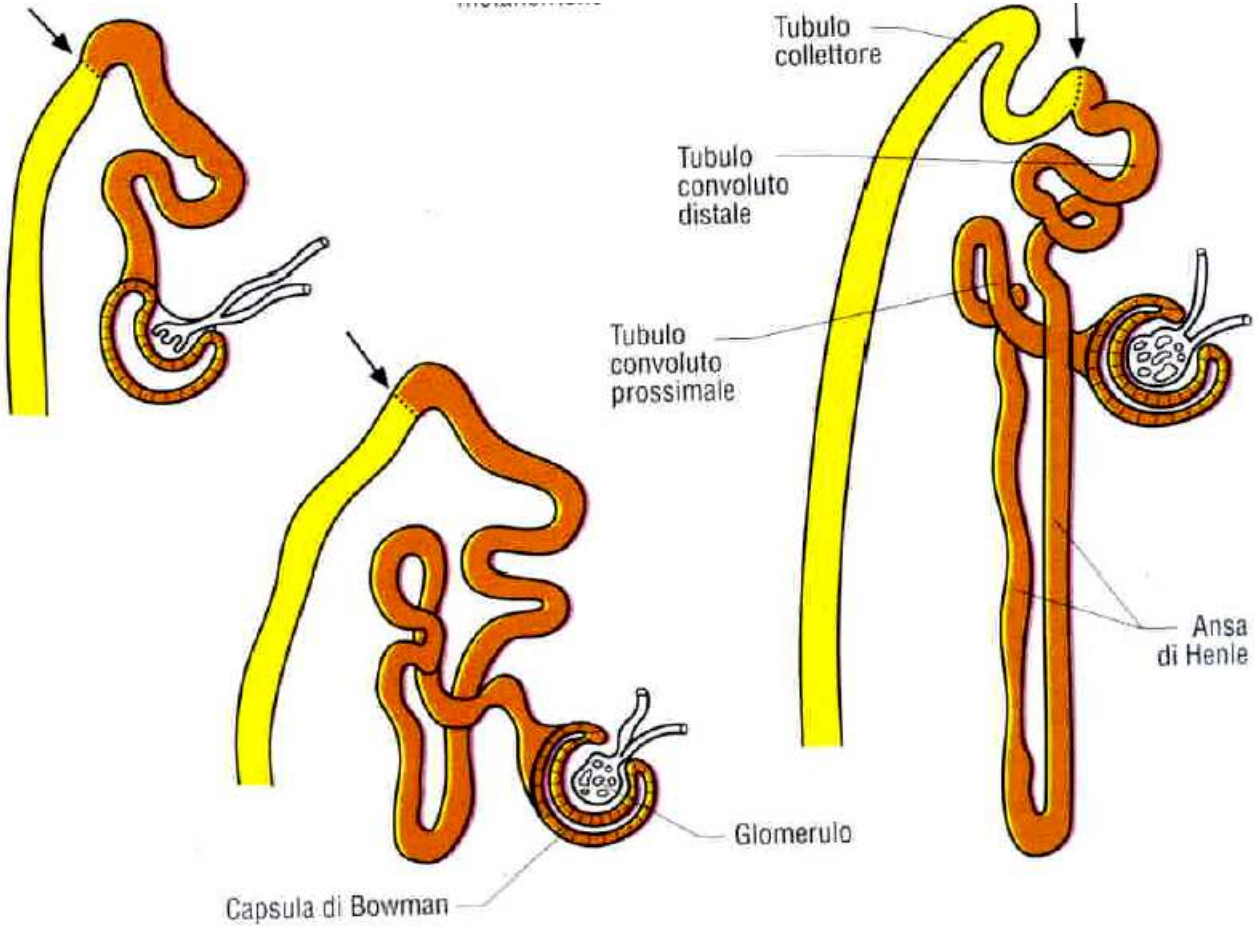
Fattori coinvolti nell'interazione



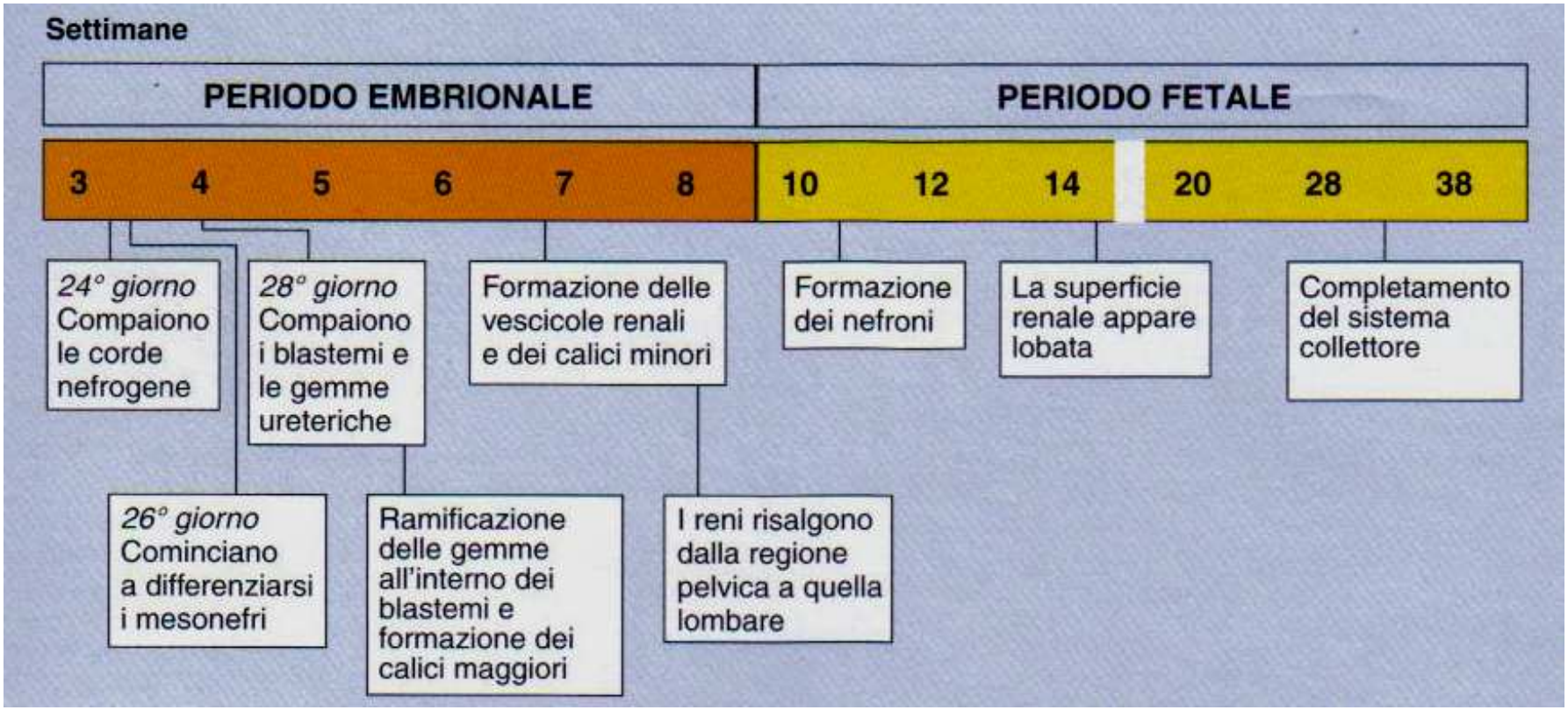
Cellule della gemma ureterica: WINT11 →
induce e regola produzione di GDNF da parte del blastema


Pronefro
in degenerazione
Mesonefro
Dotto
di Wolff
Corda
nefrogena
Nefrotomi
Seno urogenitale
Blastema
metanefrico
Gemma
ureterica
Blastema
metanefrico
Dotto
Mesonefrico
Gemma
ureterica
Uretere
Calice
maggiore
Pelvi
Pelvi
Calice
minore
Calice
maggiore
Dotti collettori
Uretere

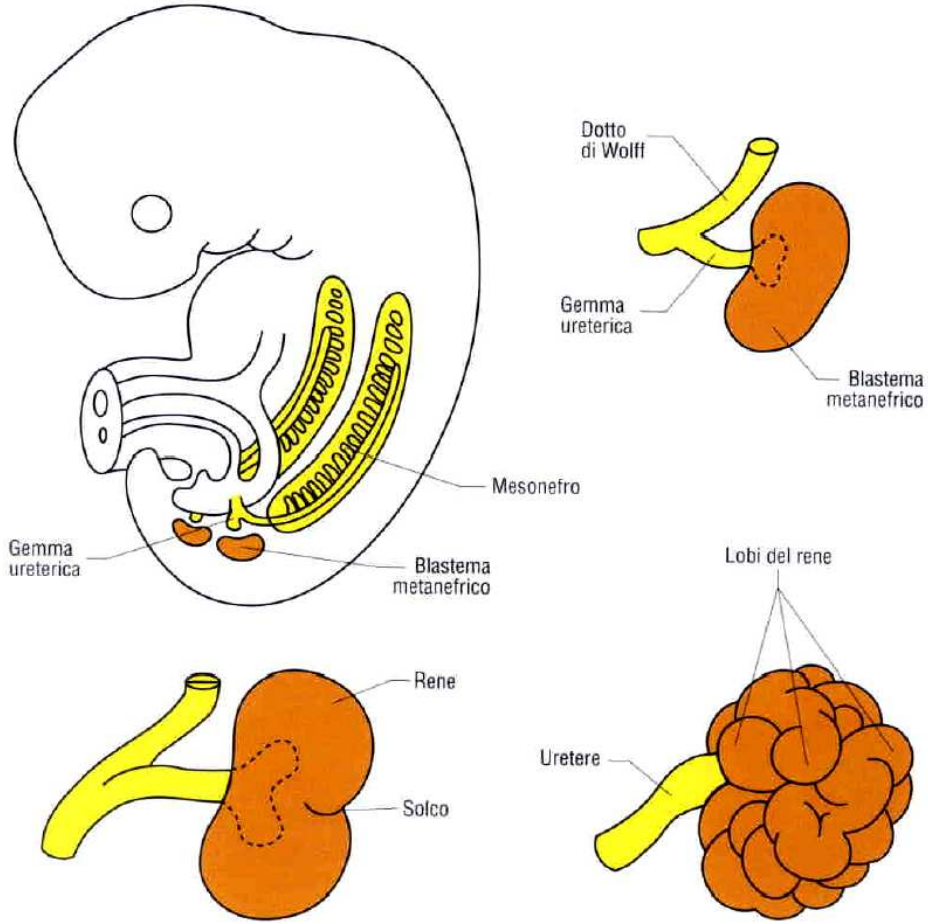

Ampolla
Vescicole
metanefriche
Tubulo
metanefrico


Tubulo collettore
Tubulo convoluto distale
Tubulo convoluto prossimale
Ansa di Henle
Glomerulo
Capsula di Bowman

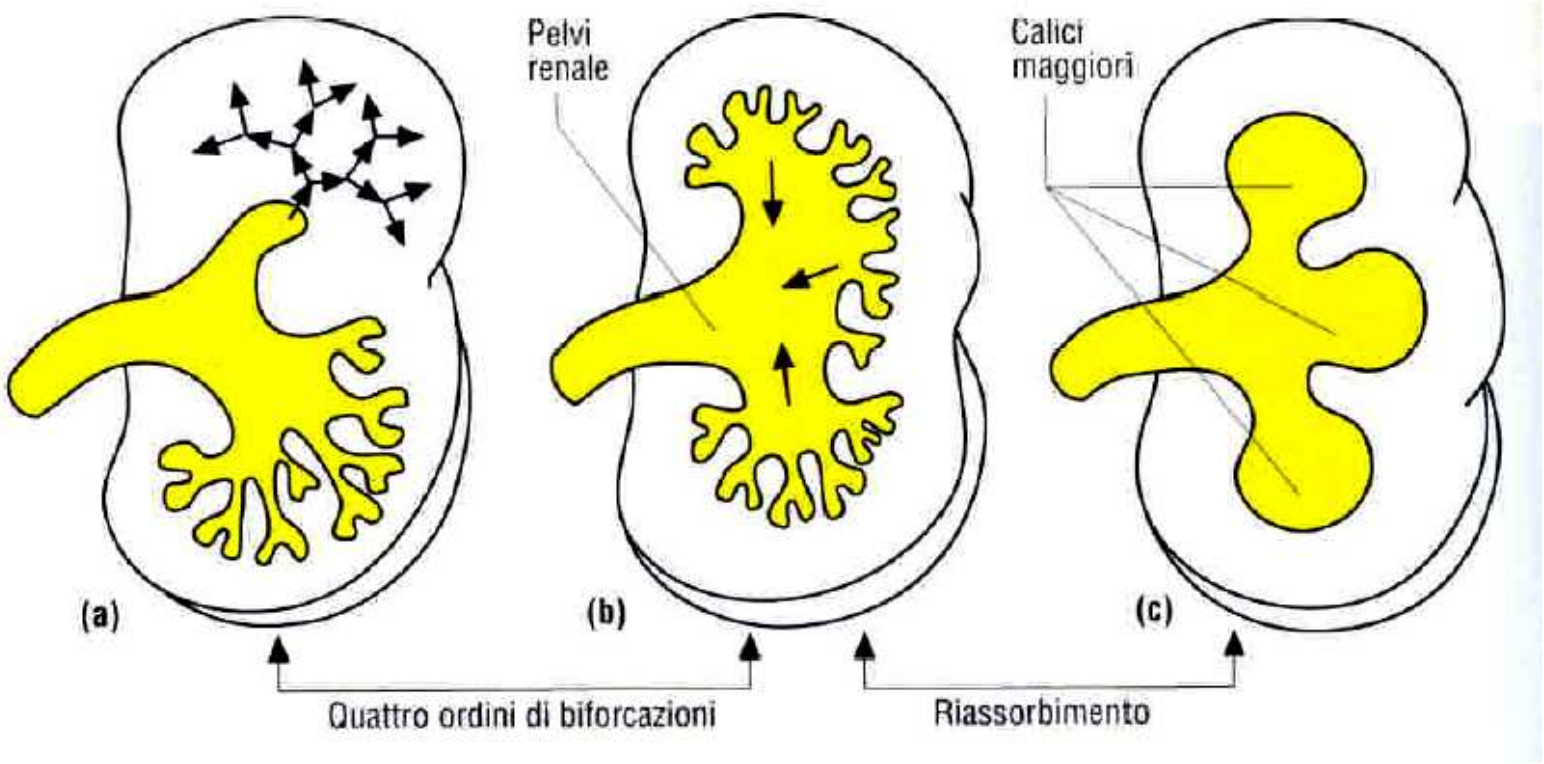
Cronologia dello sviluppo del sistema urinario



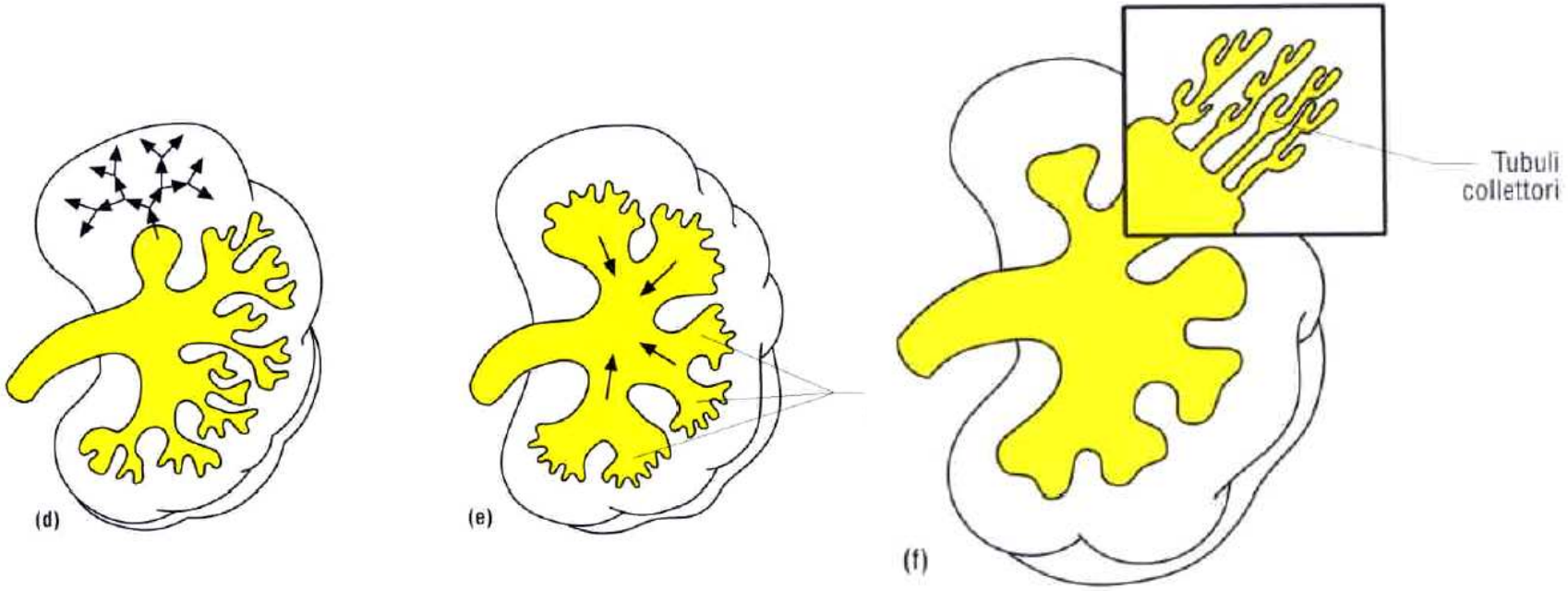
Gemma ureterica e blastema metanefrico nella formazione del rene



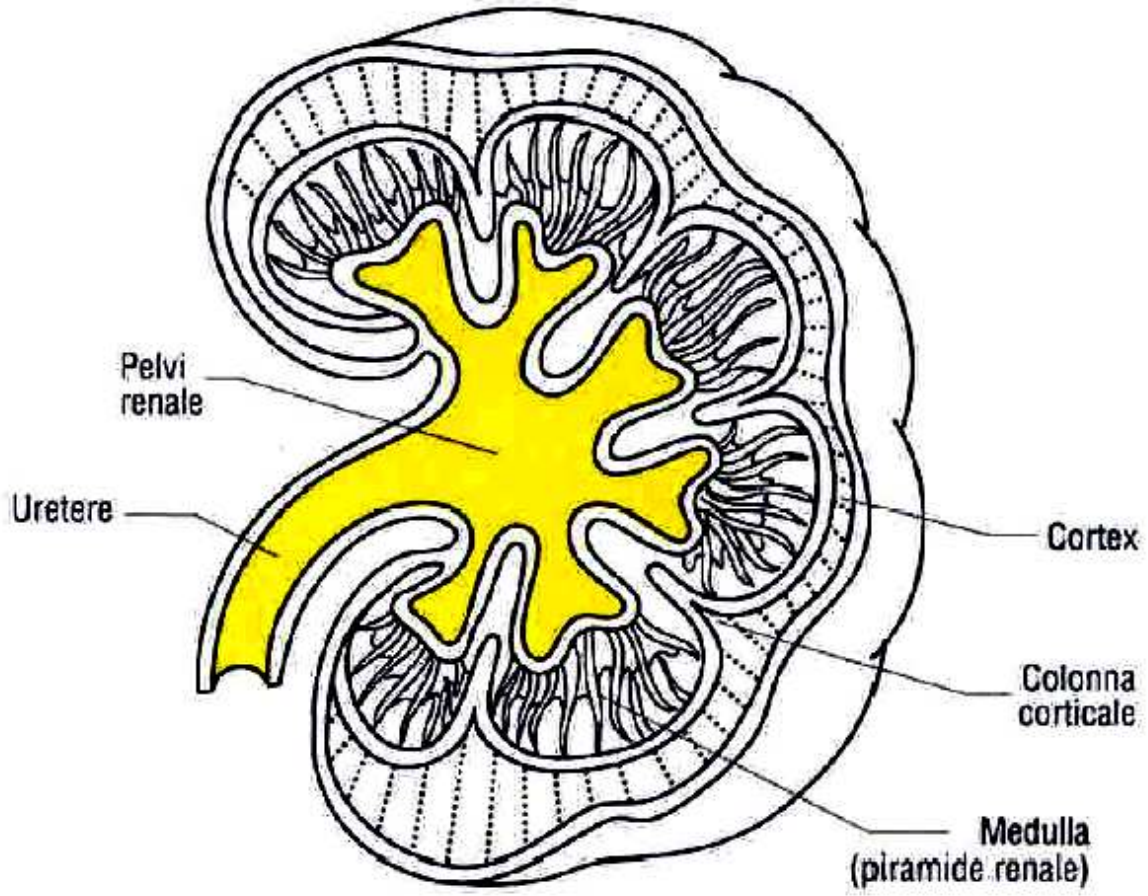
Ramificazione della componente dotti collettori



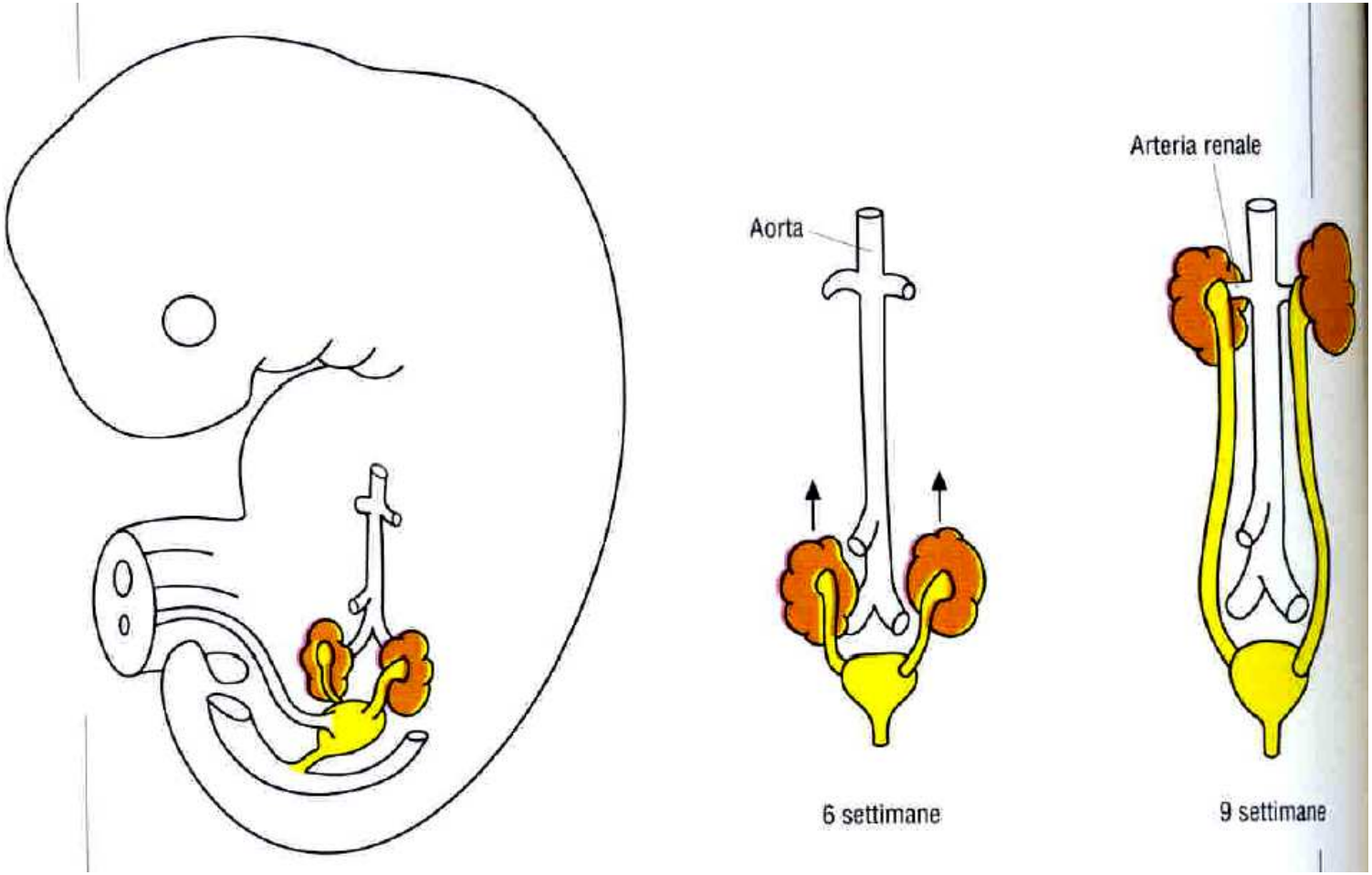
Ramificazione della componente dotti collettori



Architettura del rene (X settimana)

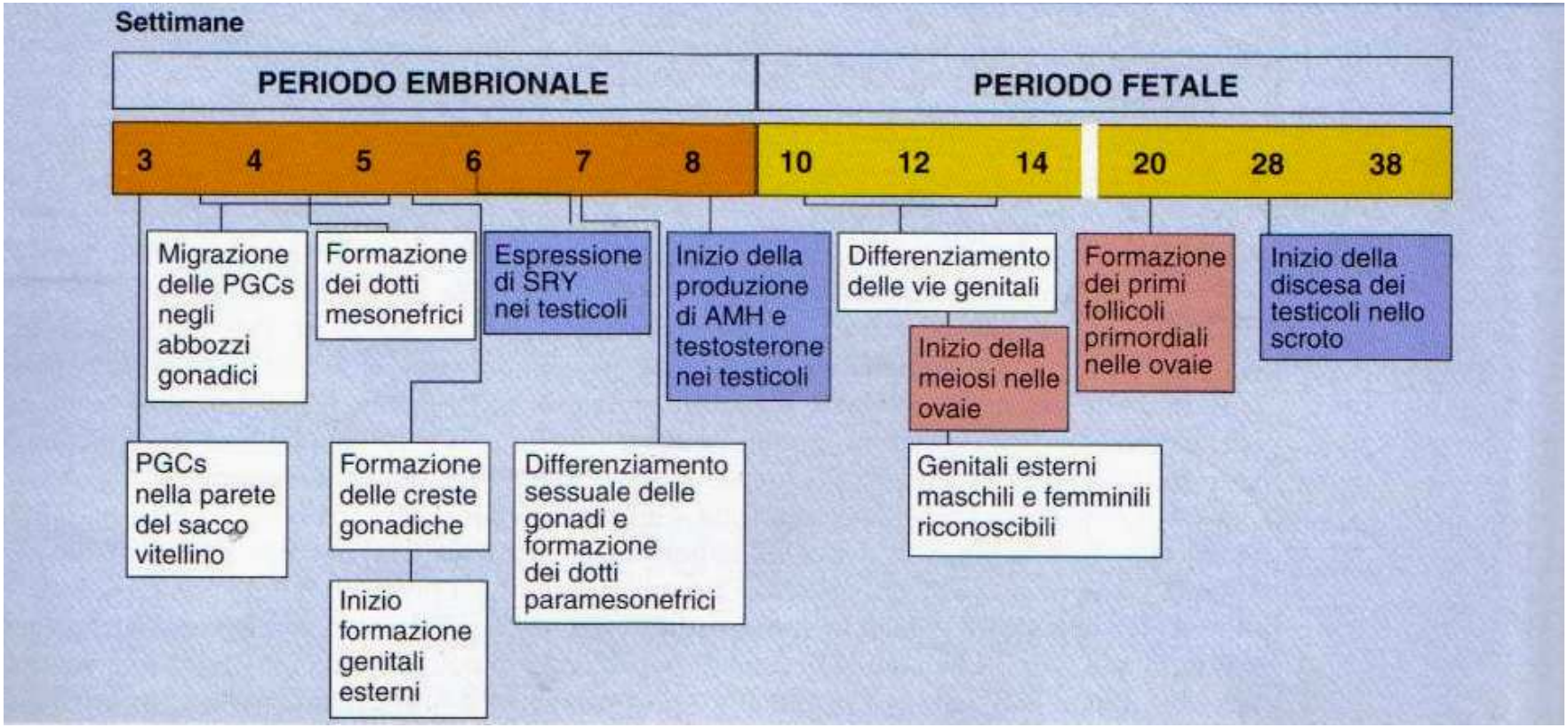


Ascesa dei reni

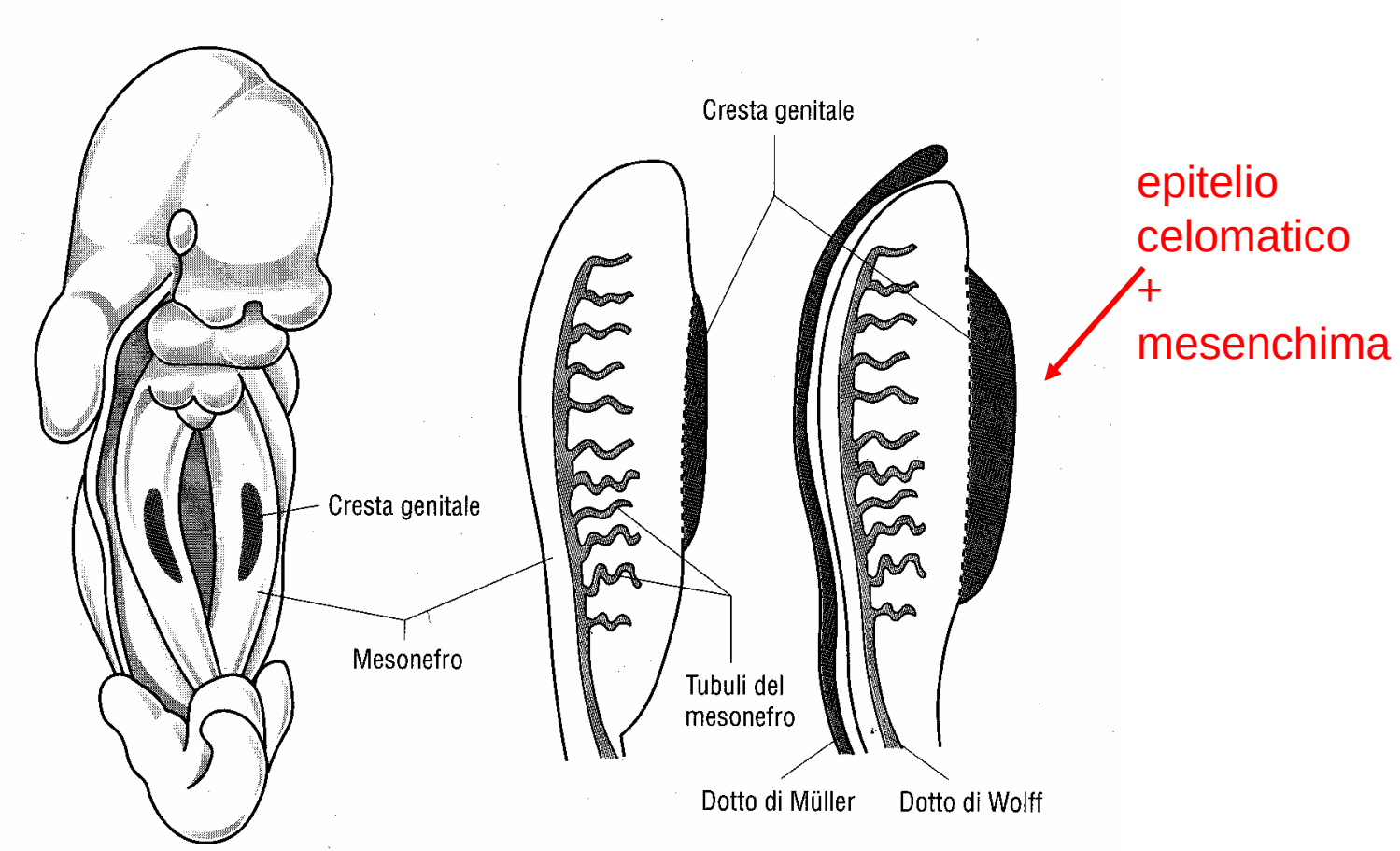


Sviluppo delle gonadi

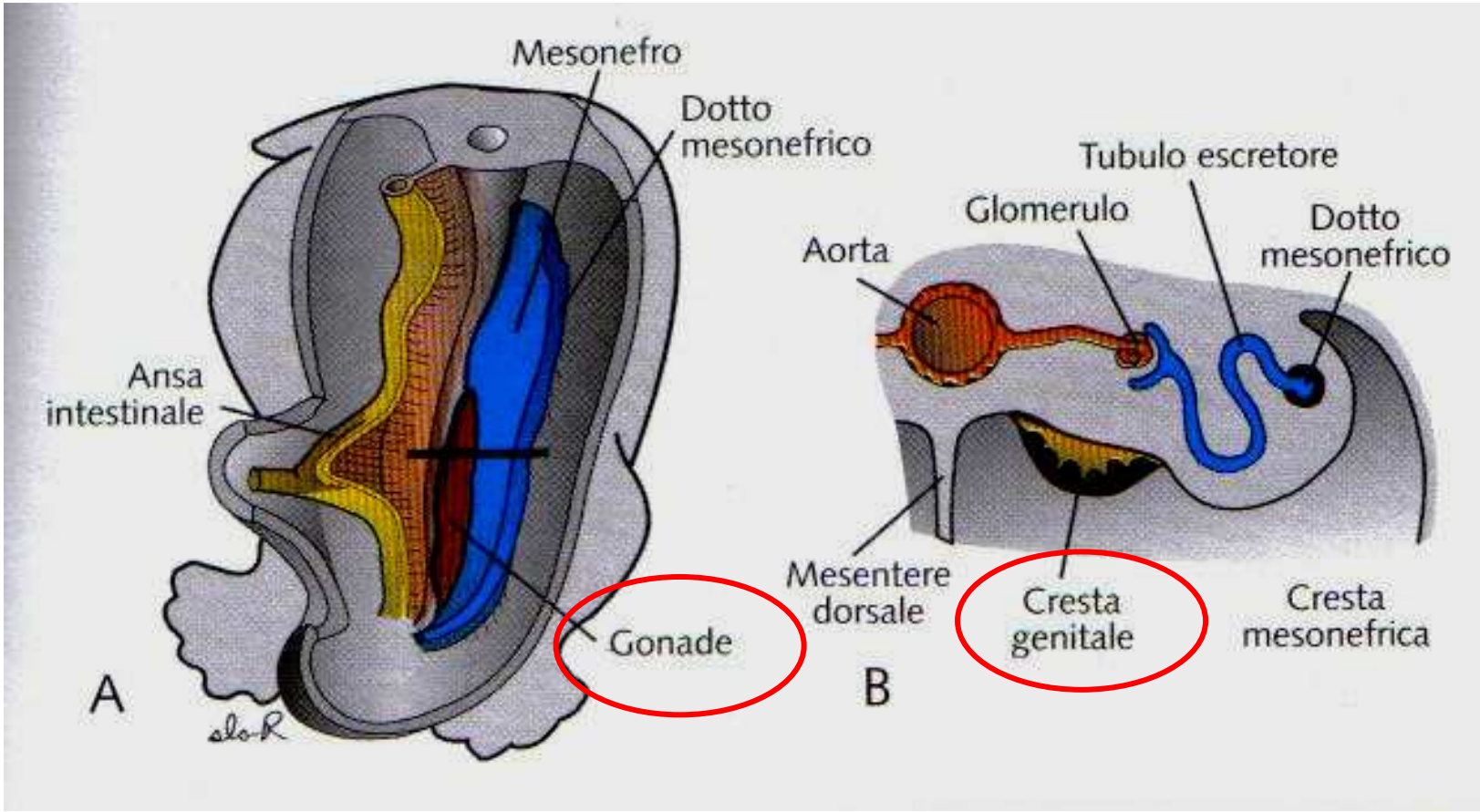
Cronologia sviluppo gonadi e vie genitali



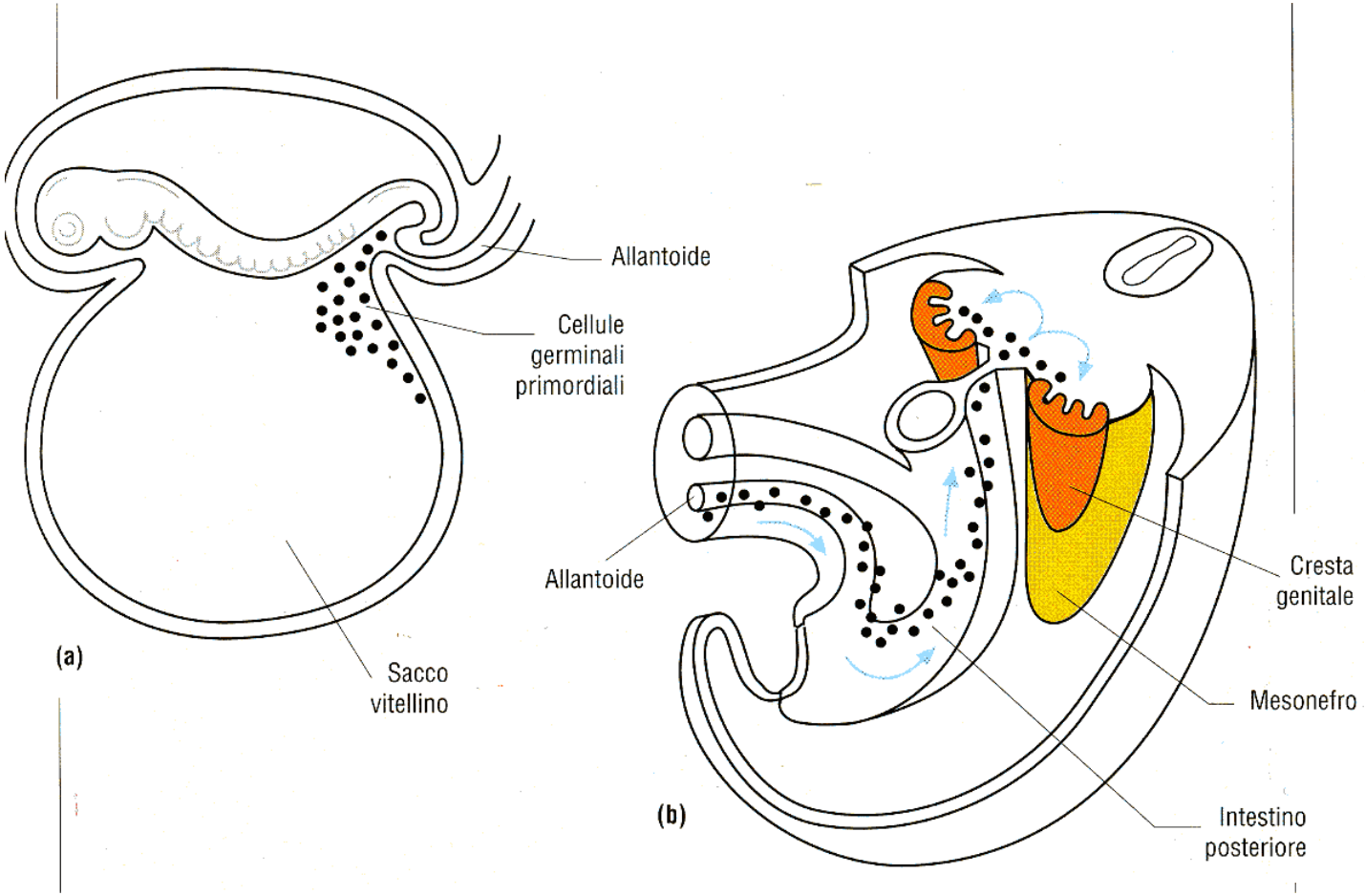
Sviluppo gonadi: formazione delle creste genitali (V settimana)



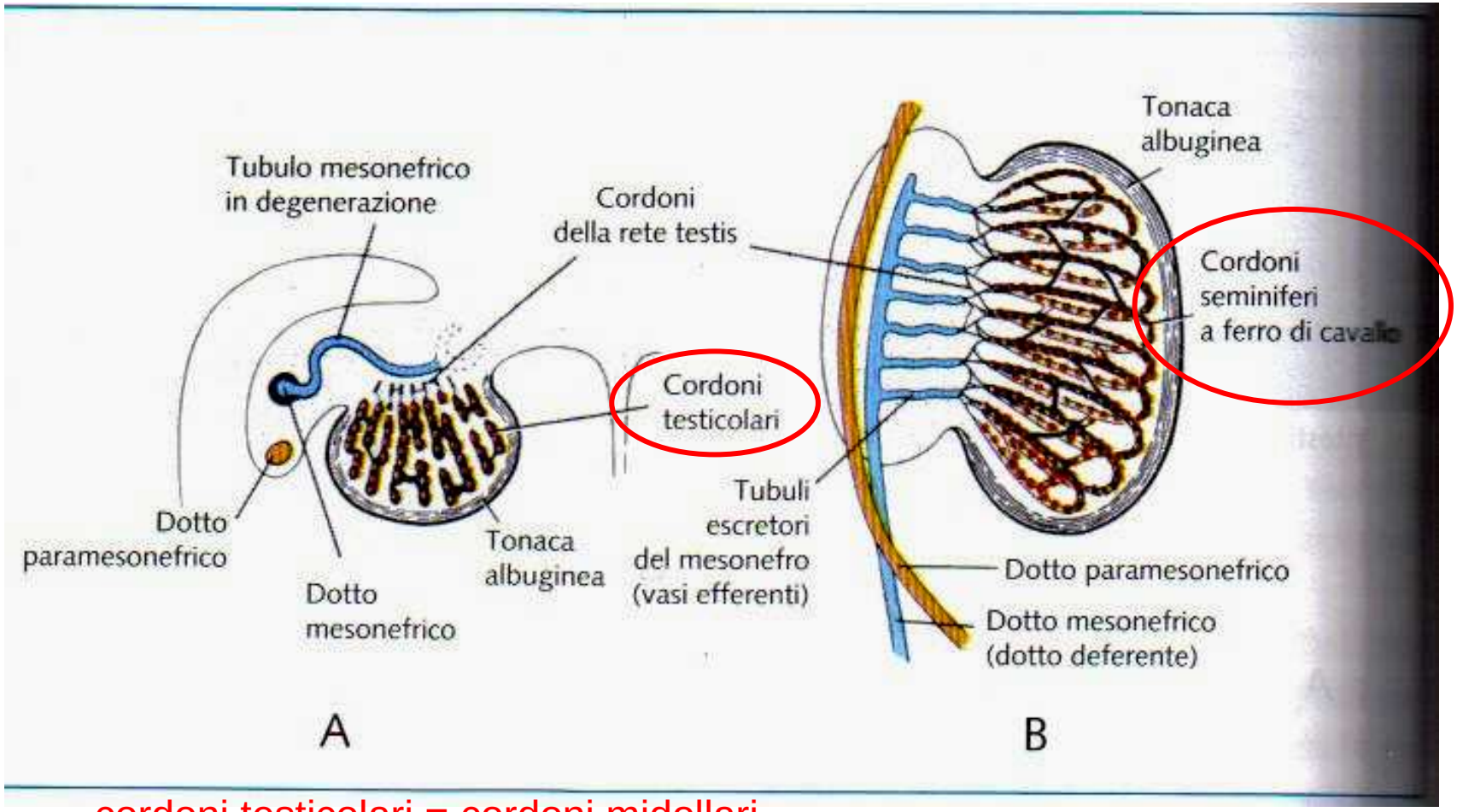
Sviluppo apparato genitale (cresta genitale)



Migrazione dei precursori delle cellule germinali (sett IV-VI)

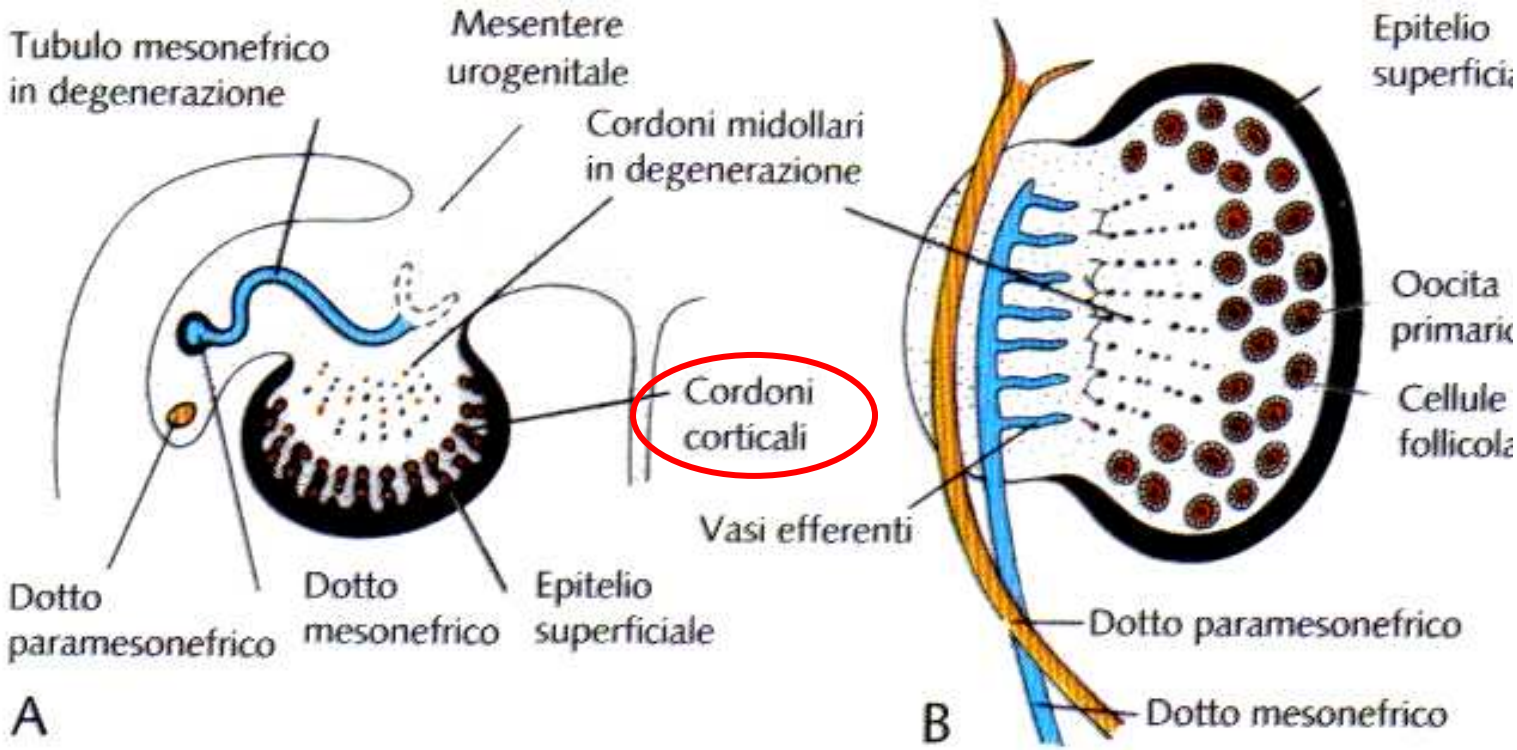


Apparato genitale maschile (sett IV e VIII)



cordoni testicolari = cordoni midollari

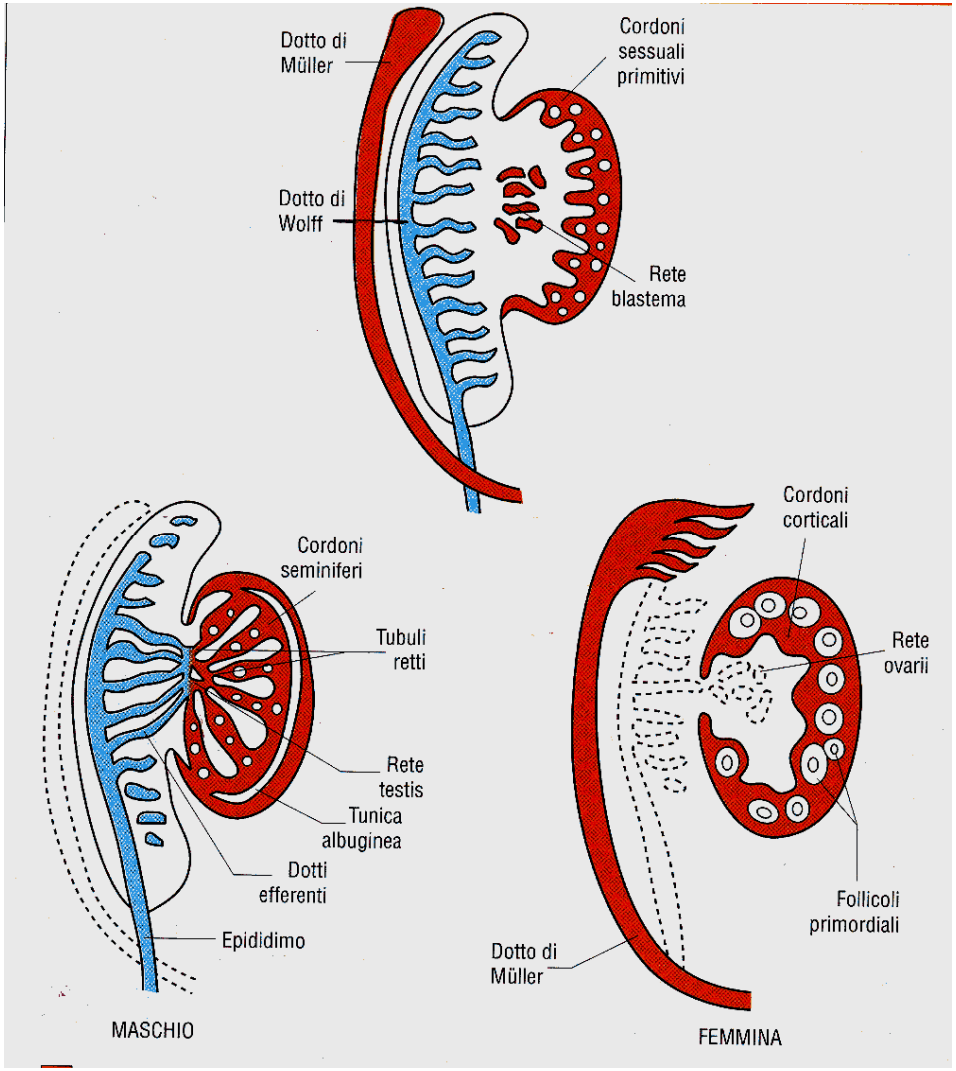
Apparato genitale femminile (sett VII e mese V)



Differenziamento delle gonadi

Cordoni seminiferi (TDF)

Degenerazione dotto di Muller (AMH → Leydig → testosterone)



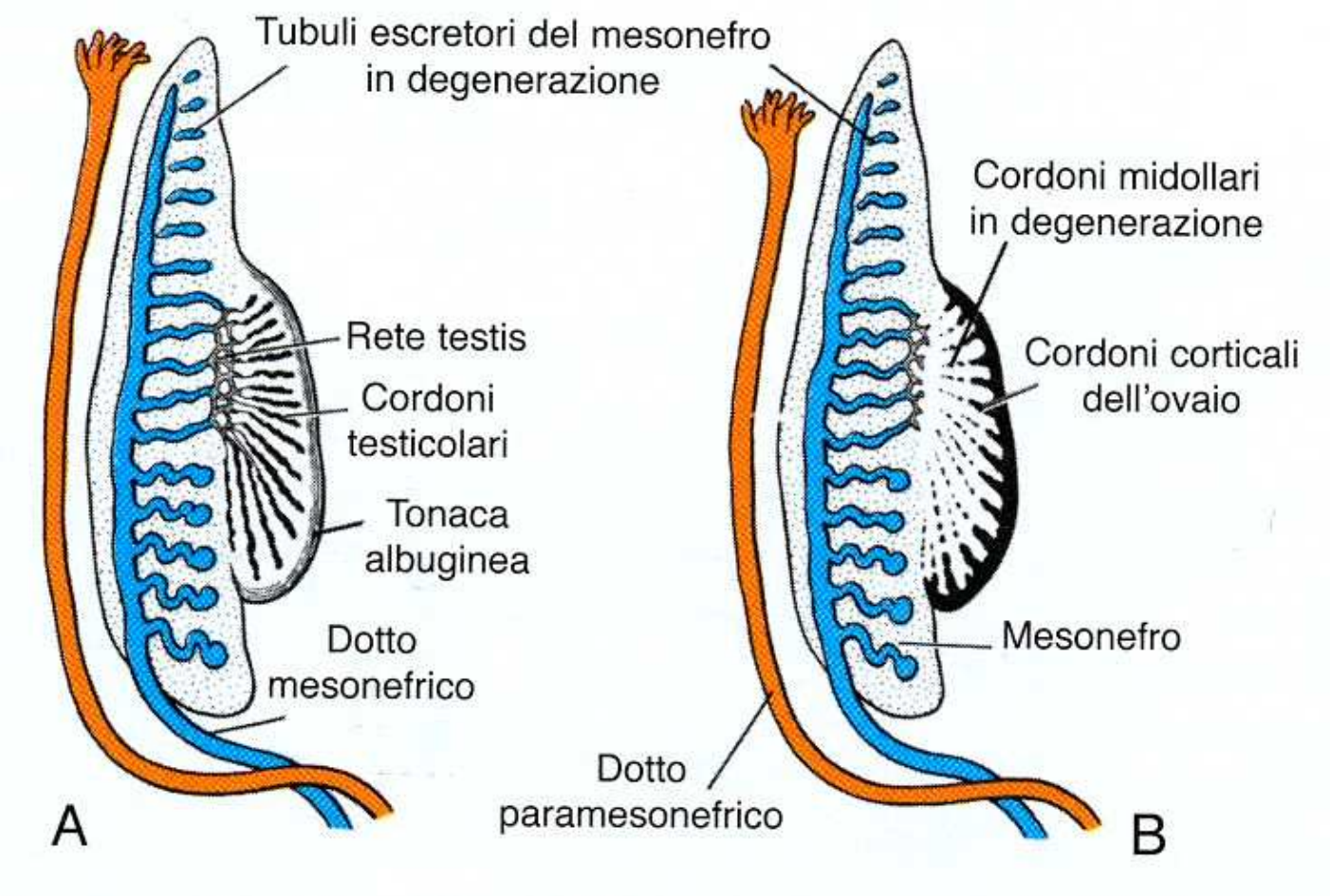
VII sett

Sviluppo cortex

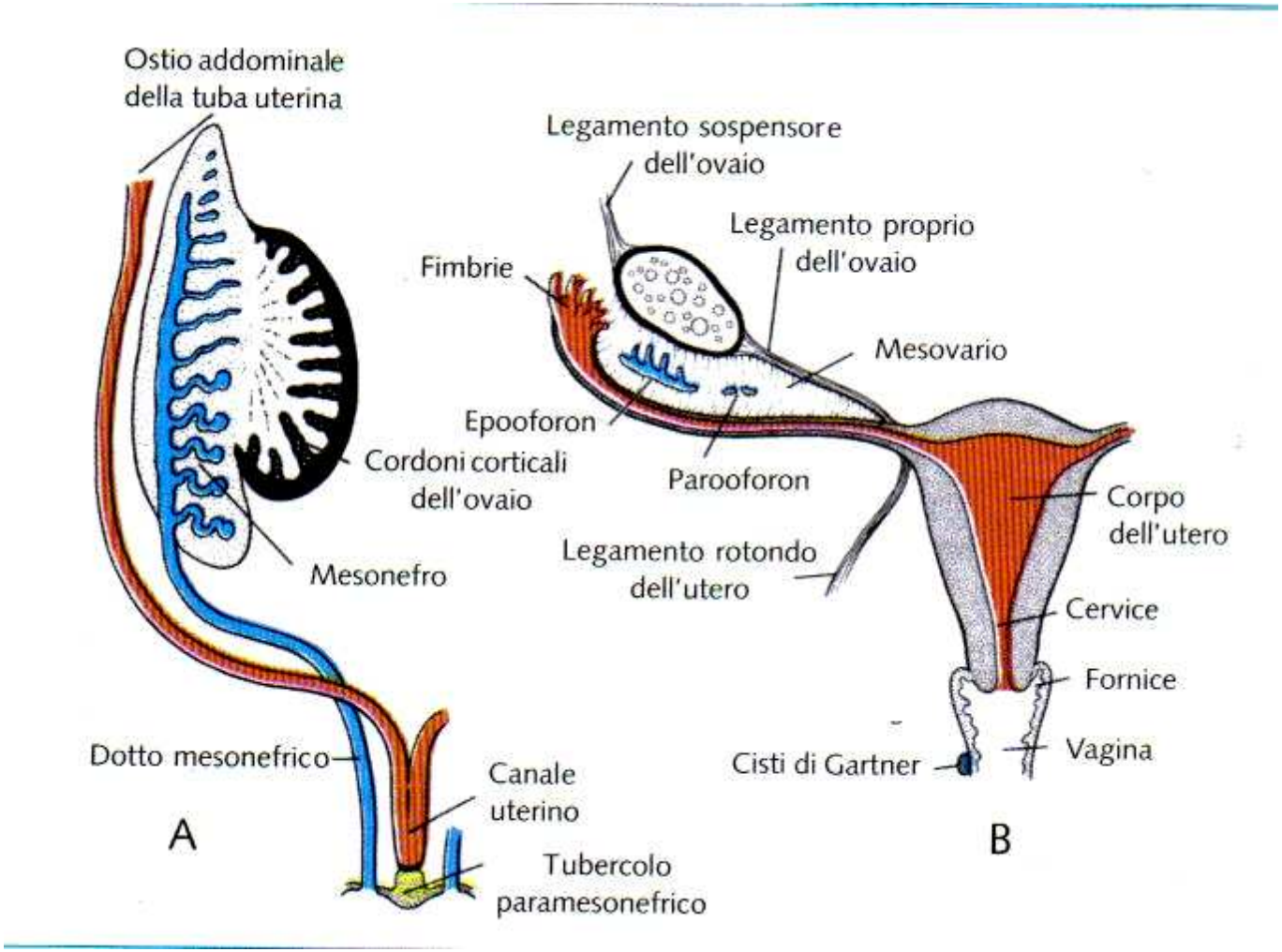
Degenerazione cordoni midollari

Cordoni corticali → Futuri follicoli

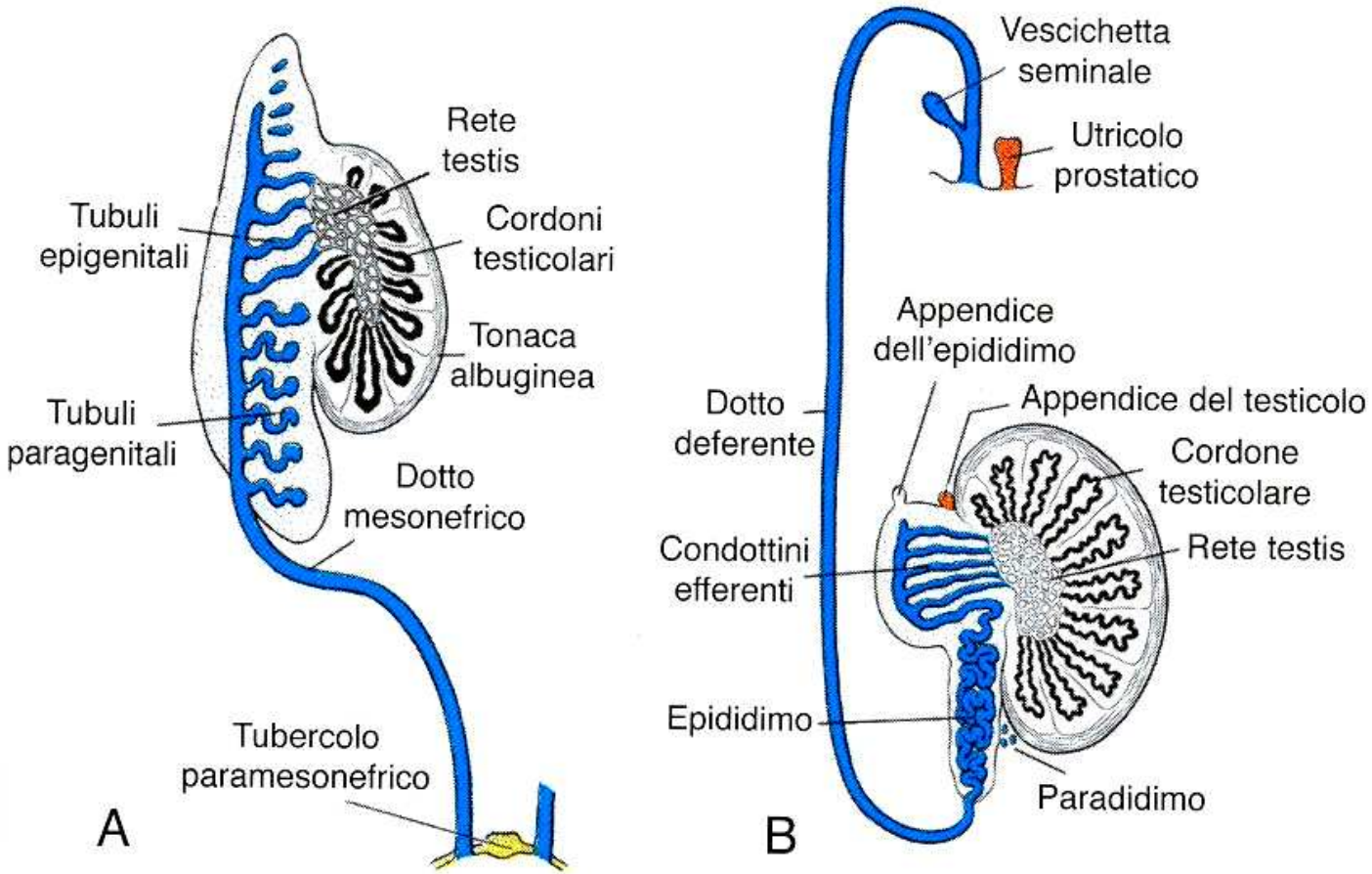
Sviluppo dei dotti genitali (VI settimana)



Sviluppo dotti genitali femminili

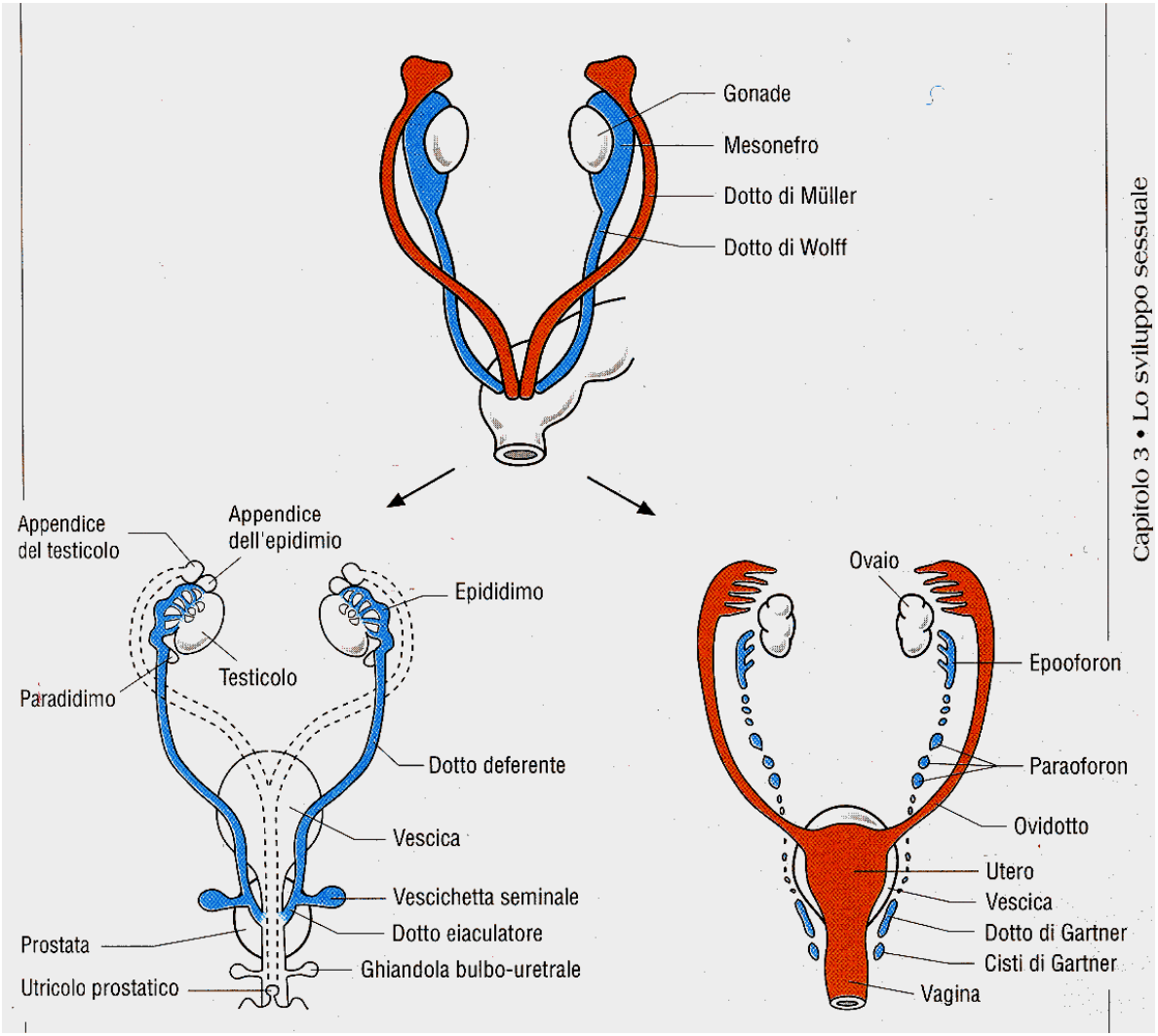


Sviluppo condotti genitali (maschio)



IV mese

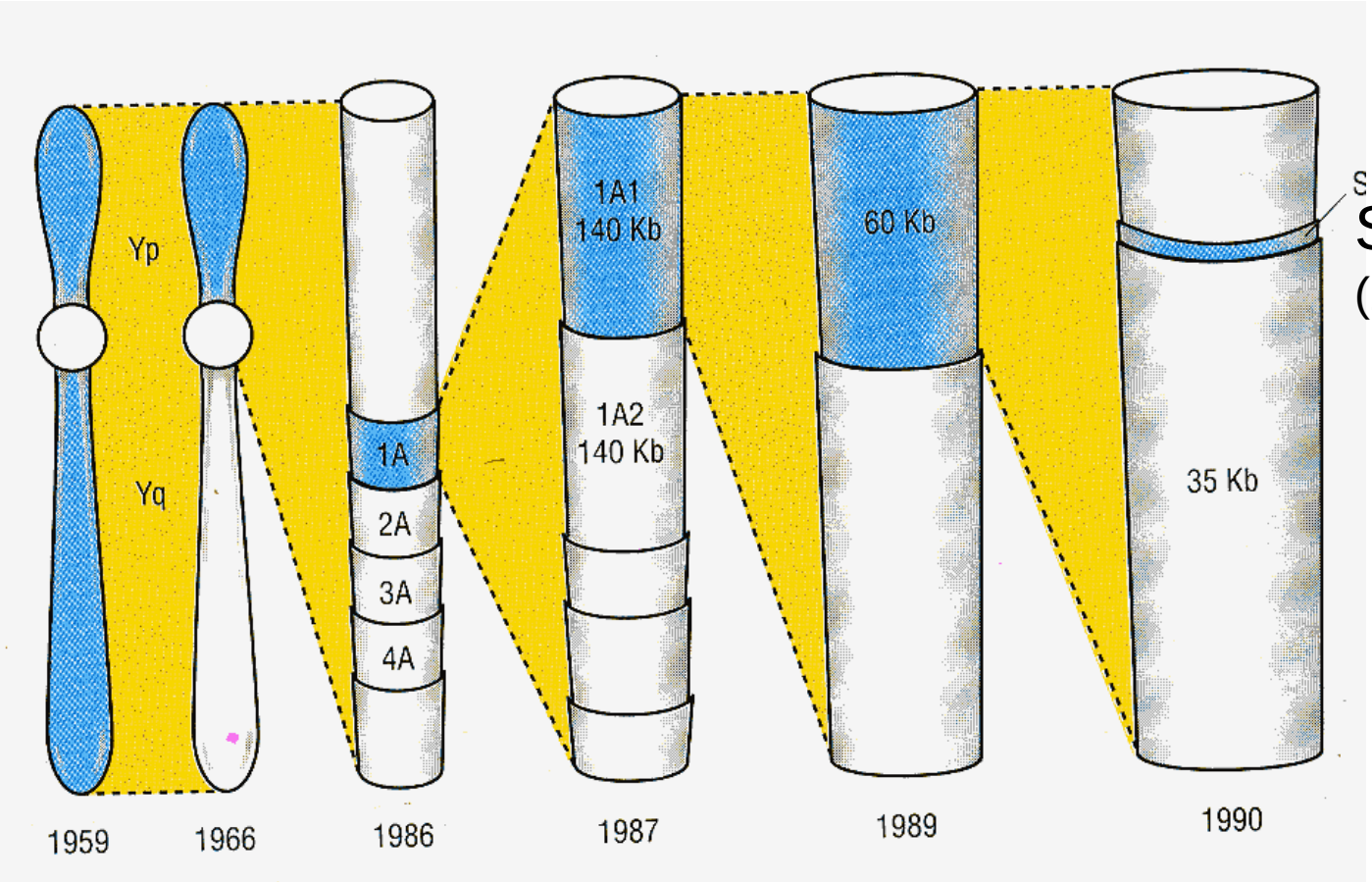
Differenziamento delle vie genitali



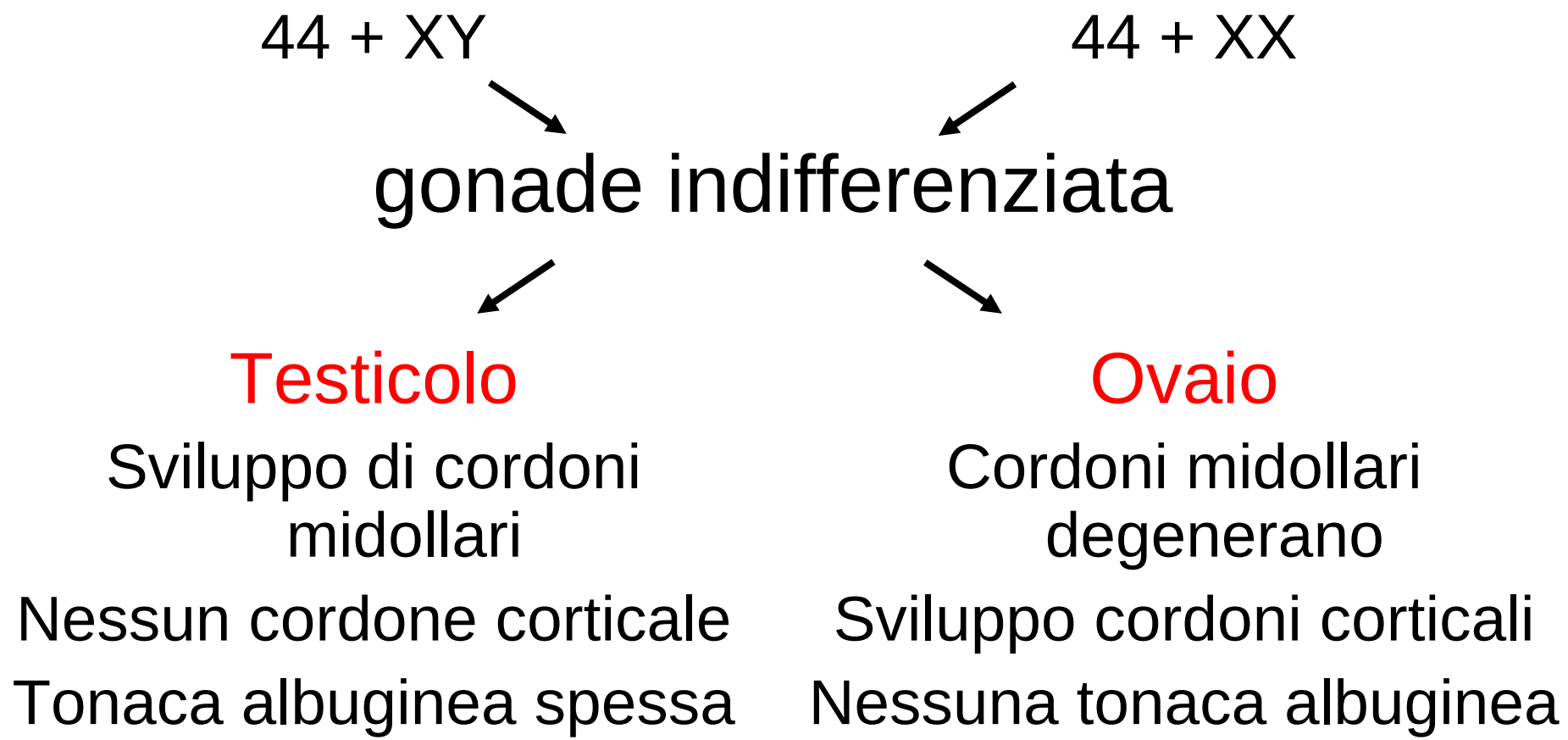
Determinazione del sesso

- Genetica: cromosomi X Y
- Y è mascolinizzante
- Esperimenti di rimozione delle gonadi: se rimosse in tempi precoci, in entrambi i casi si sviluppano femmine !!!
- Il deus ex machina per far mascolinizzare è il TDF, codificato da cromosoma Y

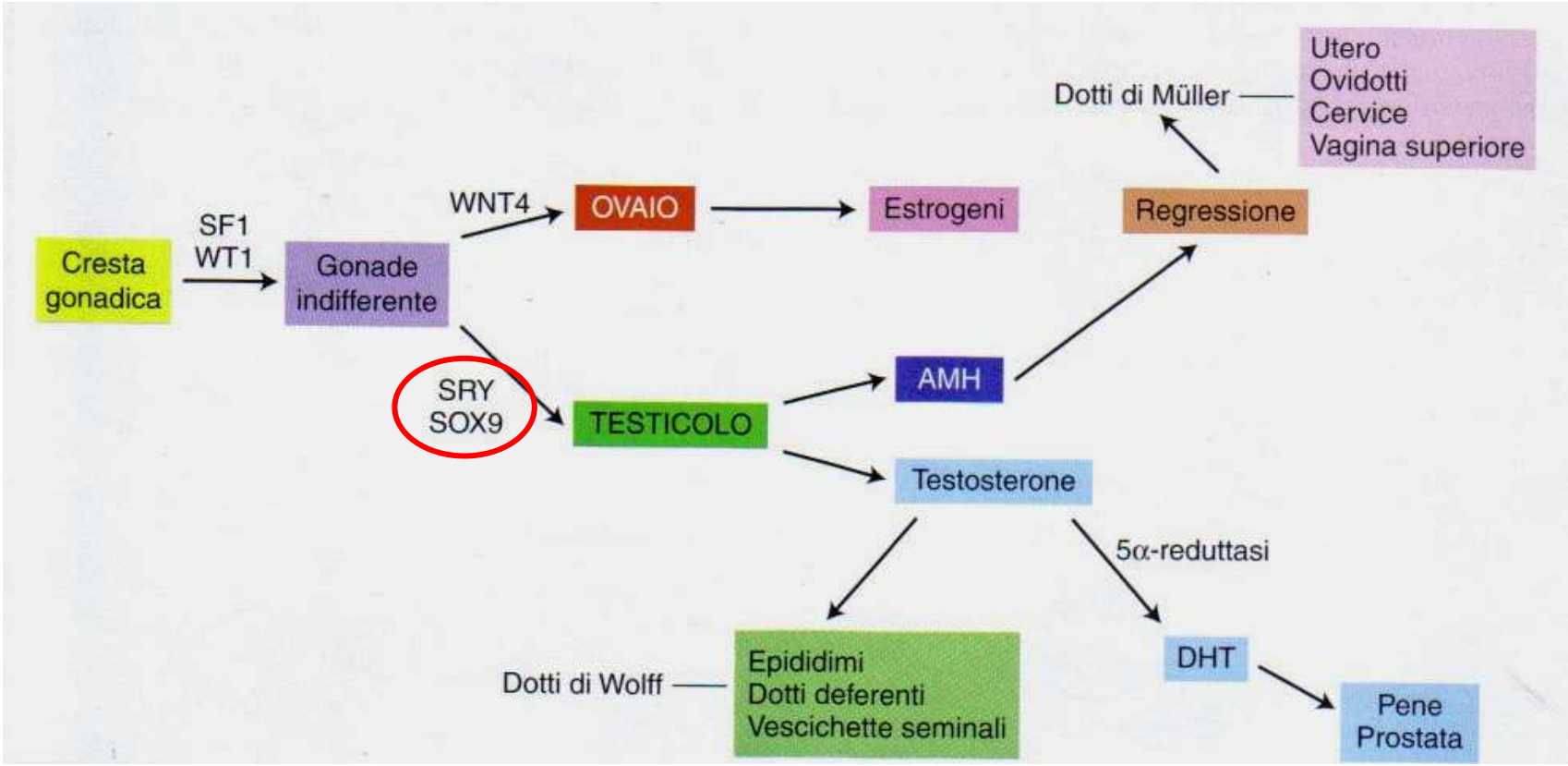
Alla ricerca del gene TDF



Ruolo del cromosoma Y



Regolazione del differenziamento sessuale dell'apparato riproduttore

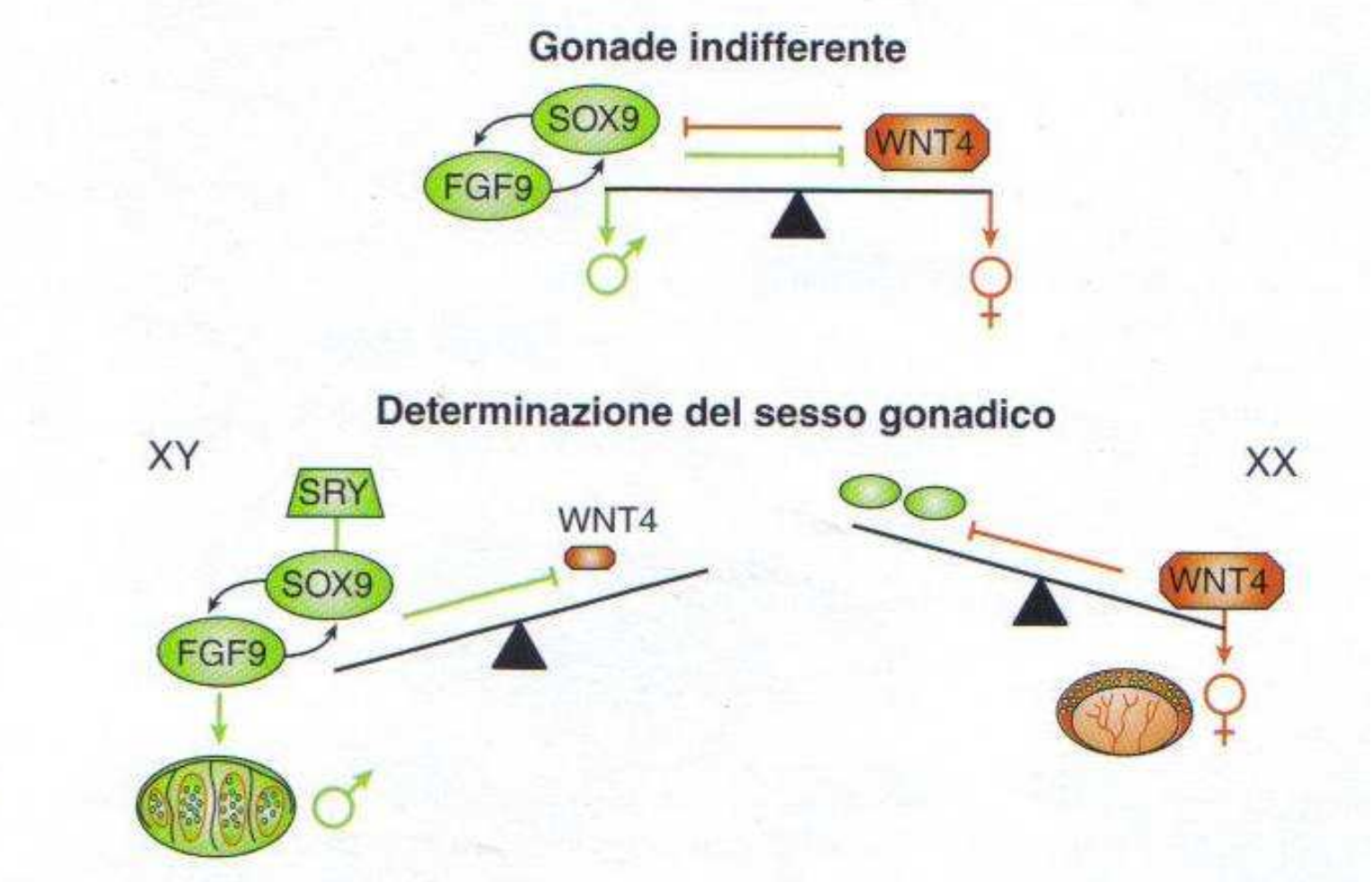


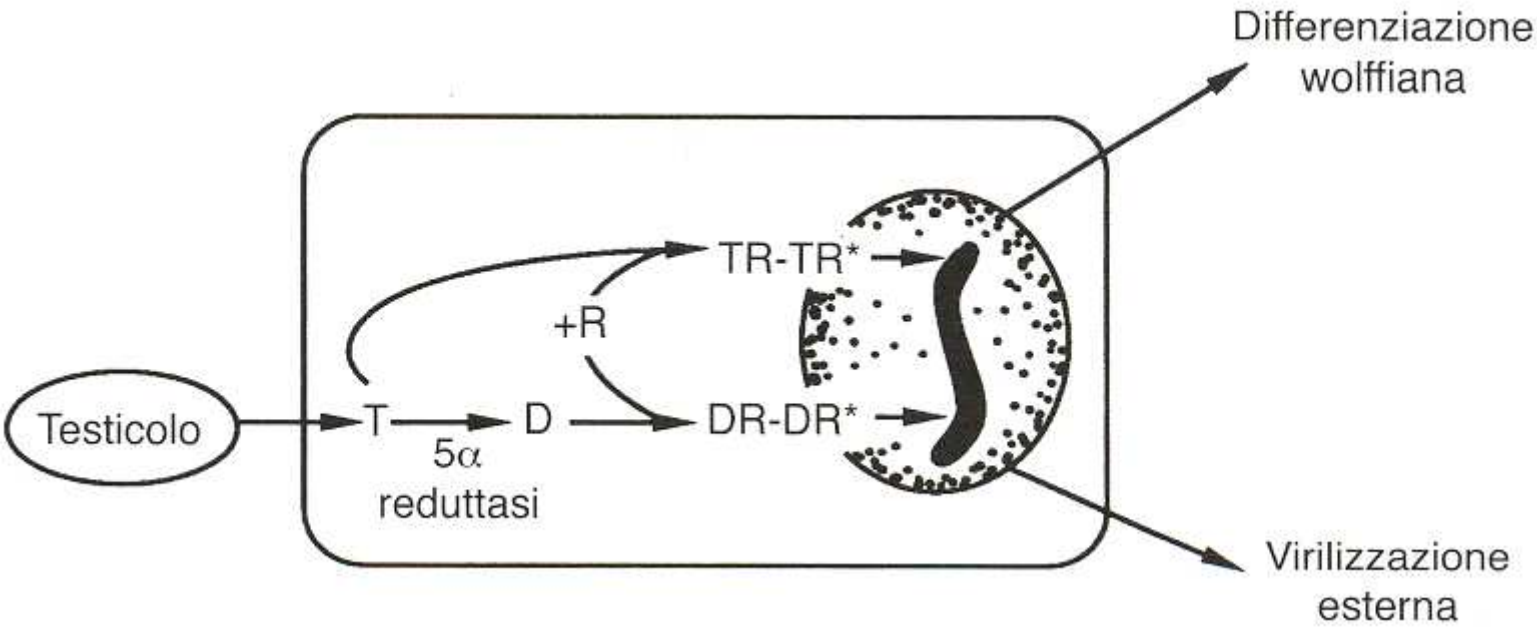
SF1 (fattore steroidogenico 1)

- Cellule di Sertoli → produzione di MIS --| condotti paramesonefrici

- SF1 → SOX9
  - Cellule di Leydig → testosterone → dotti mesonefrici
  - → diidrotestosterone → genitali esterni

Controllo del differenziamento sessuale delle gonadi




Differenziazione
wolffiana
TR-TR*
+R
Testicolo
T
D
DR-DR*
5α
reduttasi
Virilizzazione
esterna