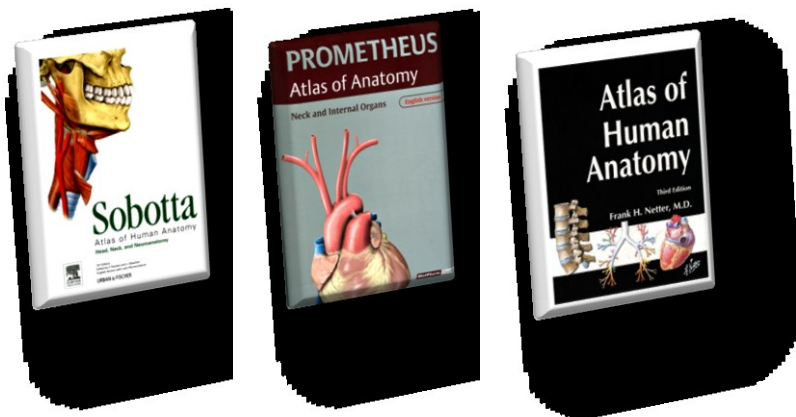
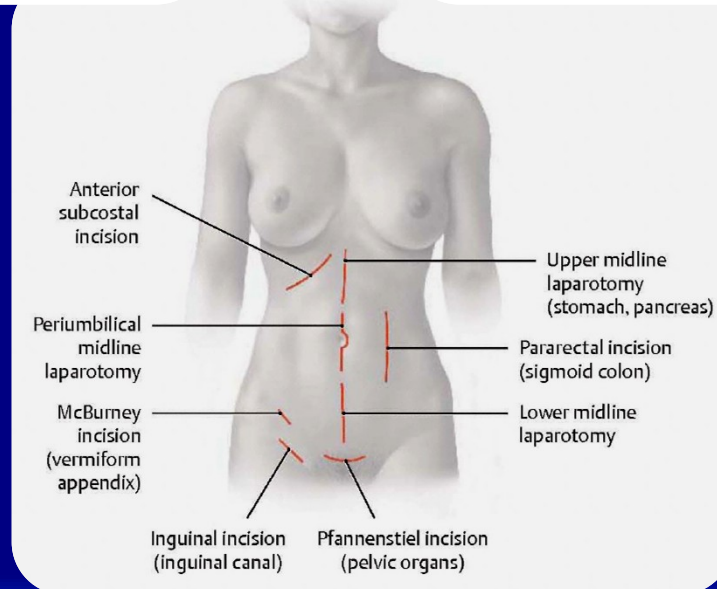
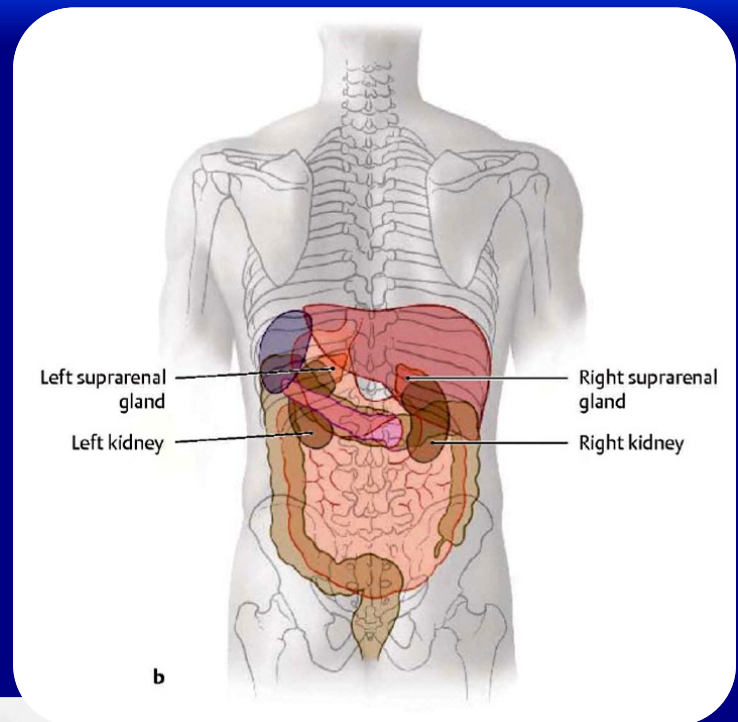
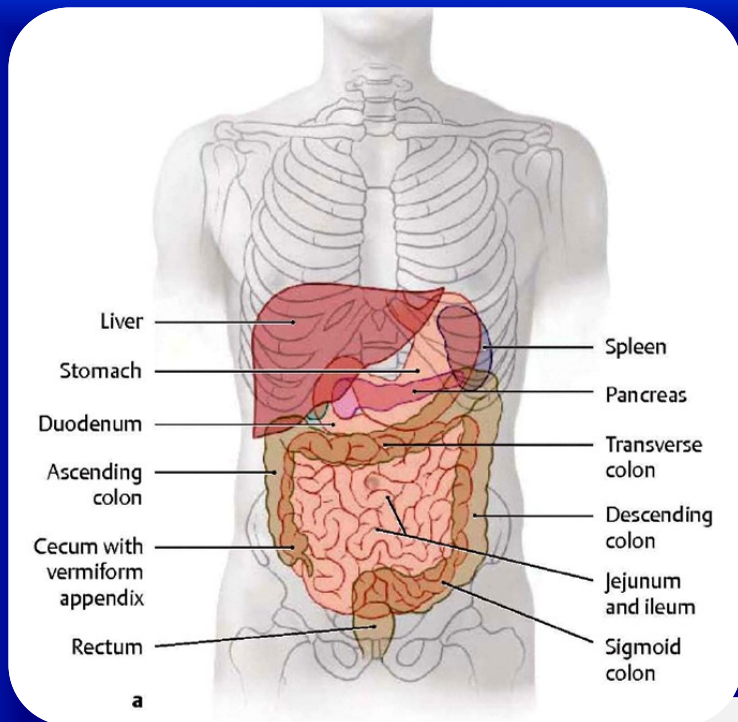


# Rozwój układu pokarmowego





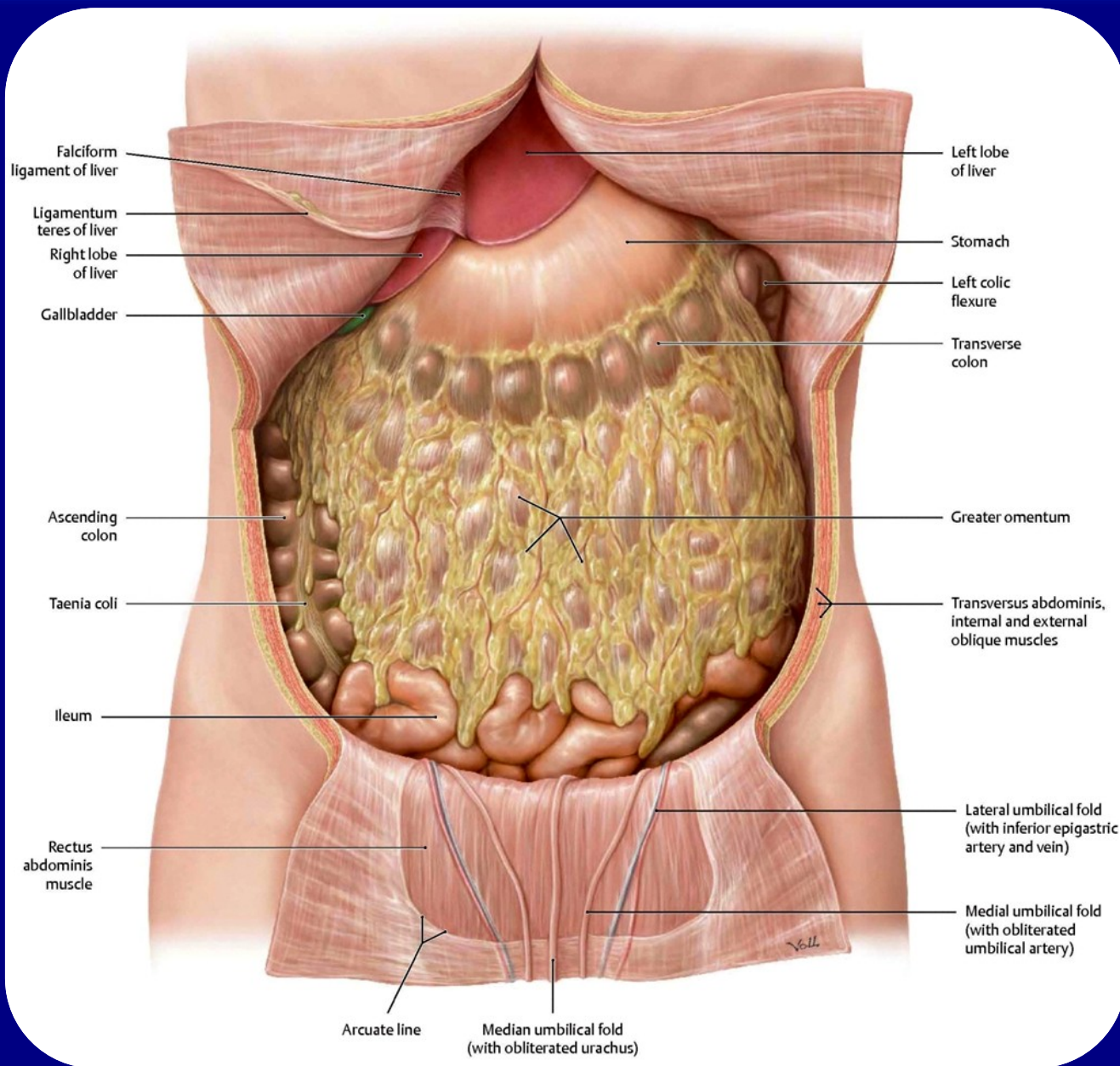
## Classification of the abdominal and pelvic organs by levels

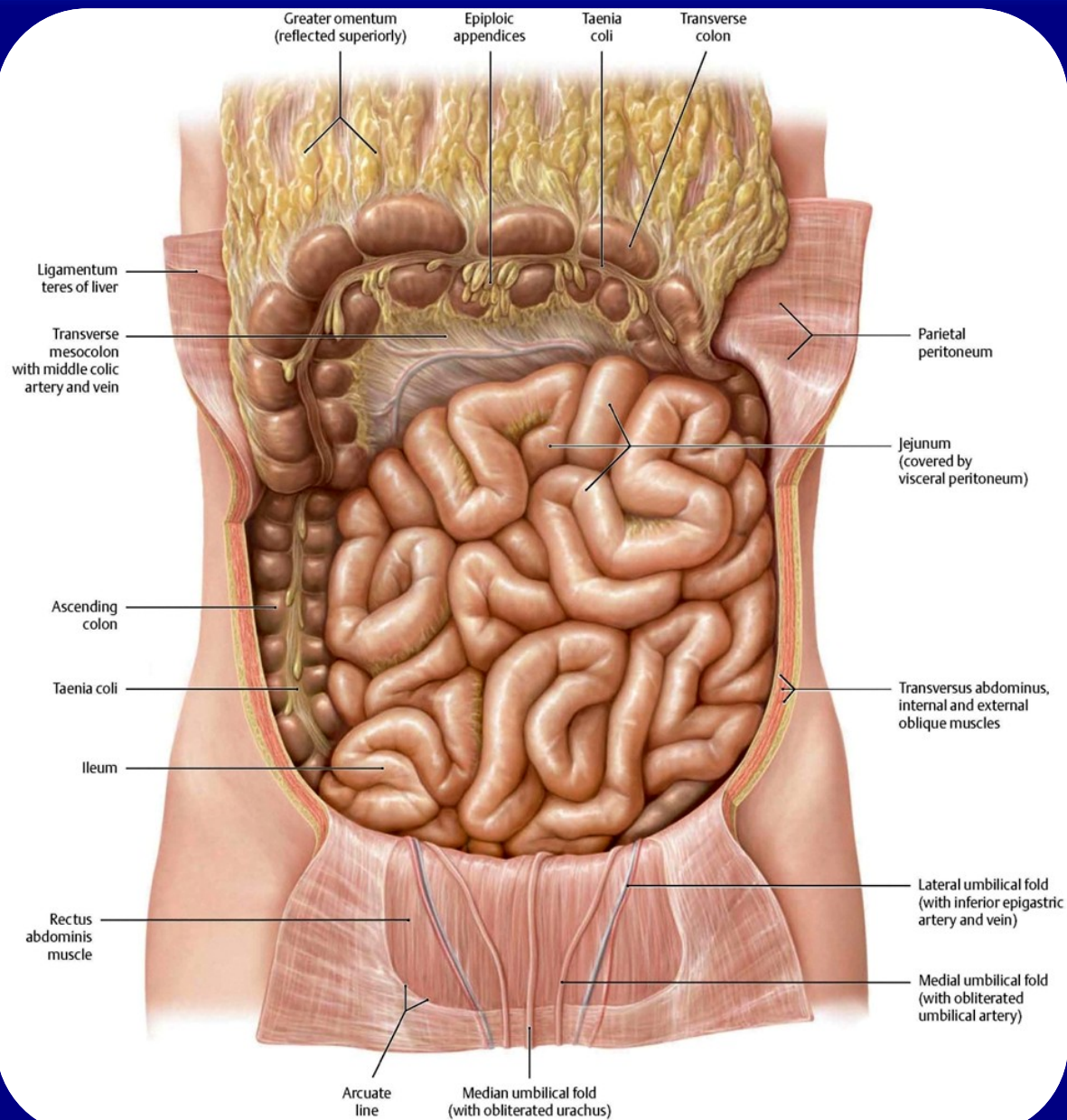
| Level                                                                      | Organs located there                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Upper abdomen<br>(above the transverse mesocolon)                          | <ul style="list-style-type: none"><li>• Stomach</li><li>• Duodenum</li><li>• Liver</li><li>• Gallbladder and biliary tract</li><li>• Spleen</li><li>• Pancreas</li></ul>                                                                                                           |
| Lower abdomen<br>(between the transverse mesocolon and pelvic inlet plane) | <ul style="list-style-type: none"><li>• Small intestine (excluding the duodenum)</li><li>• Large intestine (excluding the rectum)</li></ul> <p><i>Note: The transverse colon, while located in the upper abdomen, is classified functionally as part of the lower abdomen.</i></p> |
| Lesser pelvis                                                              | <ul style="list-style-type: none"><li>• Bladder</li><li>• Rectum</li><li>• Uterus, fallopian tube, ovary, and vagina</li><li>• Portions of the vas deferens, prostate, and seminal gland (the testis and epididymis are outside the pelvic cavity)</li></ul>                       |

## Extra- and intraperitoneal organs

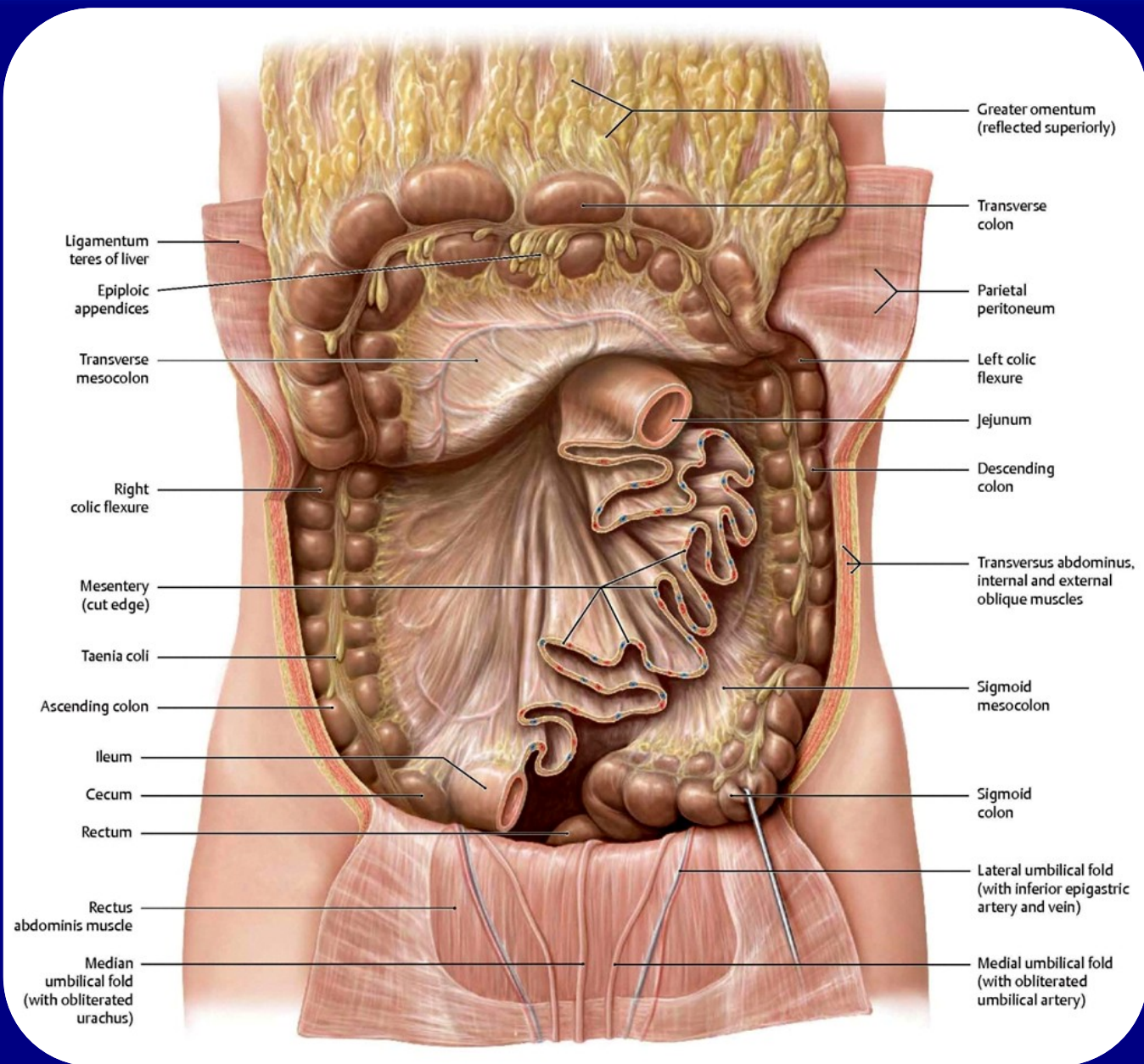
| Extra- and intraperitoneal organs                                                                                                                                                                                                                                                                                                                                                                                                                            | Organs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Intraperitoneal</b> <ul style="list-style-type: none"> <li>• In the abdominal peritoneal cavity</li> <li>• In the pelvic peritoneal cavity</li> </ul>                                                                                                                                                                                                                                                                                                     | <p>These organs are completely covered by peritoneum and are attached by a mesentery to the posterior wall of the peritoneal cavity (the liver and stomach are also attached to the anterior wall).</p> <ul style="list-style-type: none"> <li>• Stomach, small intestine (some of the superior part of the duodenum plus the jejunum and ileum), spleen, liver, and gallbladder; cecum with the vermiform appendix (the cecum has a variable peritoneal covering, and portions of variable size may be retroperitoneal); and the large intestine (transverse colon and sigmoid colon)</li> <li>• Fundus and body of the uterus, the ovaries, and the fallopian tubes</li> </ul>        |
| <b>Extraperitoneal</b> <ul style="list-style-type: none"> <li>• Retroperitoneal (behind the peritoneal cavity) <ul style="list-style-type: none"> <li>– Primarily retroperitoneal (already retroperitoneal when formed)</li> <li>– Secondarily retroperitoneal (enter the retroperitoneum during embryonic development)</li> </ul> </li> <li>• Infraperitoneal / subperitoneal (below the peritoneal cavity / below the pelvic peritoneal cavity)</li> </ul> | <p>These organs either lack a peritoneal covering (e.g., the kidneys) or are partially covered by peritoneum (e.g., the duodenum, pancreas, and bladder), usually on their anterior or superior surface; they do not have a mesentery.</p> <ul style="list-style-type: none"> <li>• Kidneys, suprarenal glands (not visible here, lateral to this midsagittal plane), and ureters</li> <li>• Duodenum (descending, horizontal and ascending [partial]); pancreas; ascending and descending colon; rectum <i>up to</i> the sacral flexure</li> <li>• Bladder and distal ureters, prostate, seminal vesicle, uterine cervix, vagina, and rectum <i>past</i> the sacral flexure</li> </ul> |

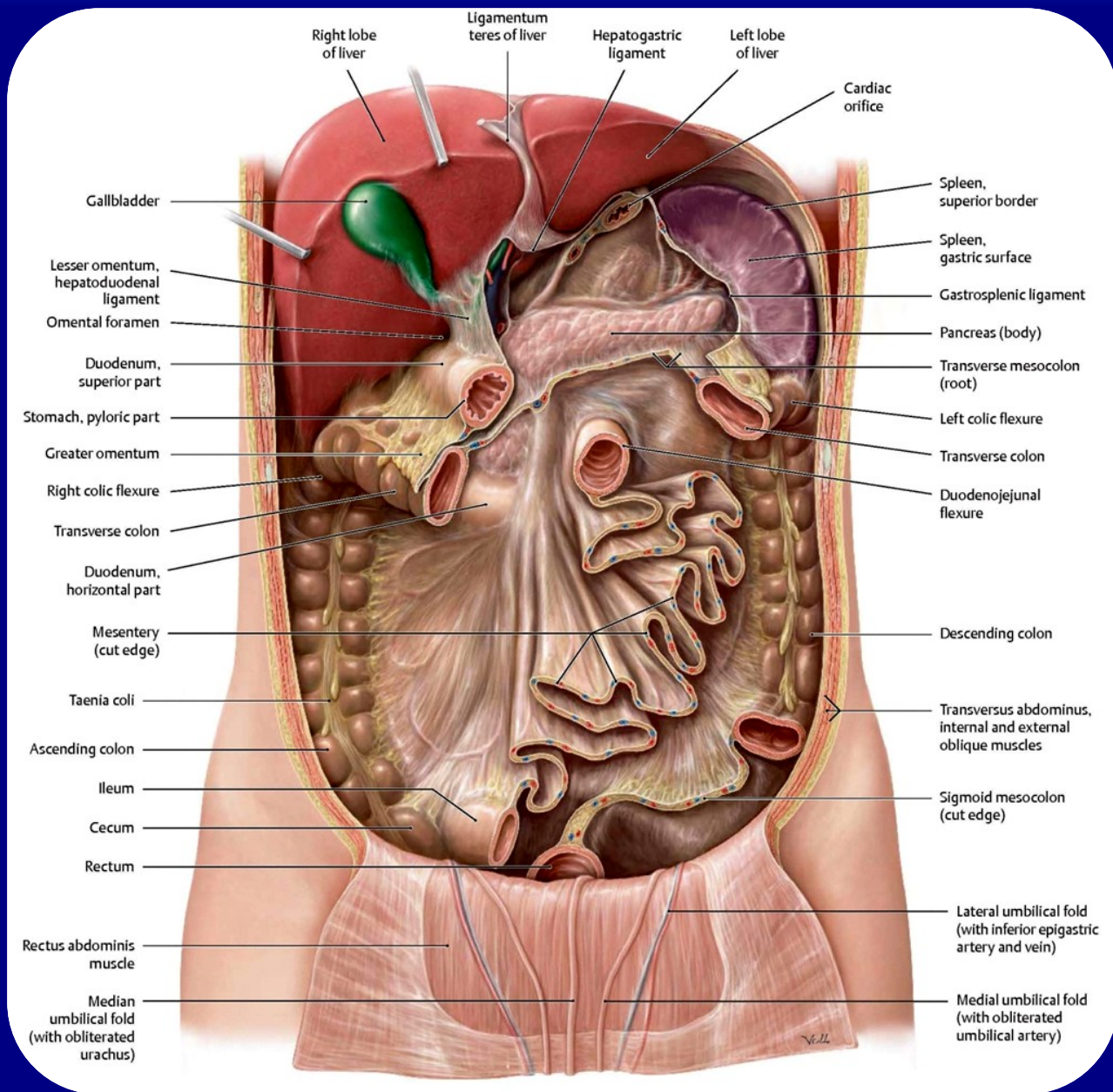




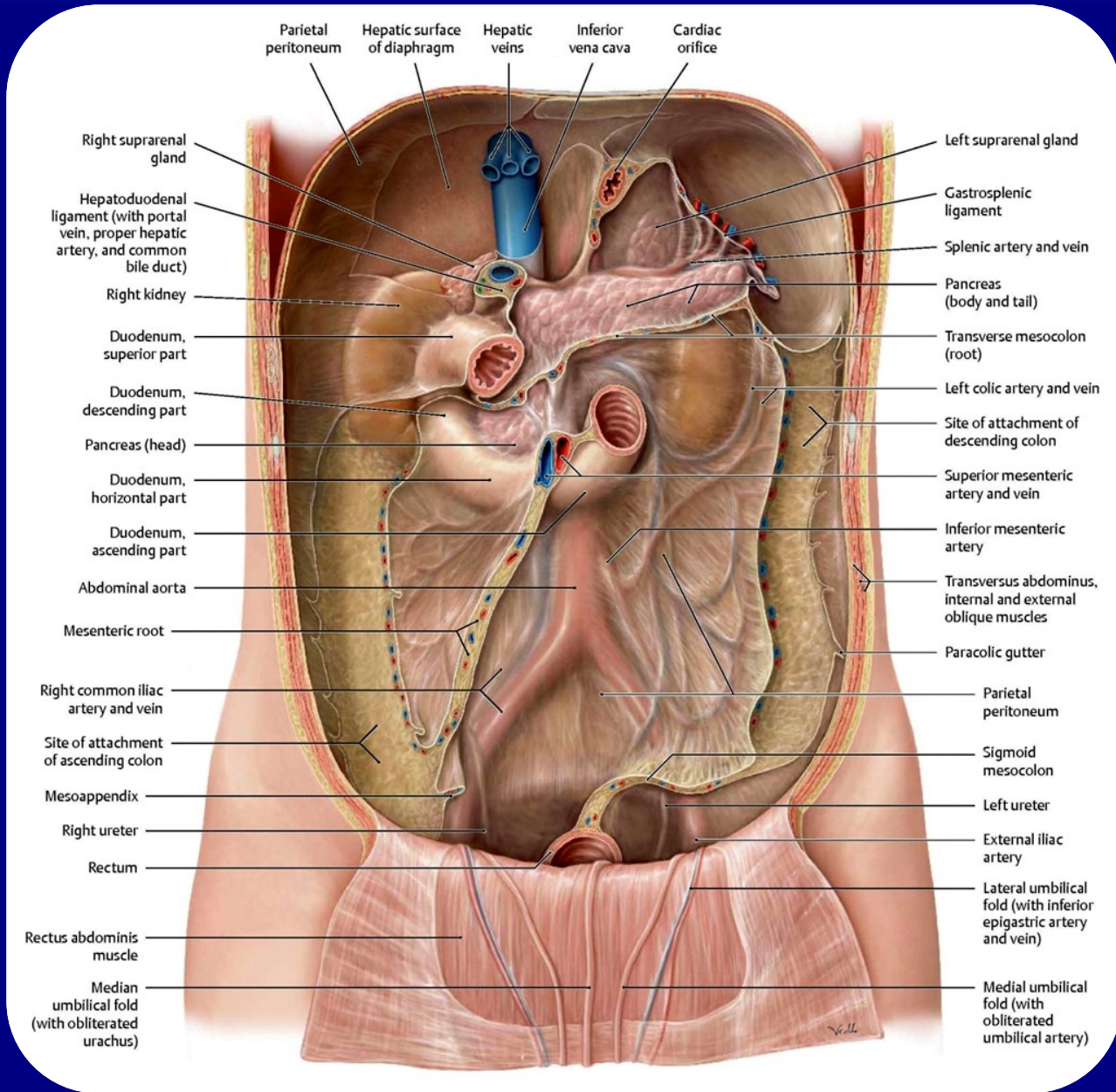




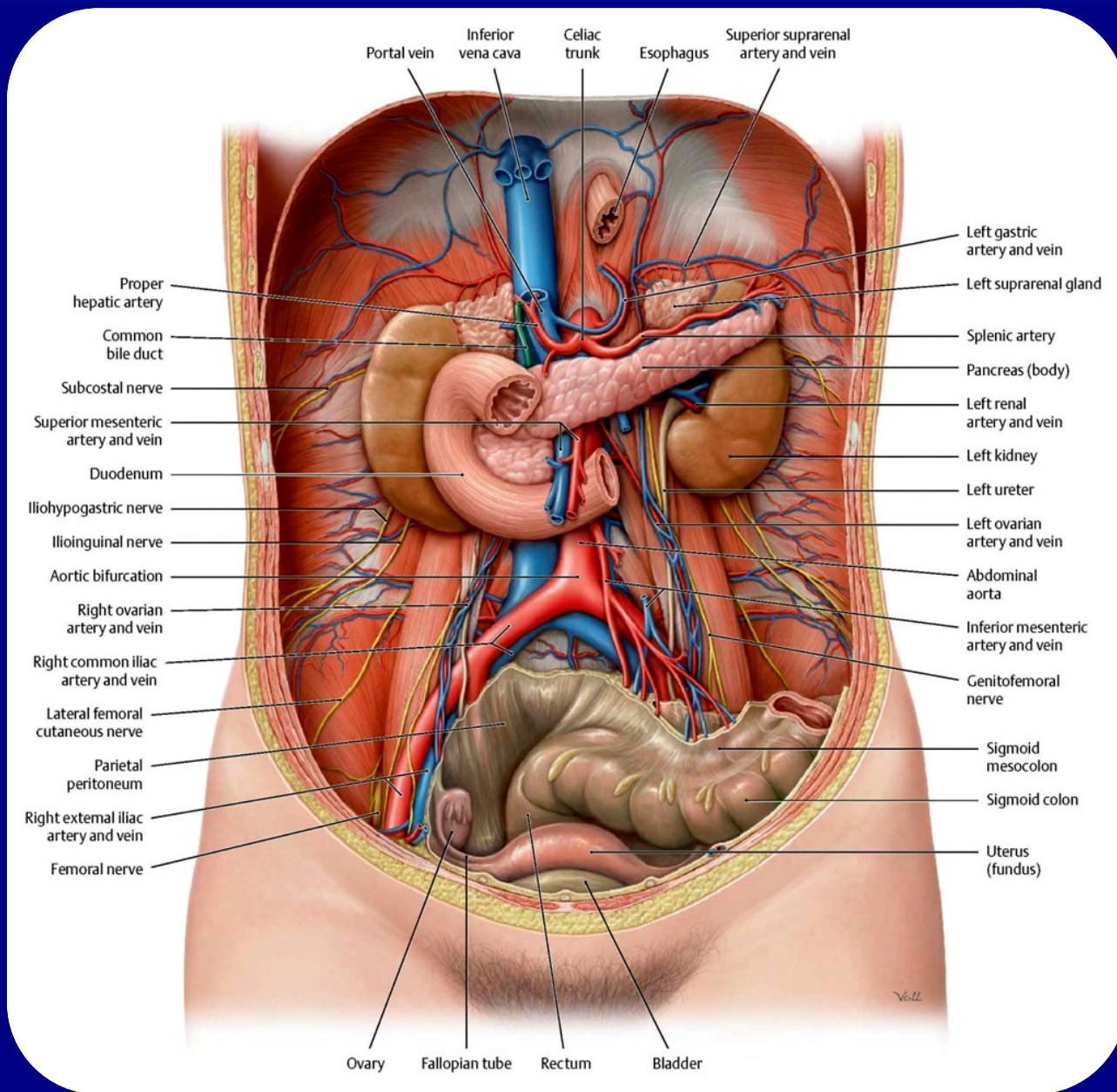










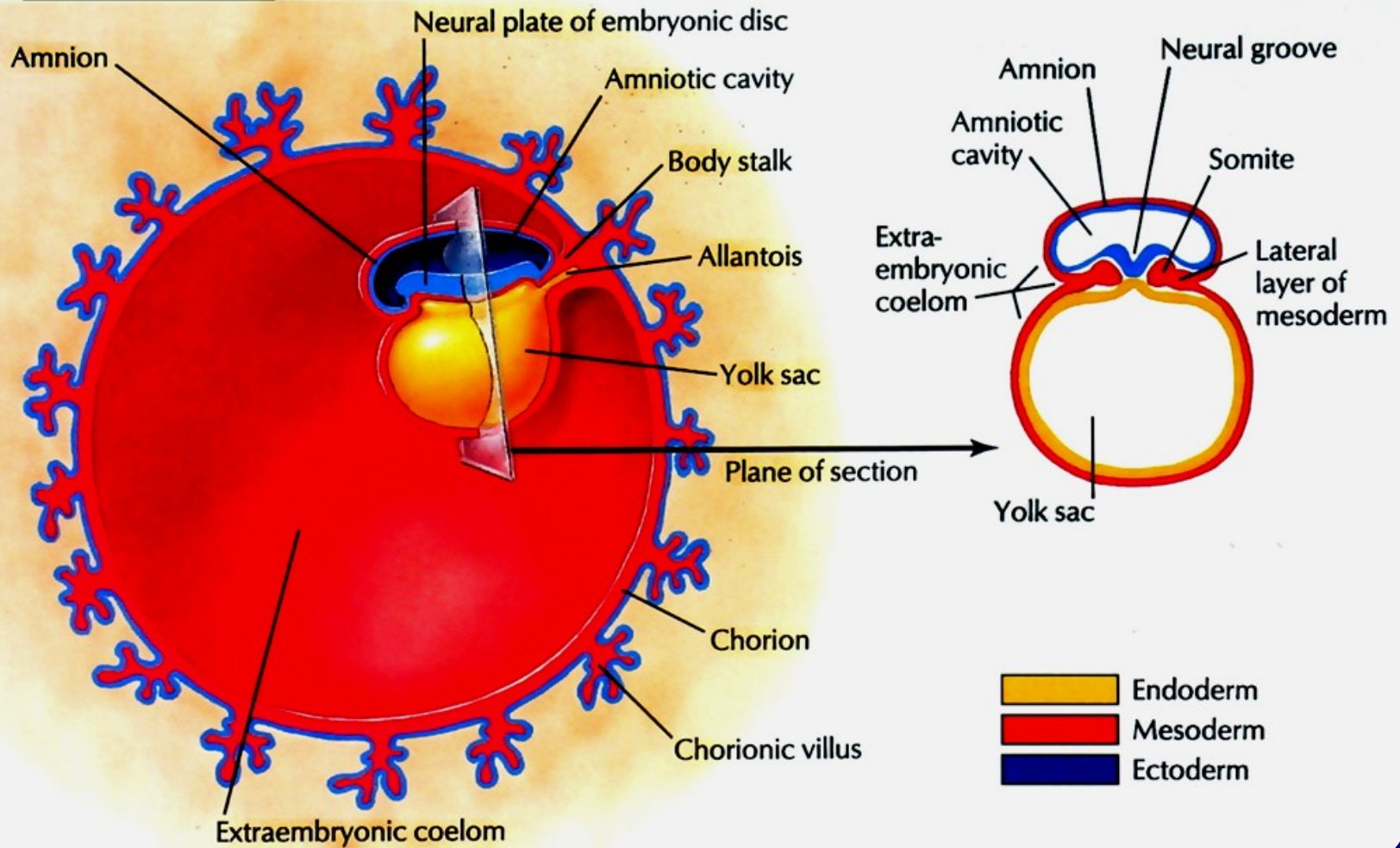


Wytworzenie fałdu głowowego i ogonowego oraz fałdów bocznych doprowadza do tego, że wysłana endodermą jama ciała wpukla się do wnętrza zarodka wytwarzając prajelito.

Z prajelita części głowowej i ogonowej powstają ślepo zakończone przewody – jelito przednie i tylne.

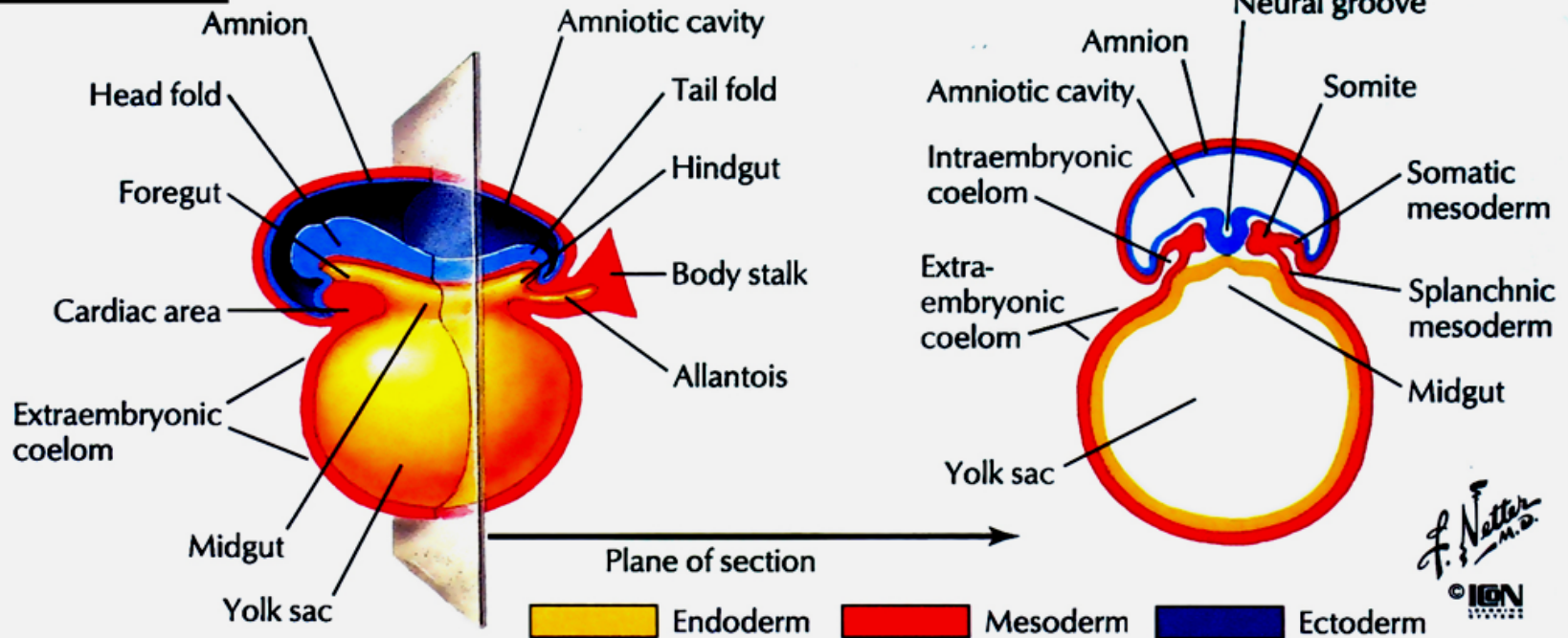
Natomiast część środkowa łączy się przejściowo z woreczkiem żółtkowym za pośrednictwem przewodu żółtkowo-jelitowego.

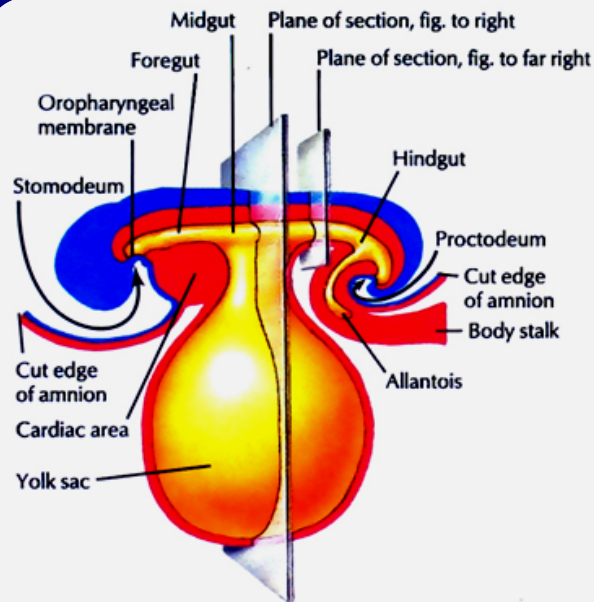
14 days



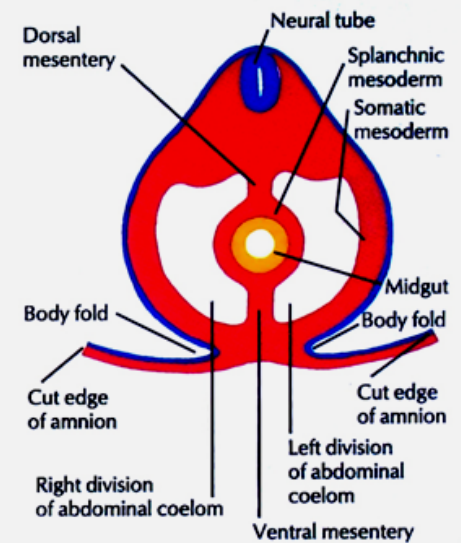
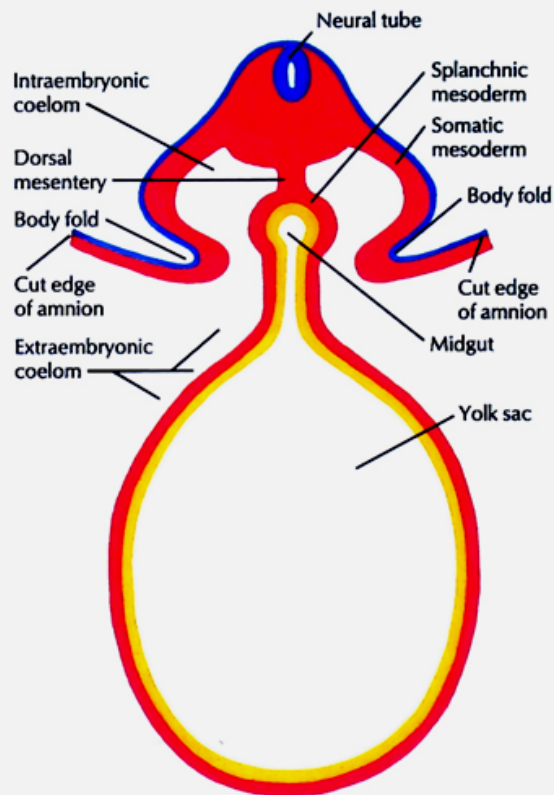


16 days

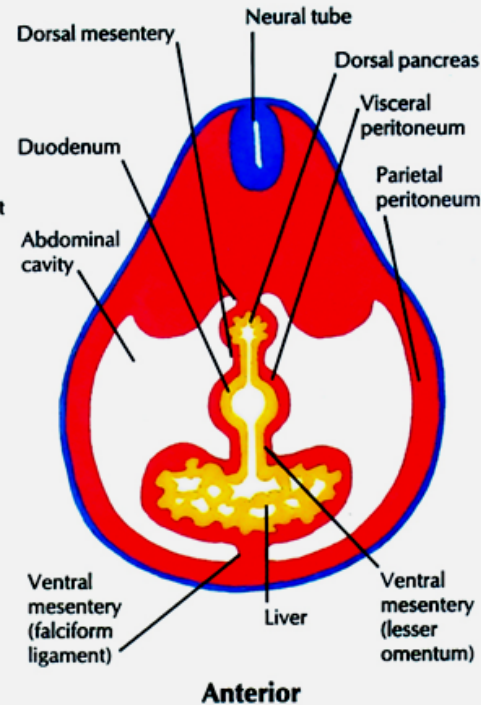
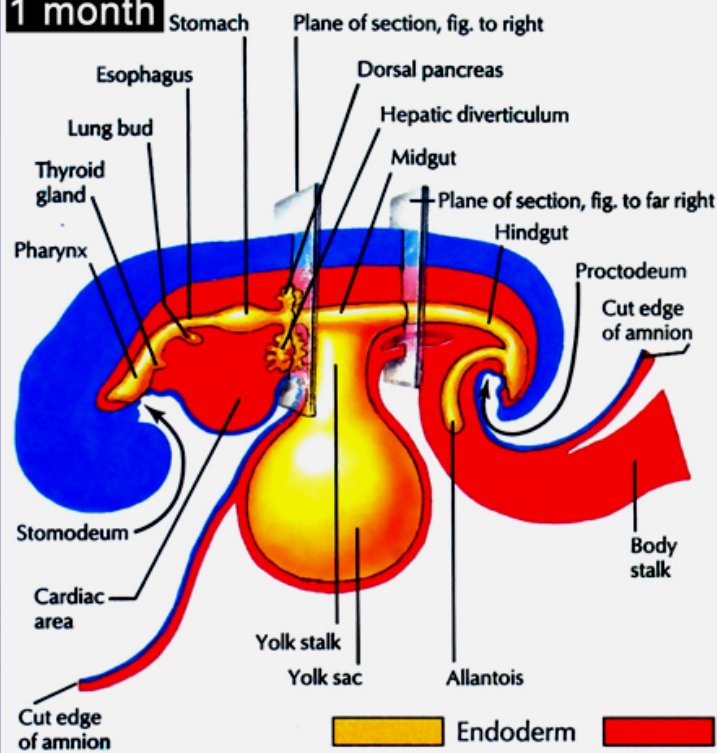




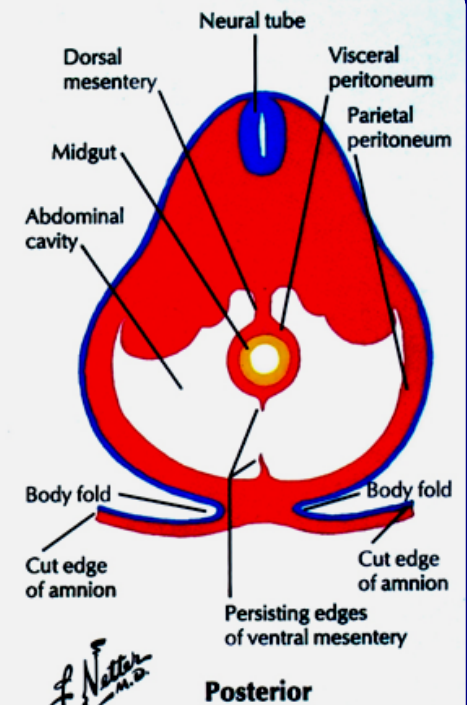
18 days



**1 month**



**Anterior**



**Posterior**

Endoderm Mesoderm Ectoderm

*J. Natter*  
M.D.  
© IGIN



## Z prajelita powstają:

- jelito gardłowe (lub gardło) – rozpoczynające się od błony policzkowo-gardłowej
- jelito przednie – sięgające do miejsca wypęczkowania uchylku wątrobowego
- jelito środkowe – dochodzące do granicy 2/3 bliższych i 1/3 dalszej okrężnicy poprzecznej
- jelito tylne – kończące się błoną stekową.

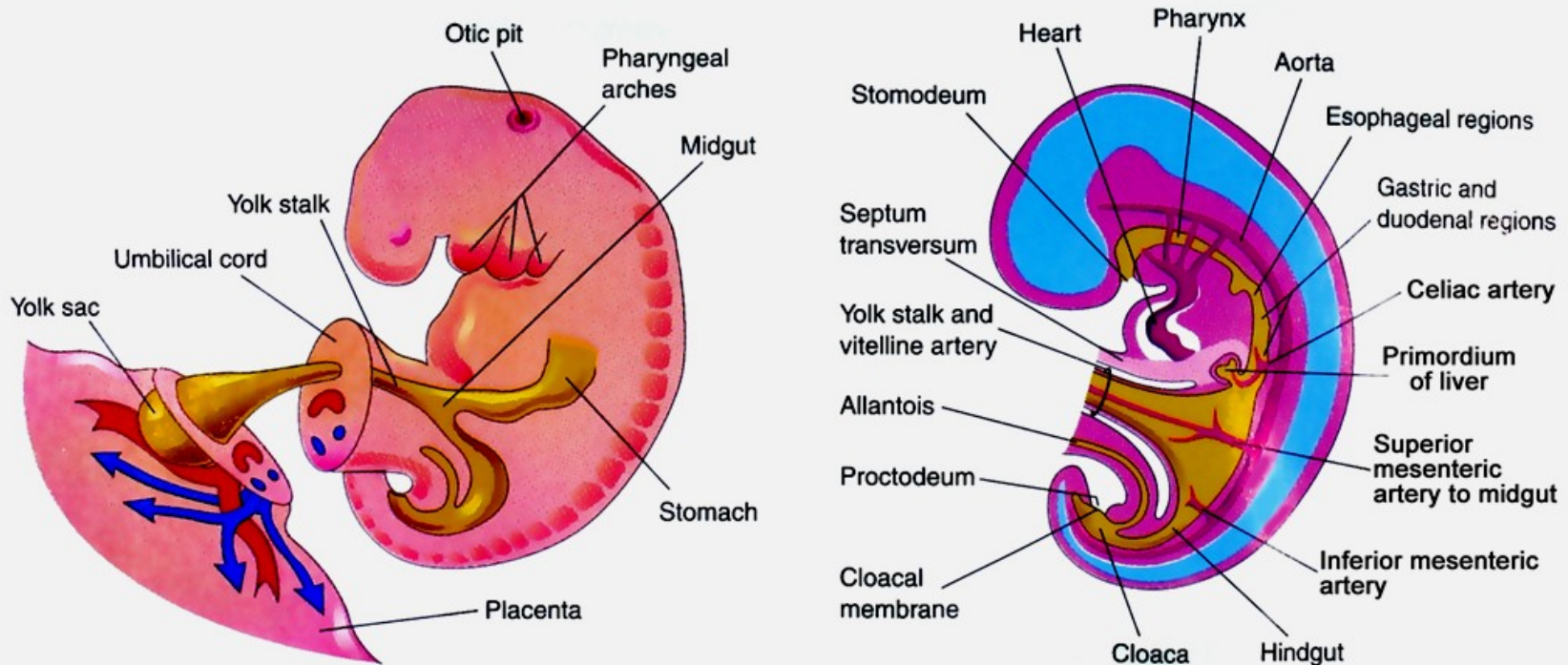
Endoderma wytwarza nabłonkową wyściółkę przewodu pokarmowego oraz daje początek wątrobie i trzustce.

Składniki mięśniowe i otrzewnowe ścian powstają z mezodermy trzewnej.

Do trzech brzusznych odcinków prajelita dochodzą gałęzie tętnic:

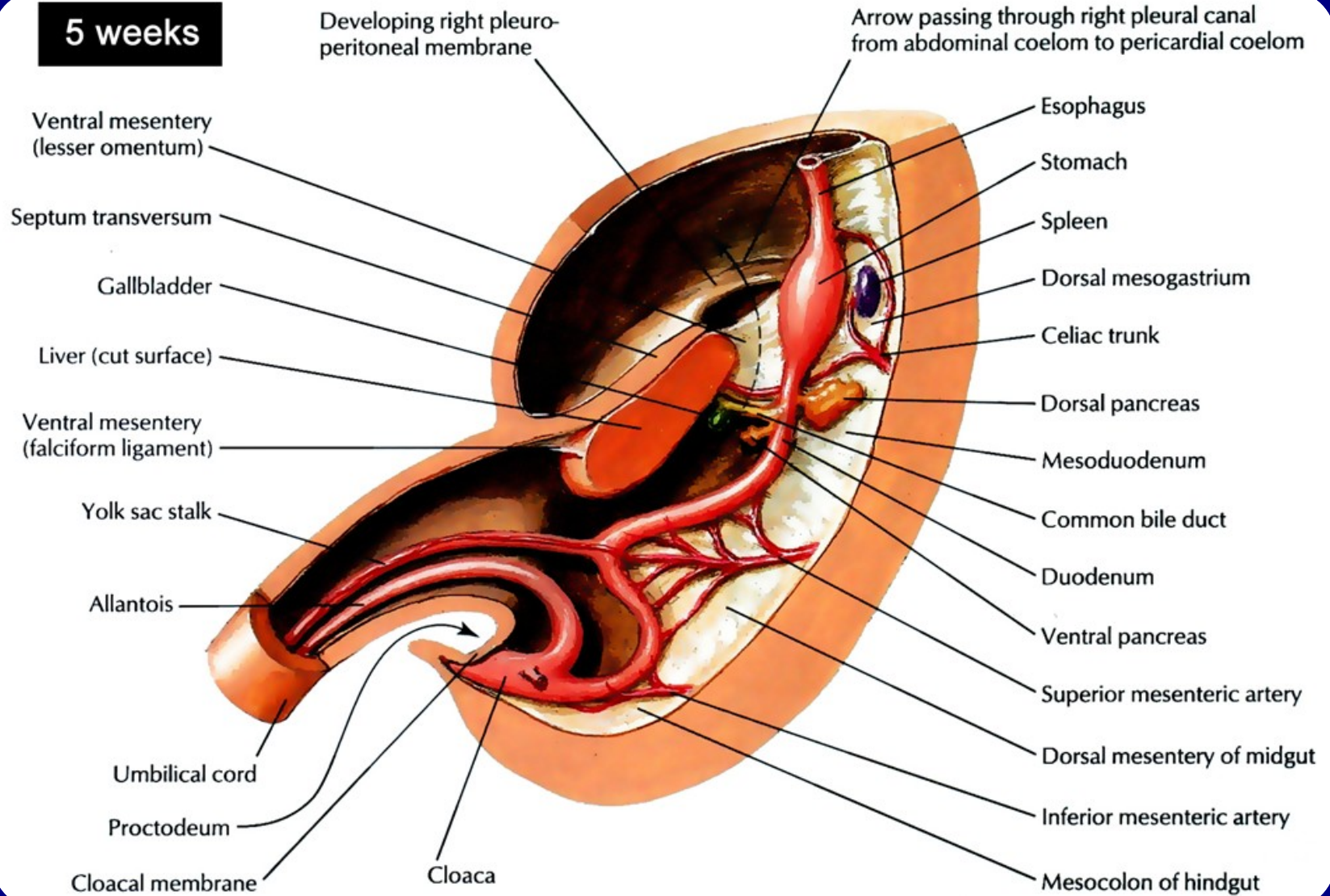
- do jelita przedniego – pień trzewny
- do jelita środkowego – tętnica krezkowa górna
- do jelita ogonowego – tętnica krezkowa dolna

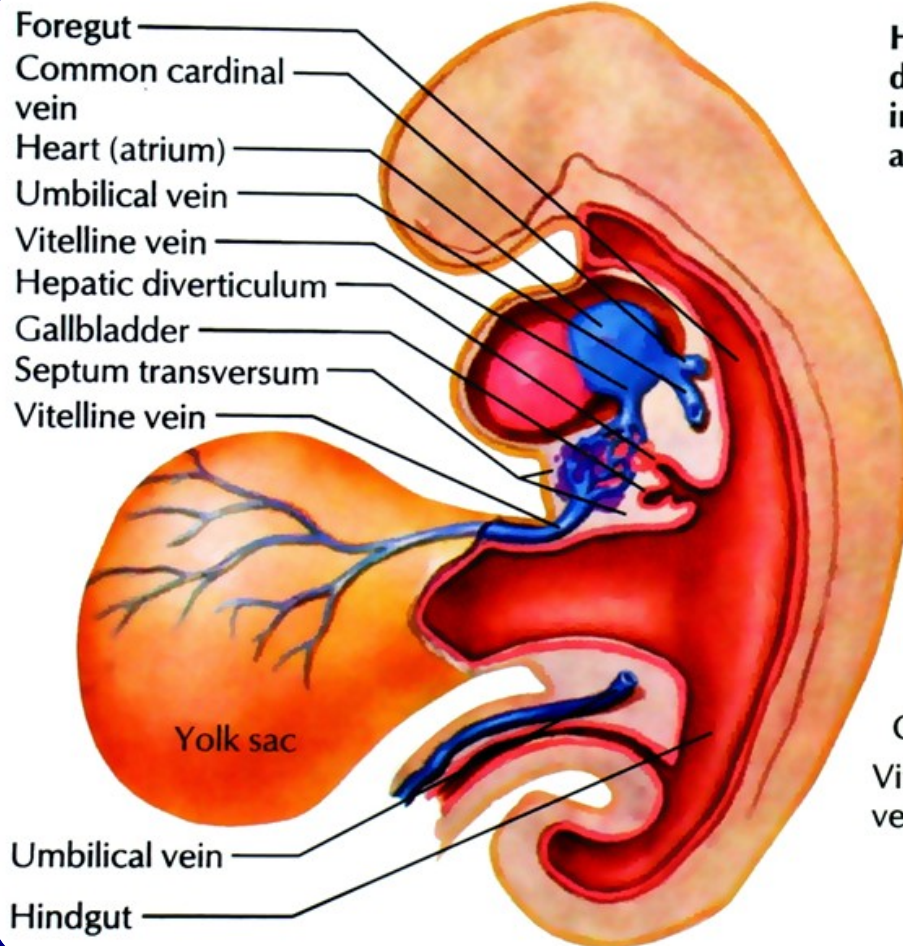




Lateral view of a 4-week-old embryo showing the relationship of the primordial gut to yolk sac

**5 weeks**

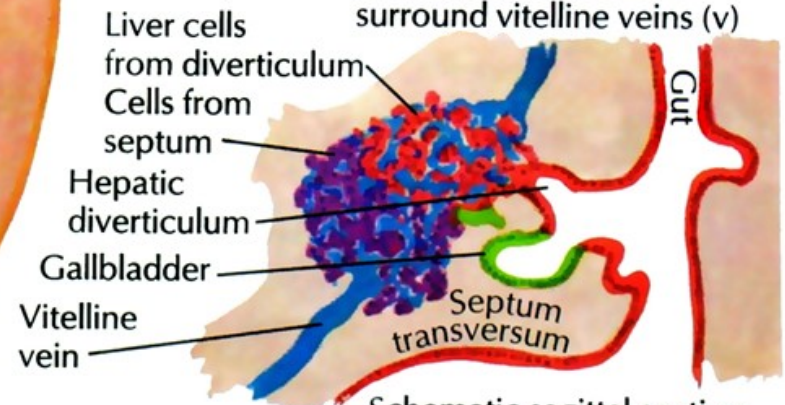




**Hepatic diverticulum in embryo of about 4 mm**

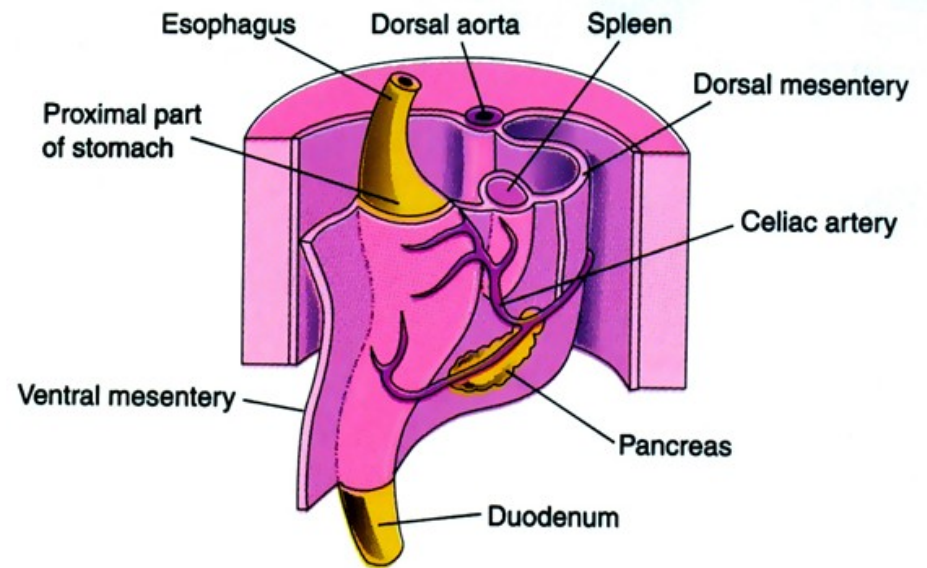
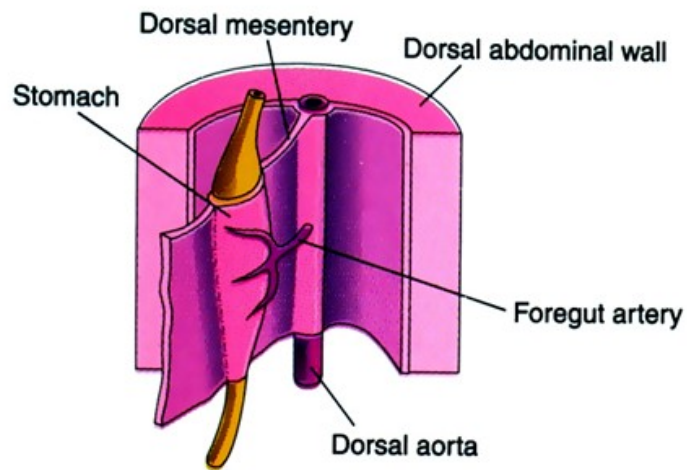


Endodermal cells penetrating septum transversum to surround vitelline veins (v)



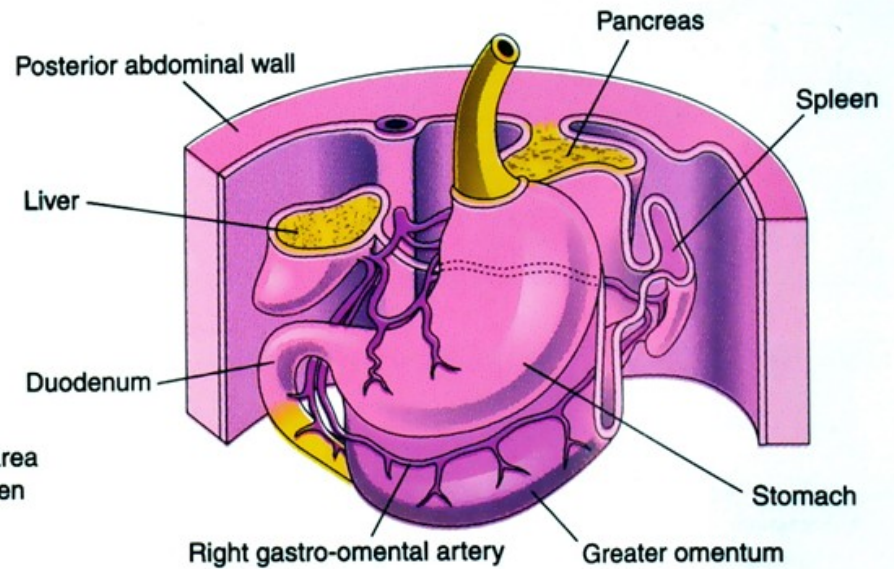
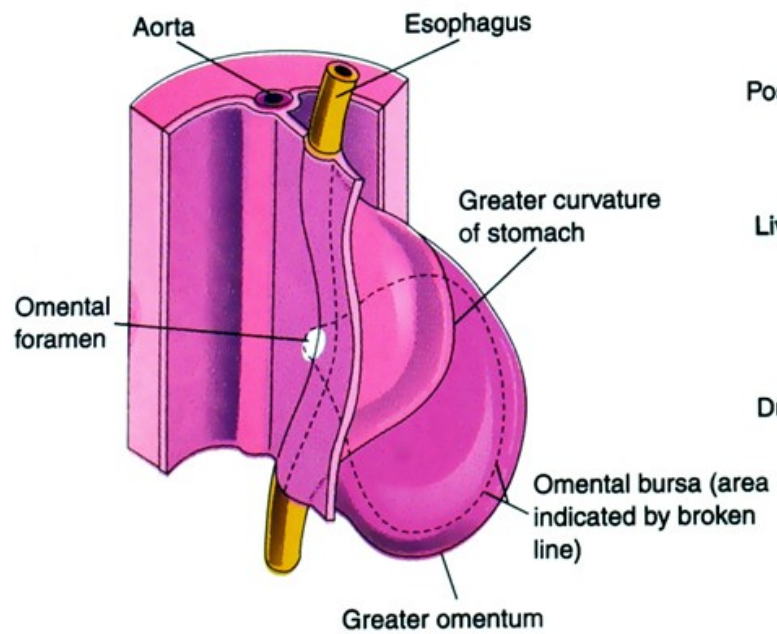
Schematic sagittal section of septum in 5-mm embryo



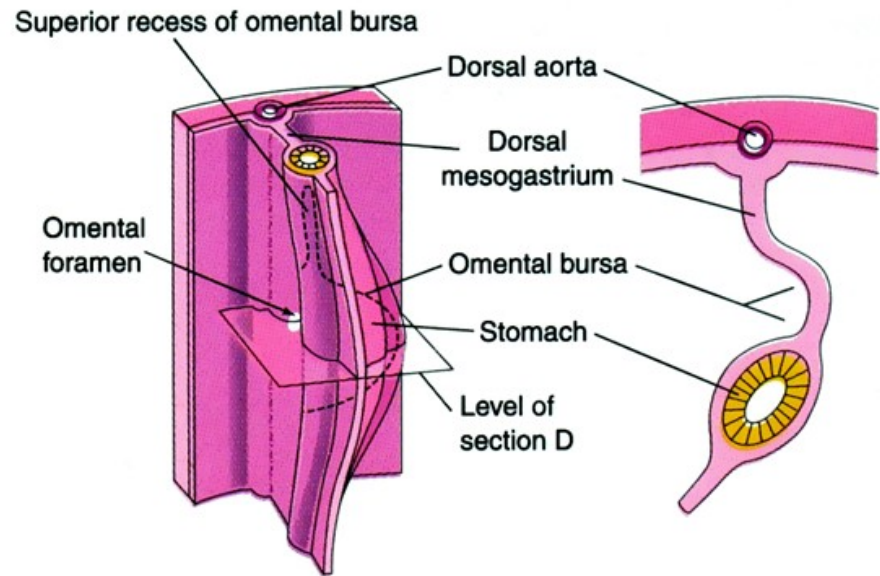
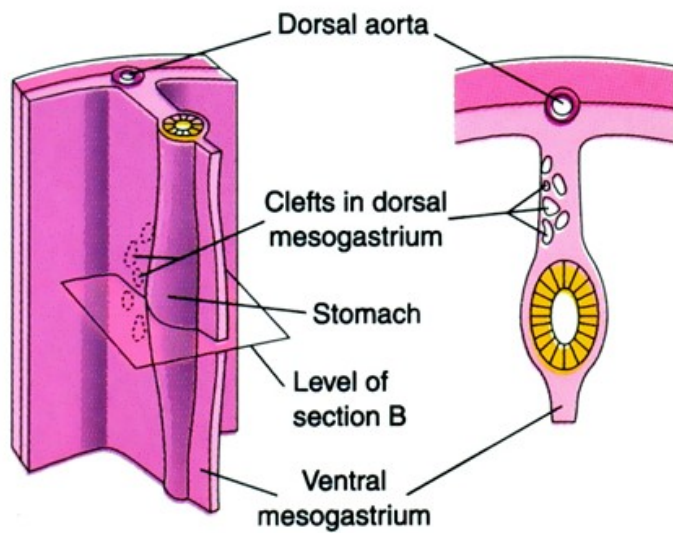


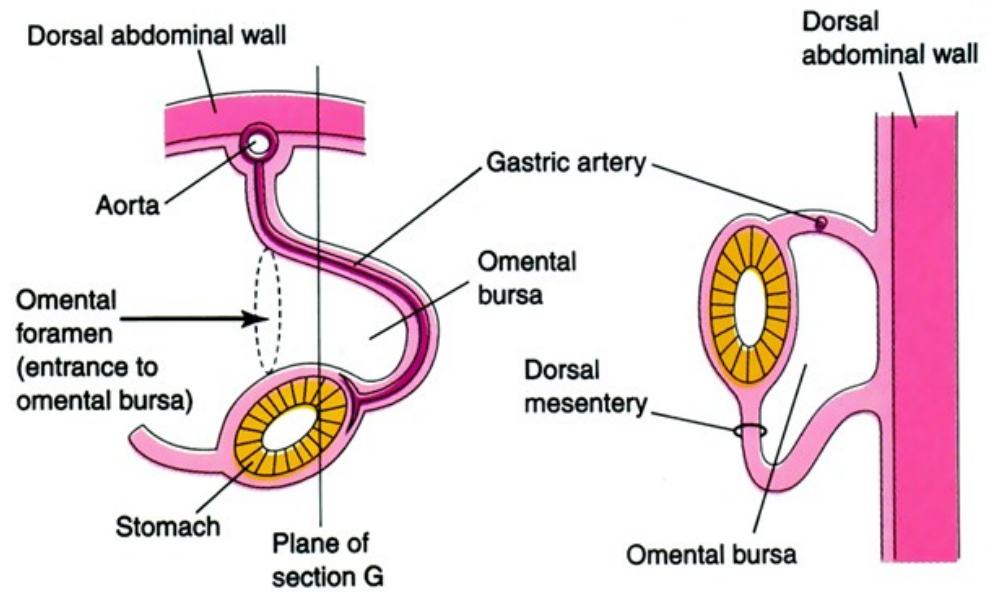
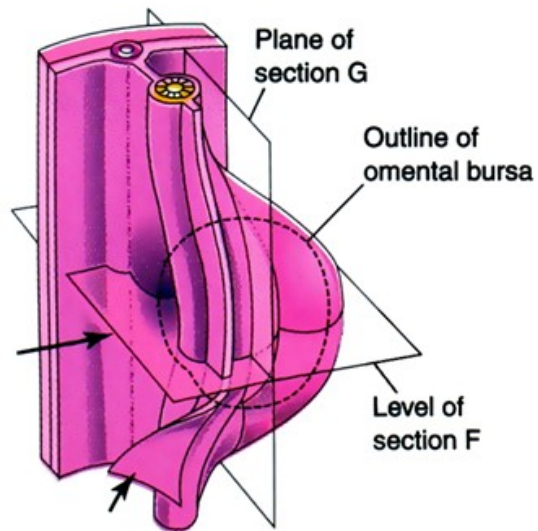
28/35-day – old embryo

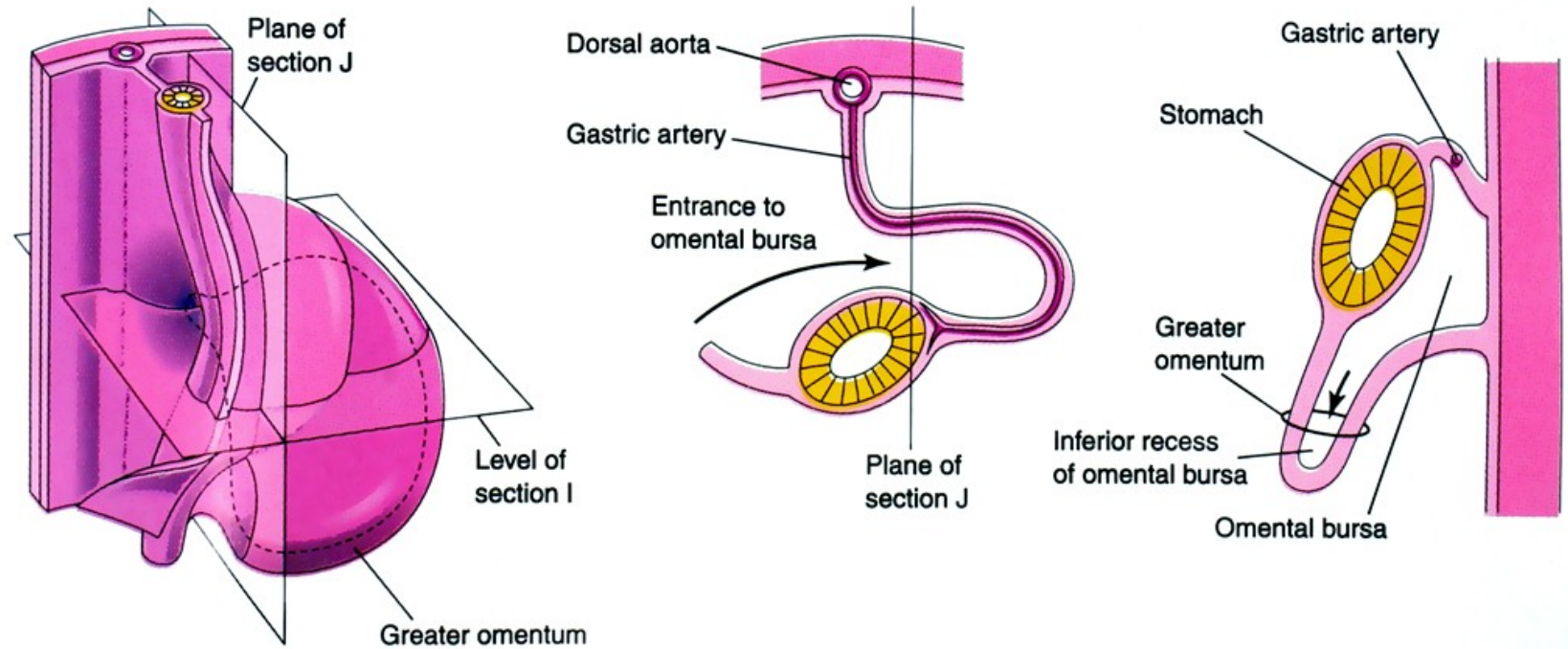




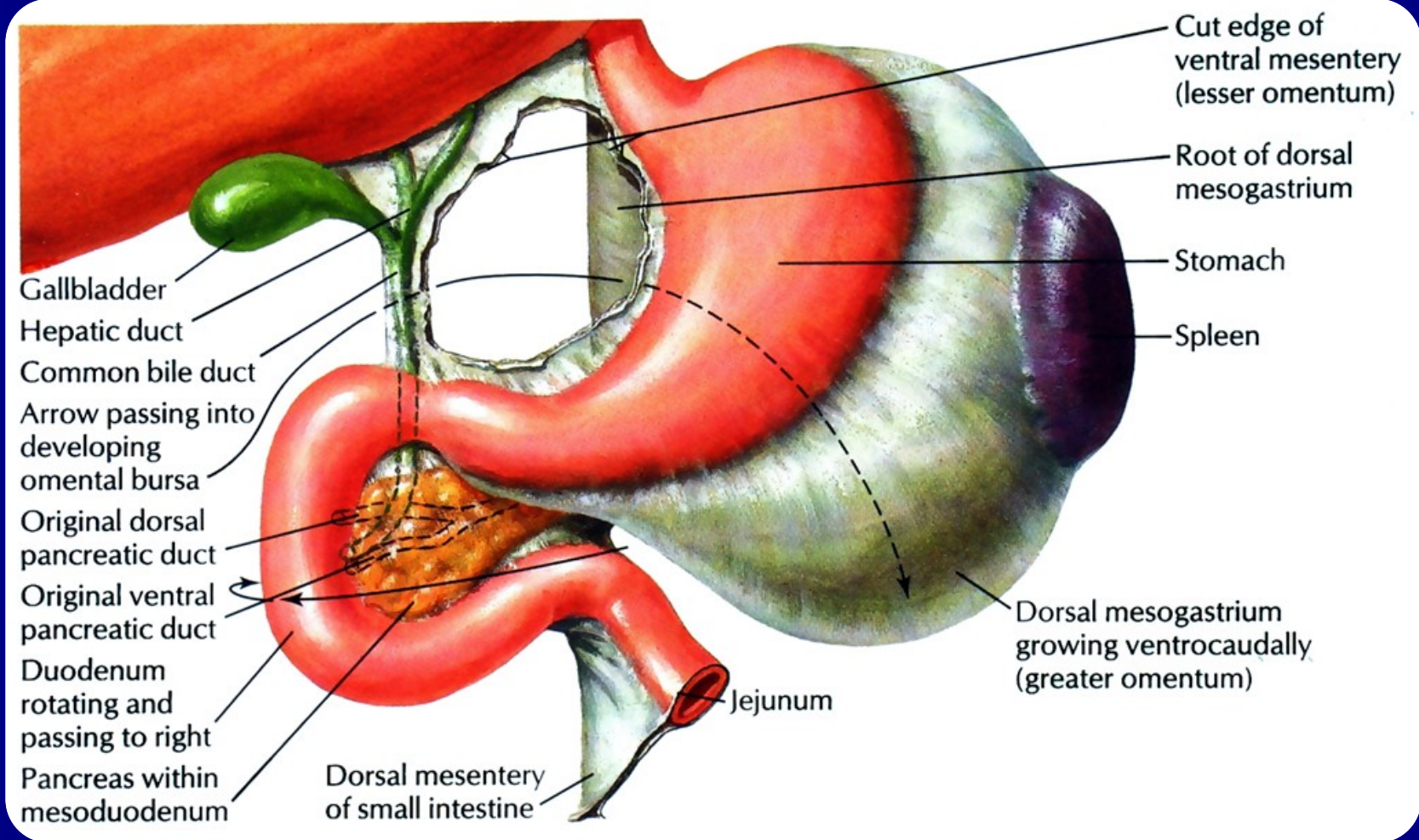
40/48-day – old embryo



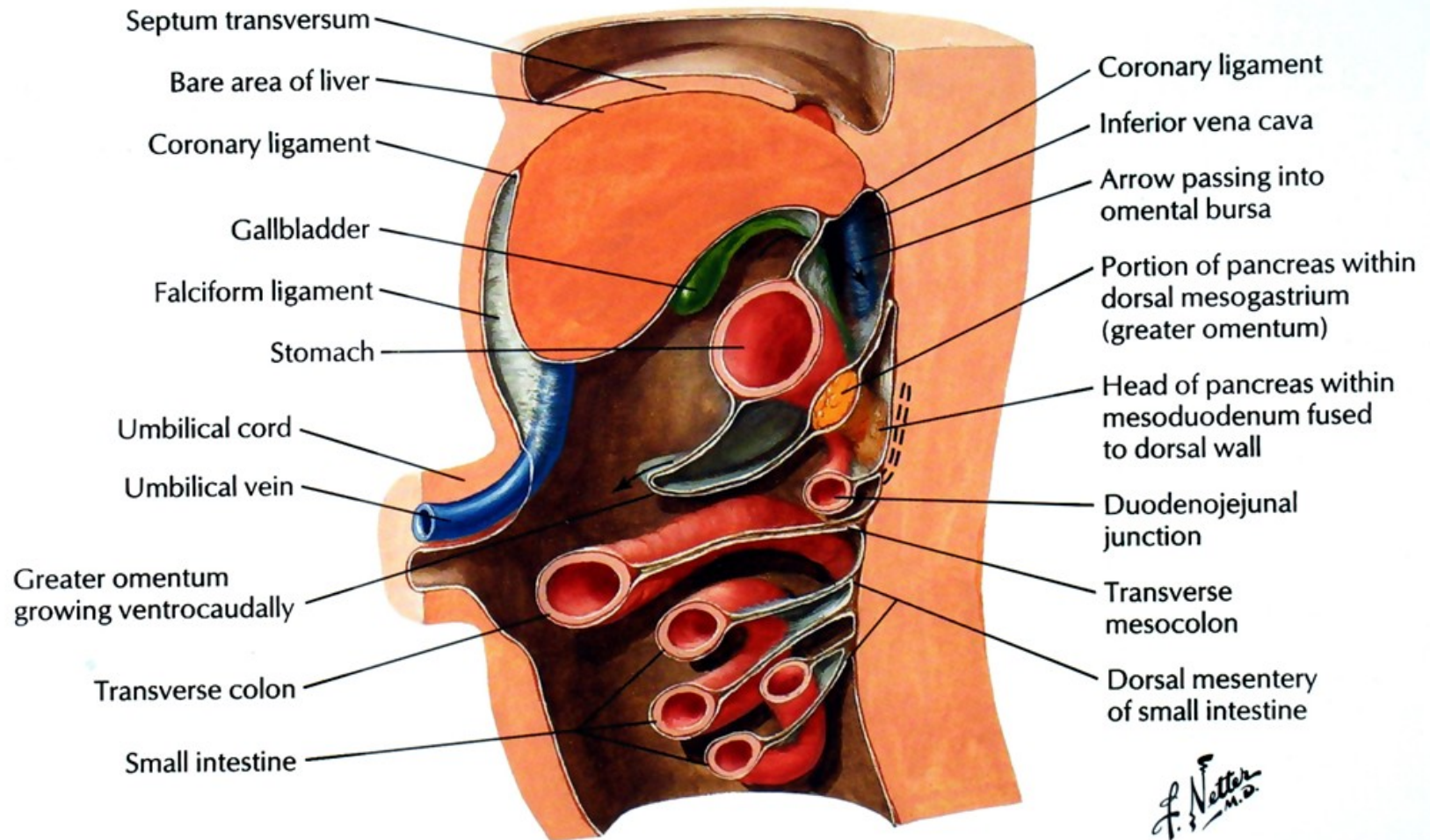






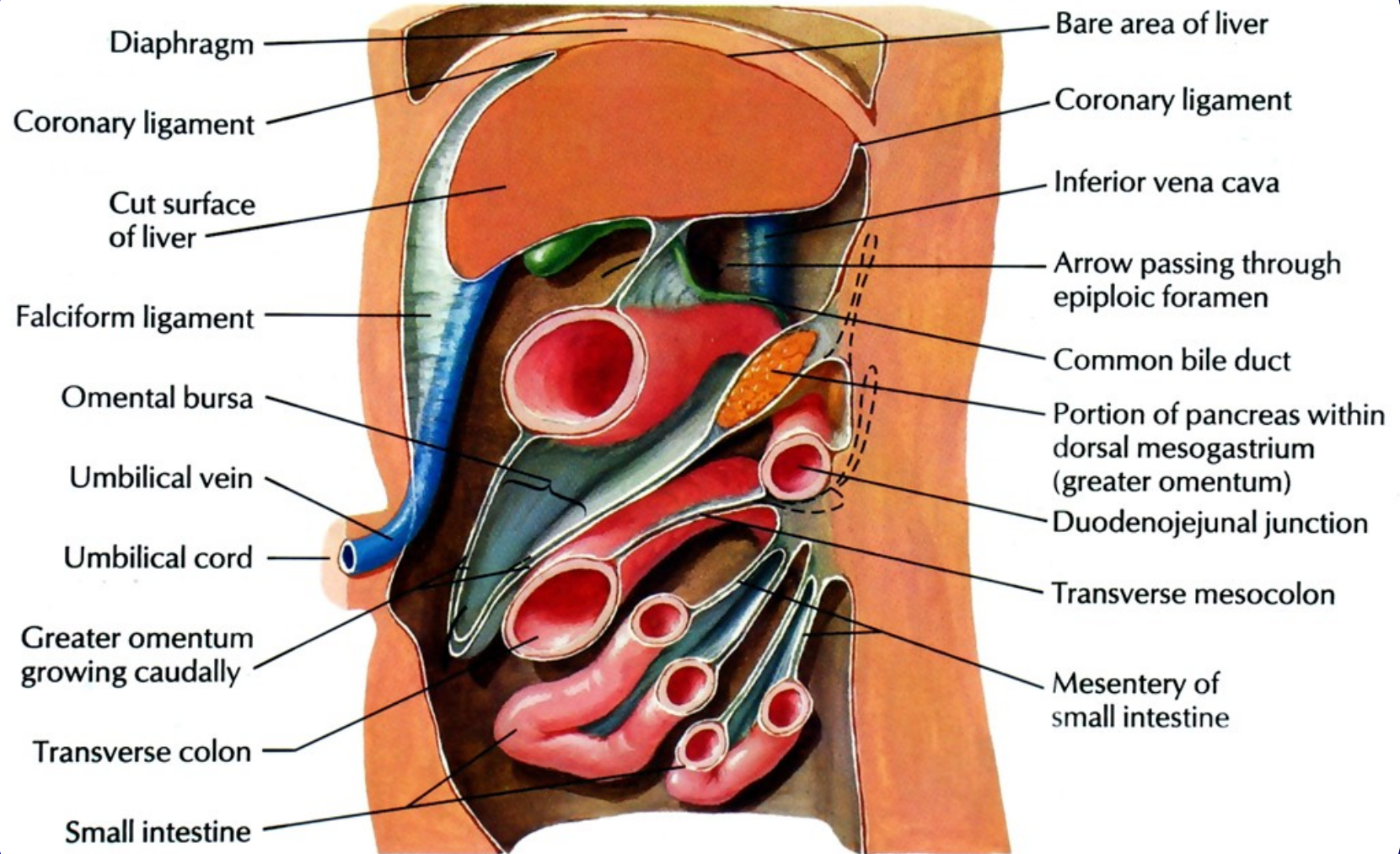


2 months

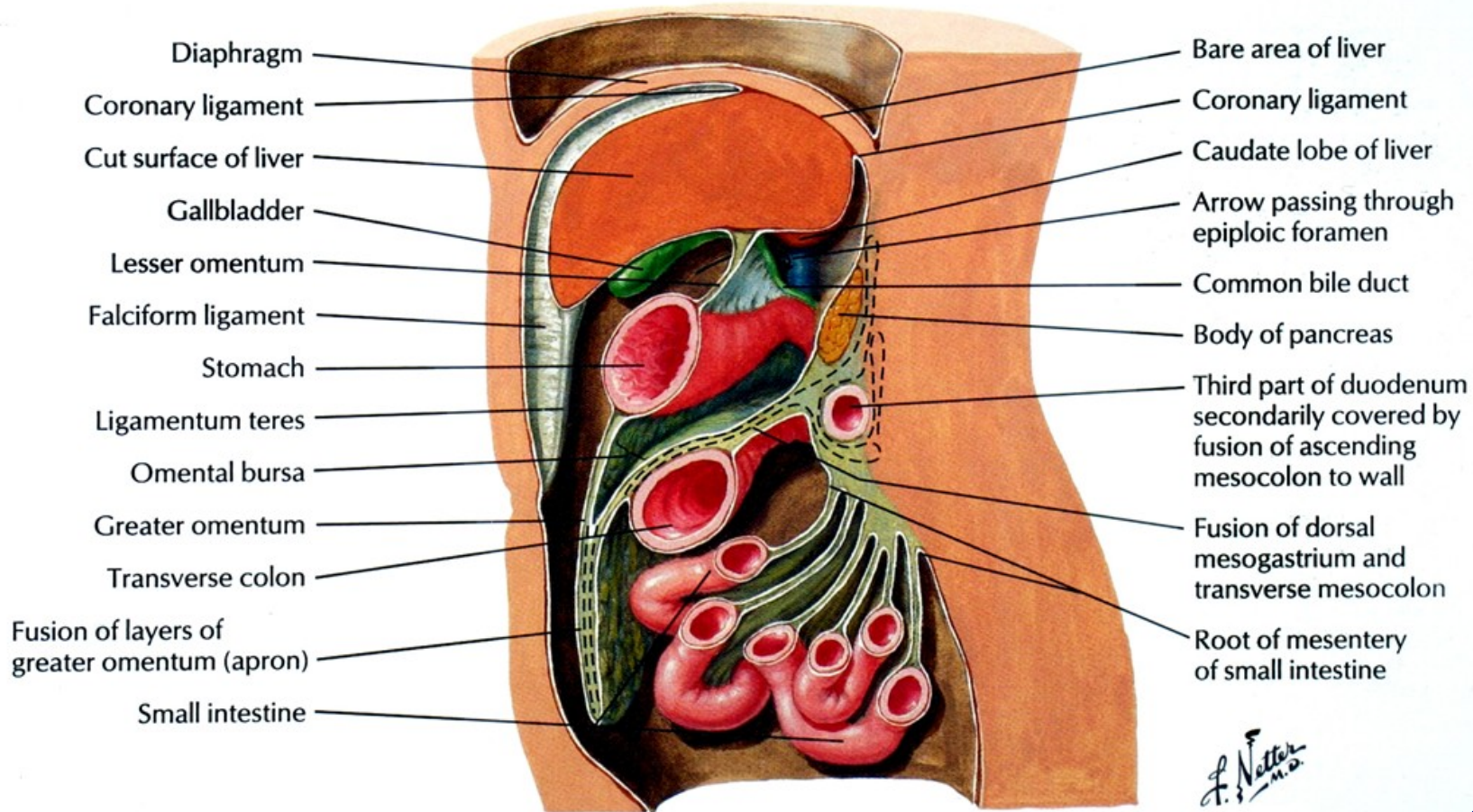


2 to 3 months



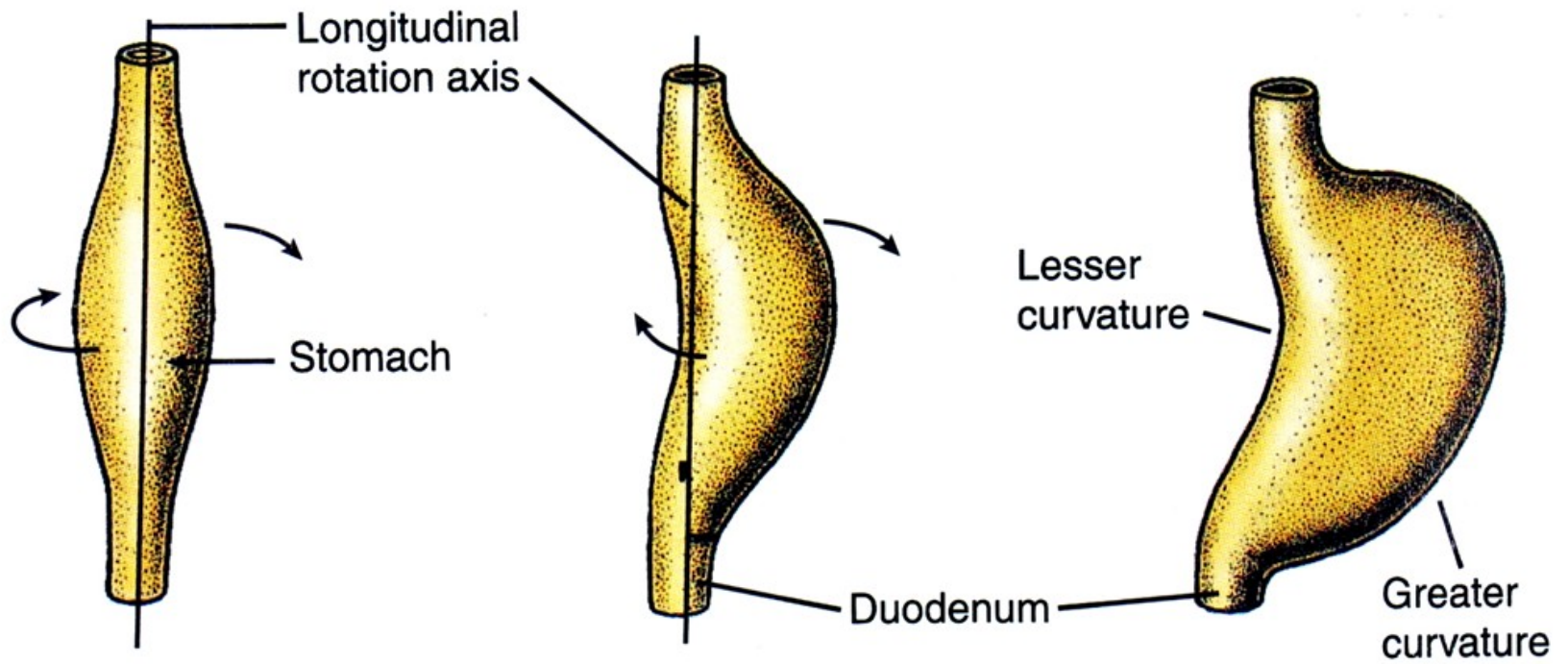


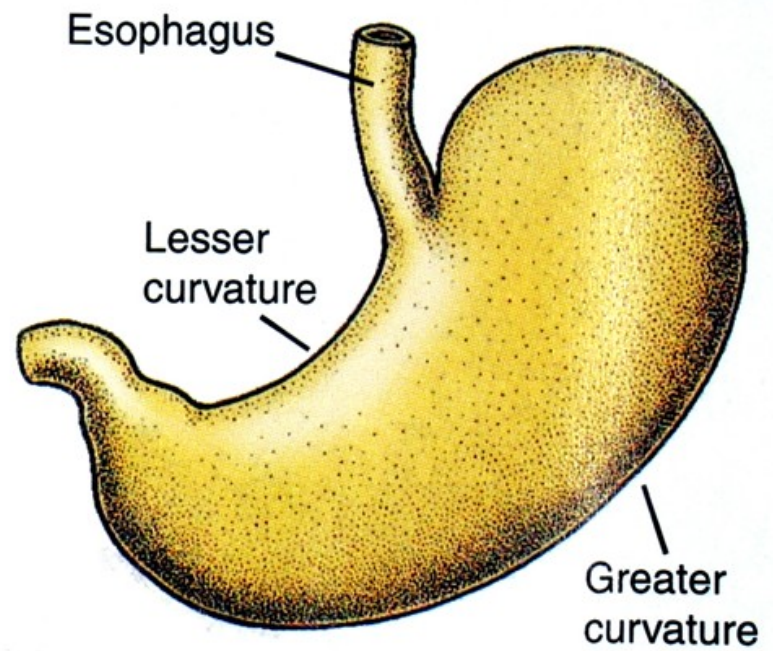
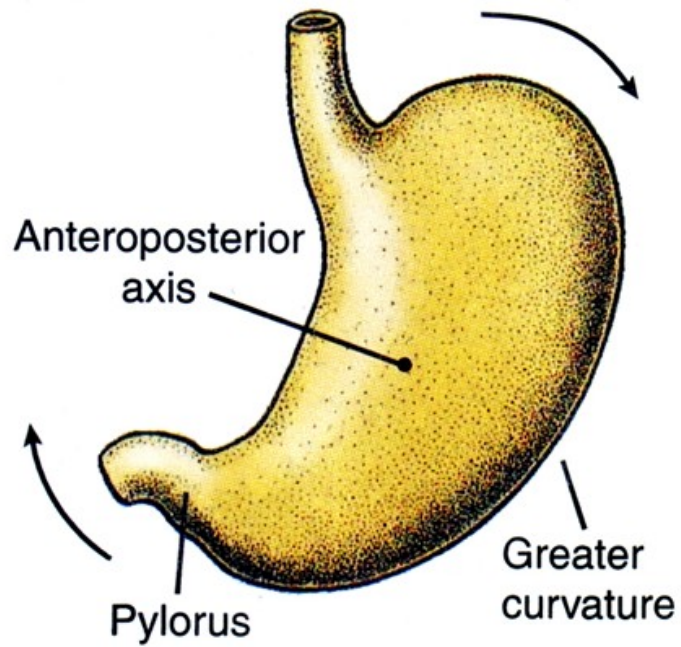
3 to 4 months

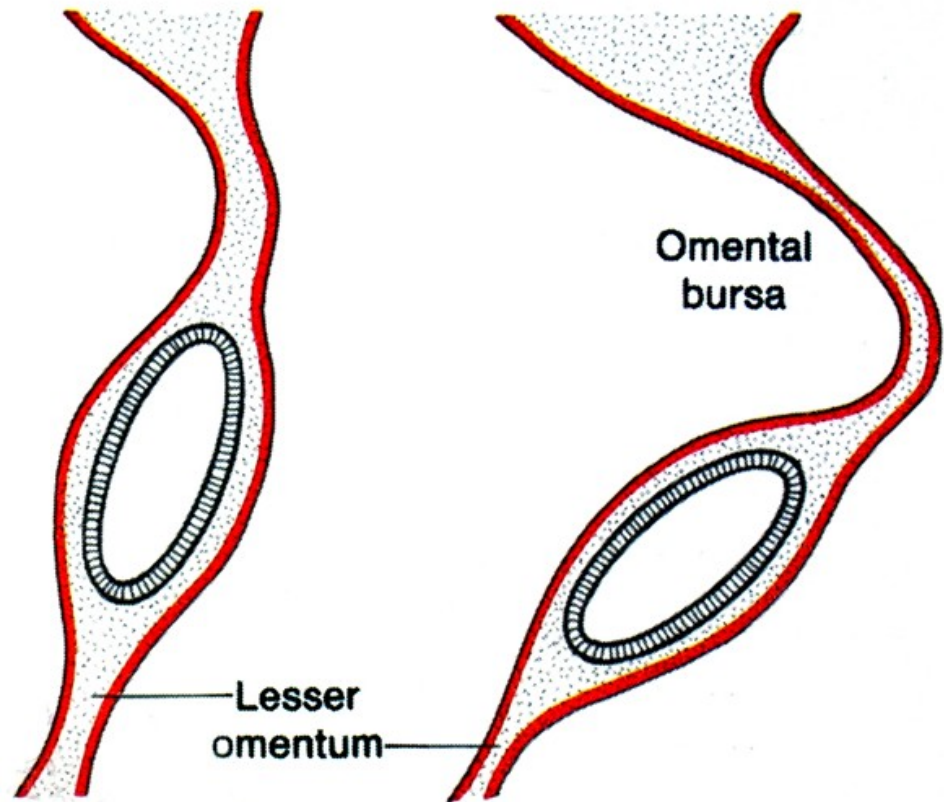
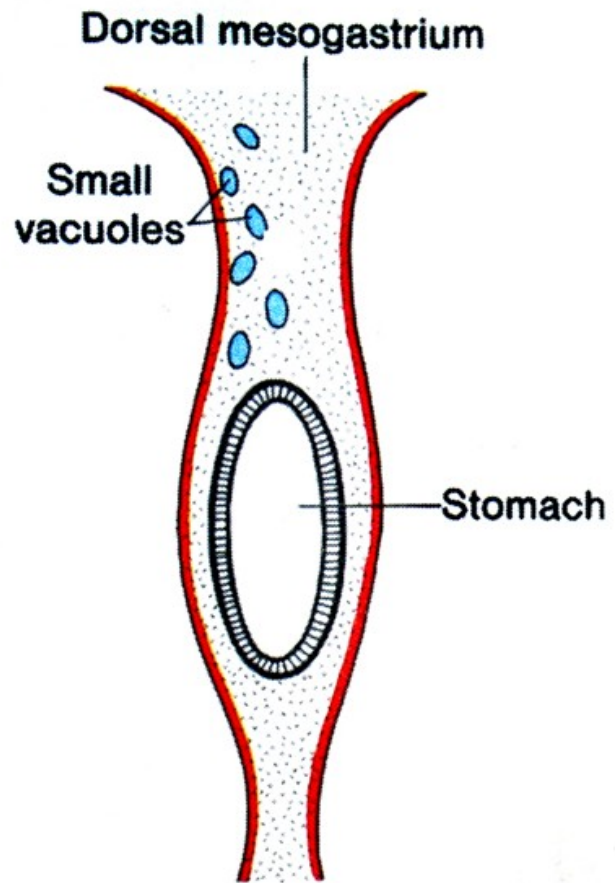


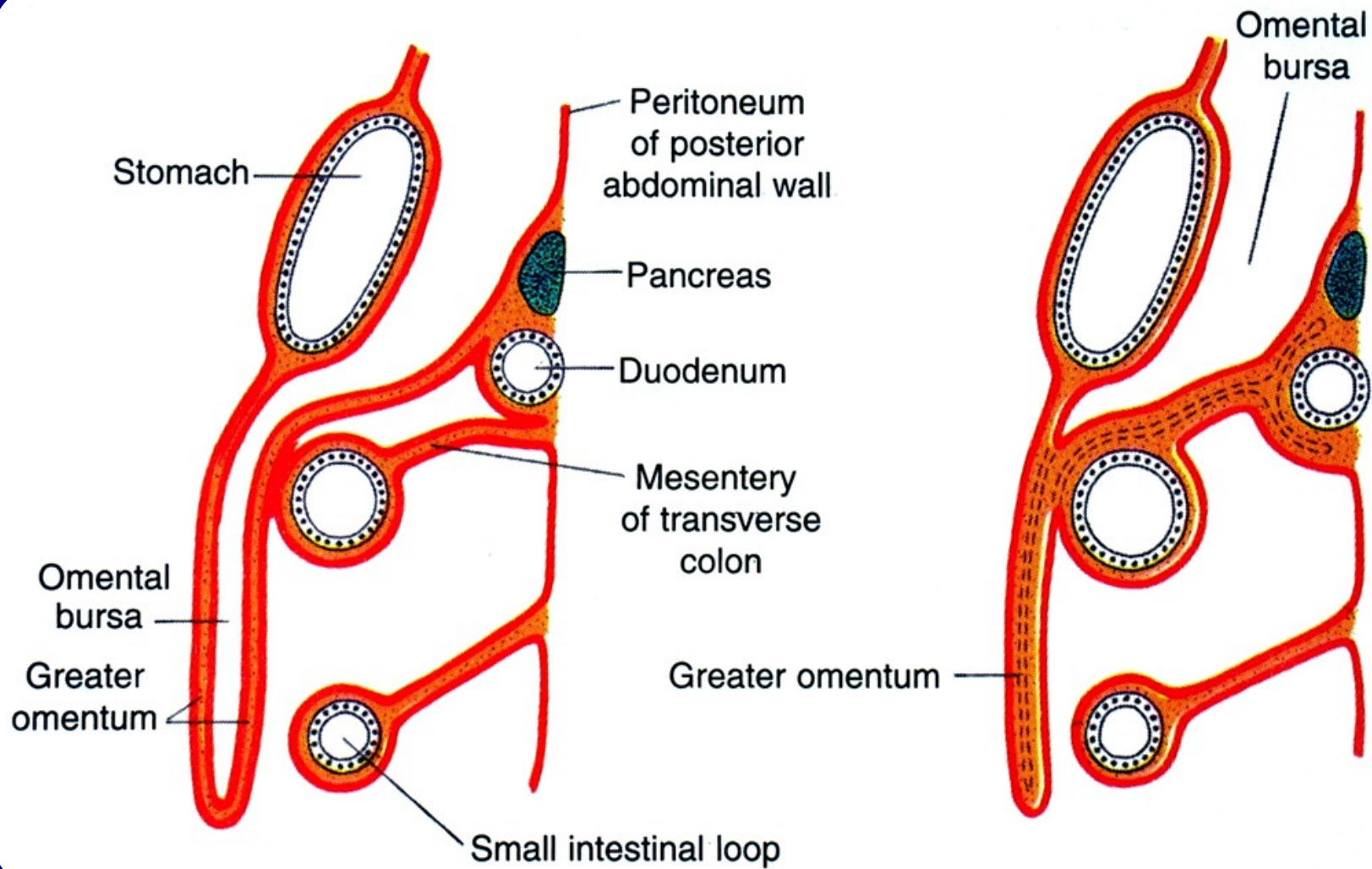
Adult relationships









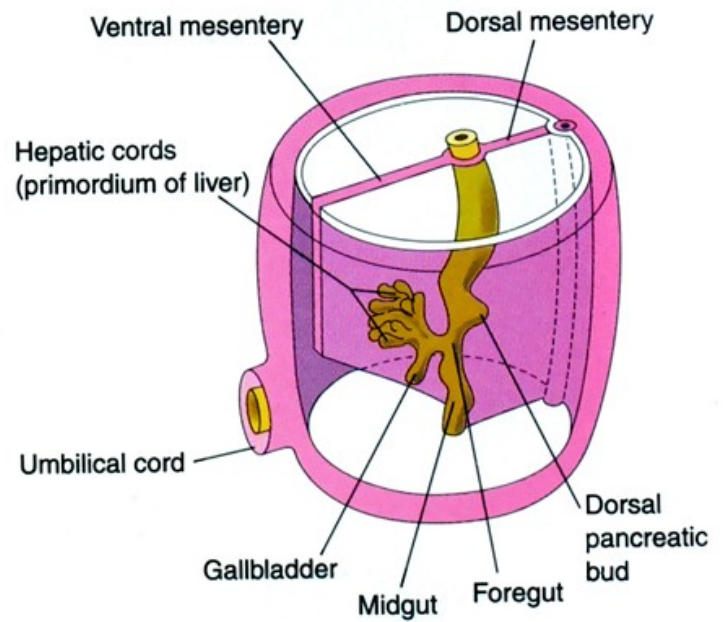
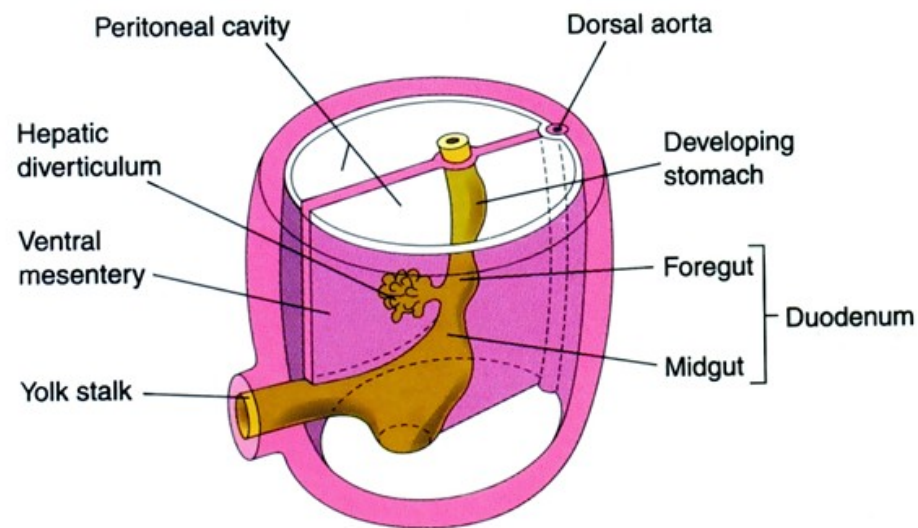


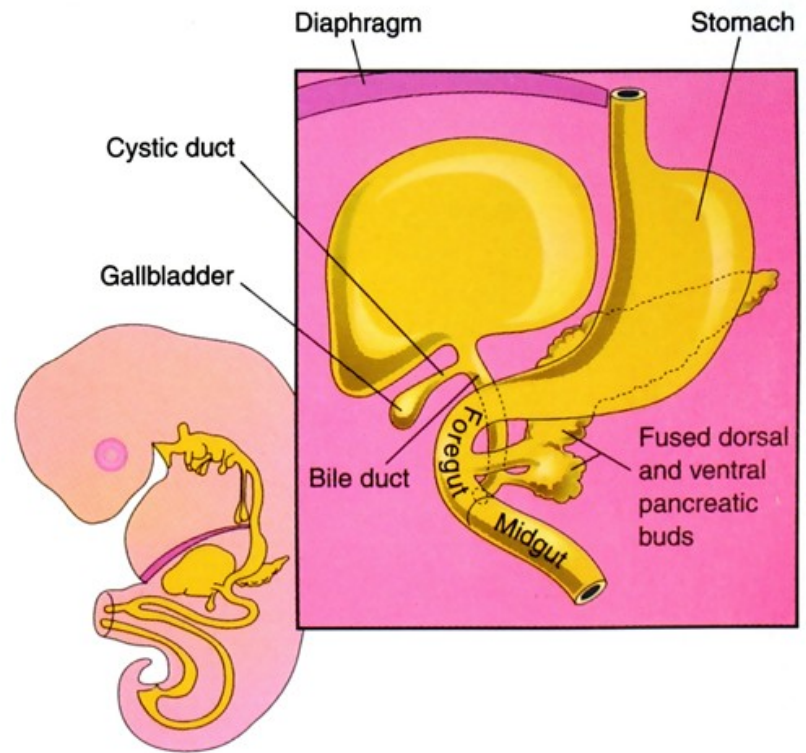
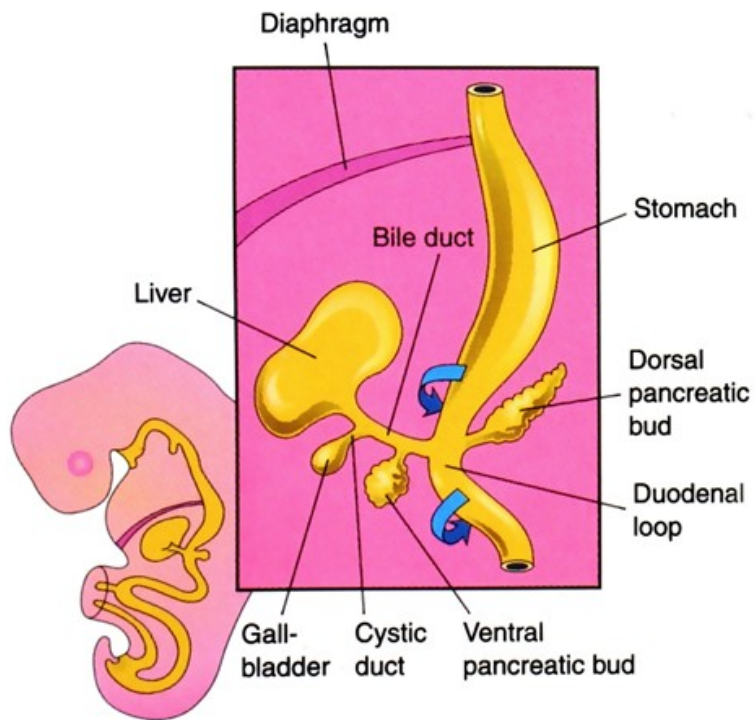


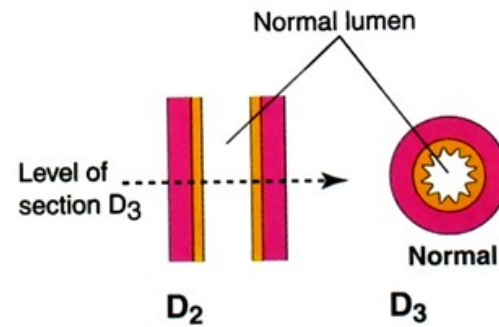
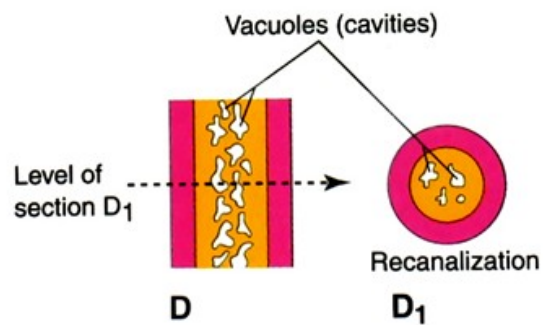
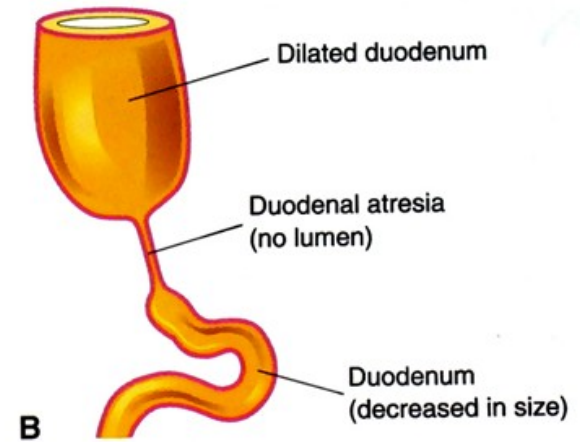
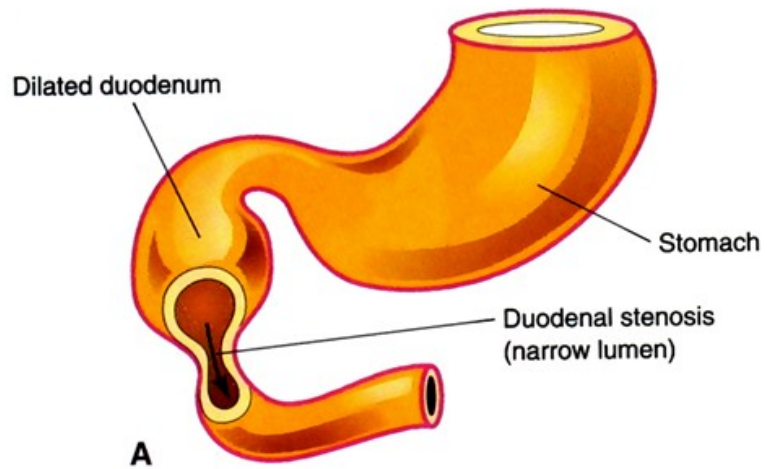
Wzrastający w obrębie dobrzuszej krezki zawiązek wątroby dzieli ją na dwie części:

- między wewnętrzną powierzchnią przedniej ściany brzucha i wątrobą (więzadło sierpowate wątroby)
- między wątrobą i cewą pokarmową (sieć mniejsza = więzadło wątrobowo-przelykowe, wątrobowo-żołądkowe i żołądkowo-dwunastnicze).

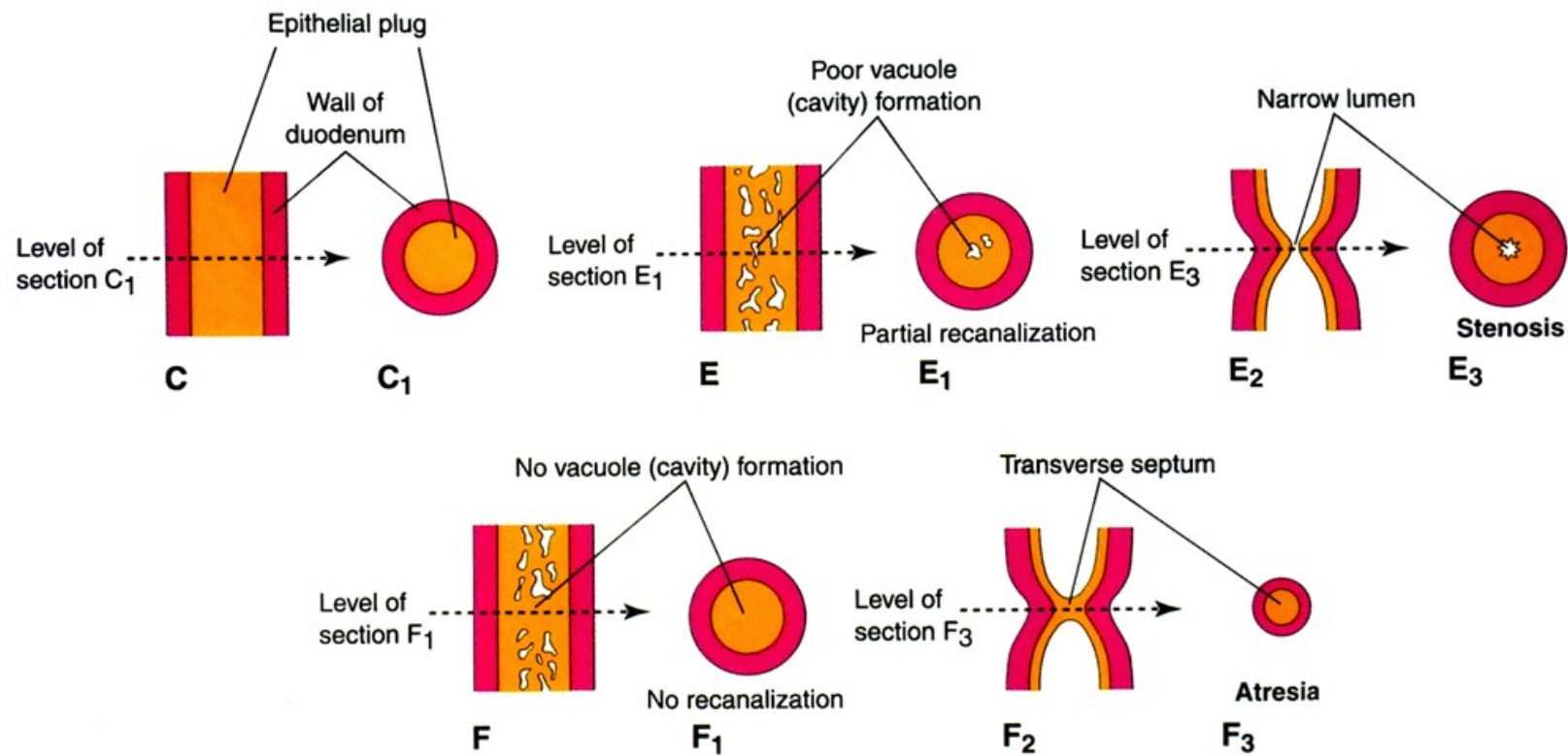
Błaszki krezki dobrzuszej opłaszczające zawiązek wątroby przekształcają się w jej otrzewną (więzadło wieńcowe wątroby). Część zawiązku wątroby przylega do mezenchymy przegrody poprzecznej i nigdy nie zostaje pokryta otrzewną = pole nagie.

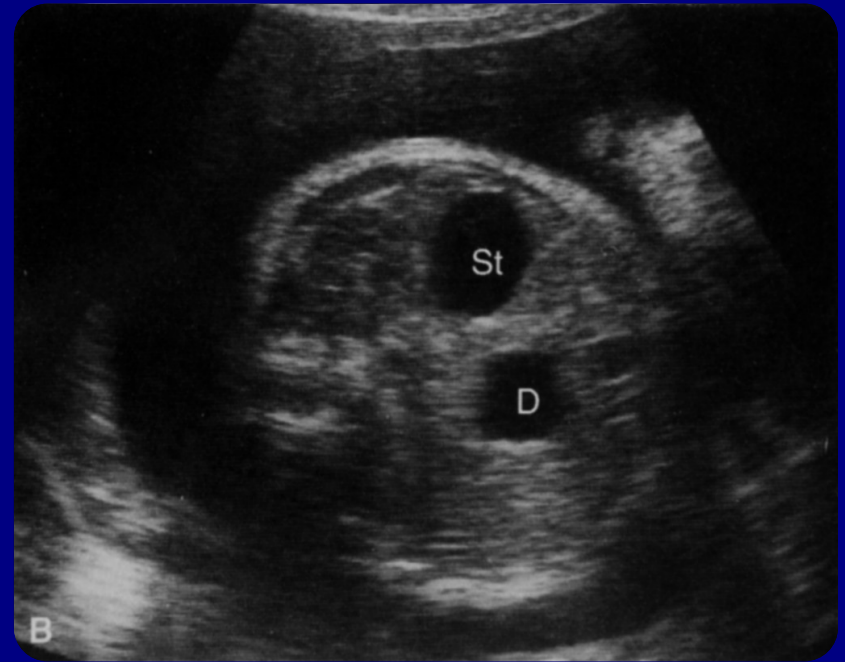
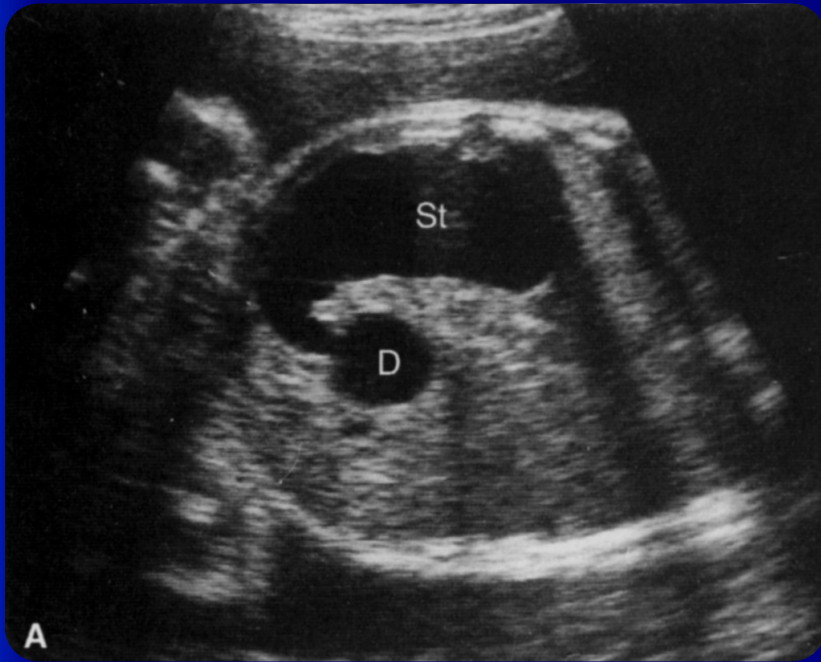




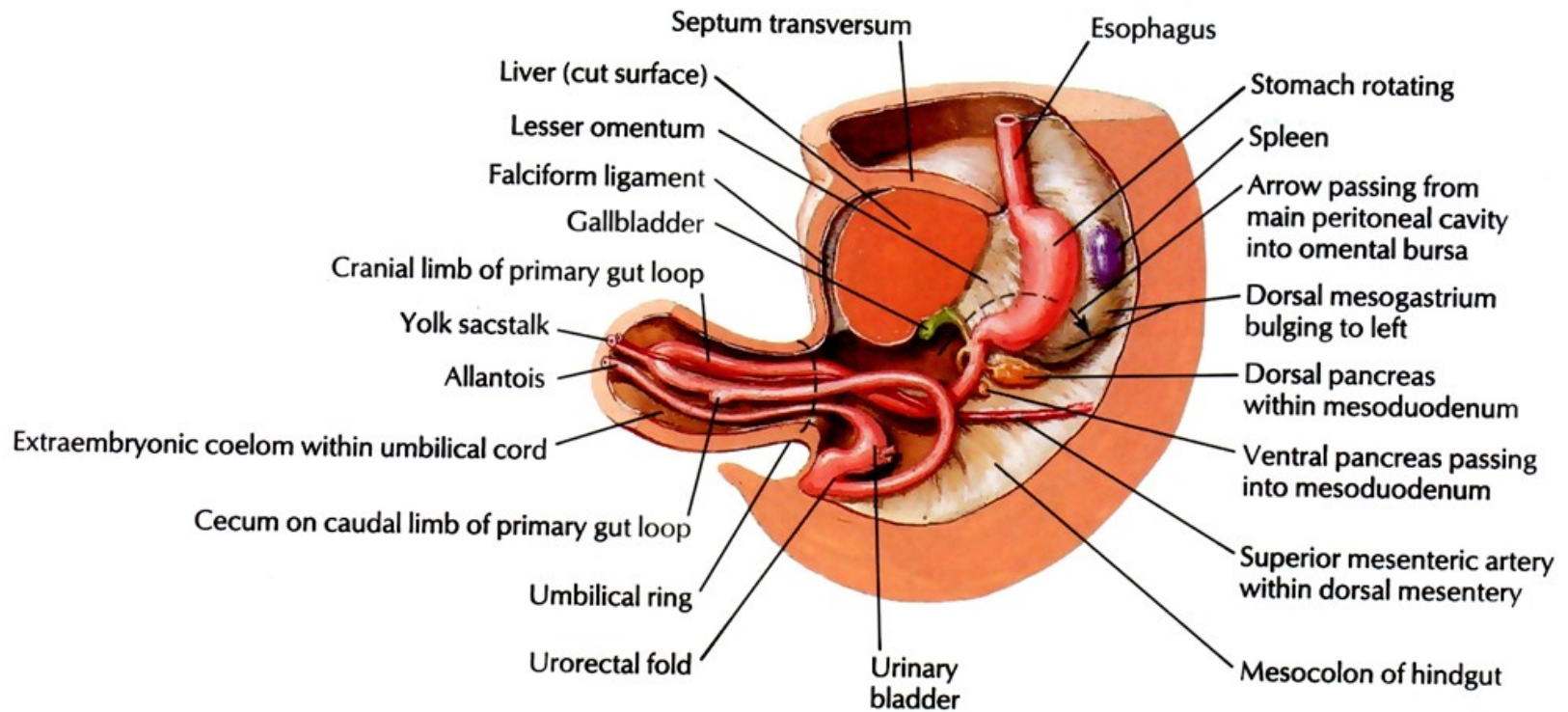




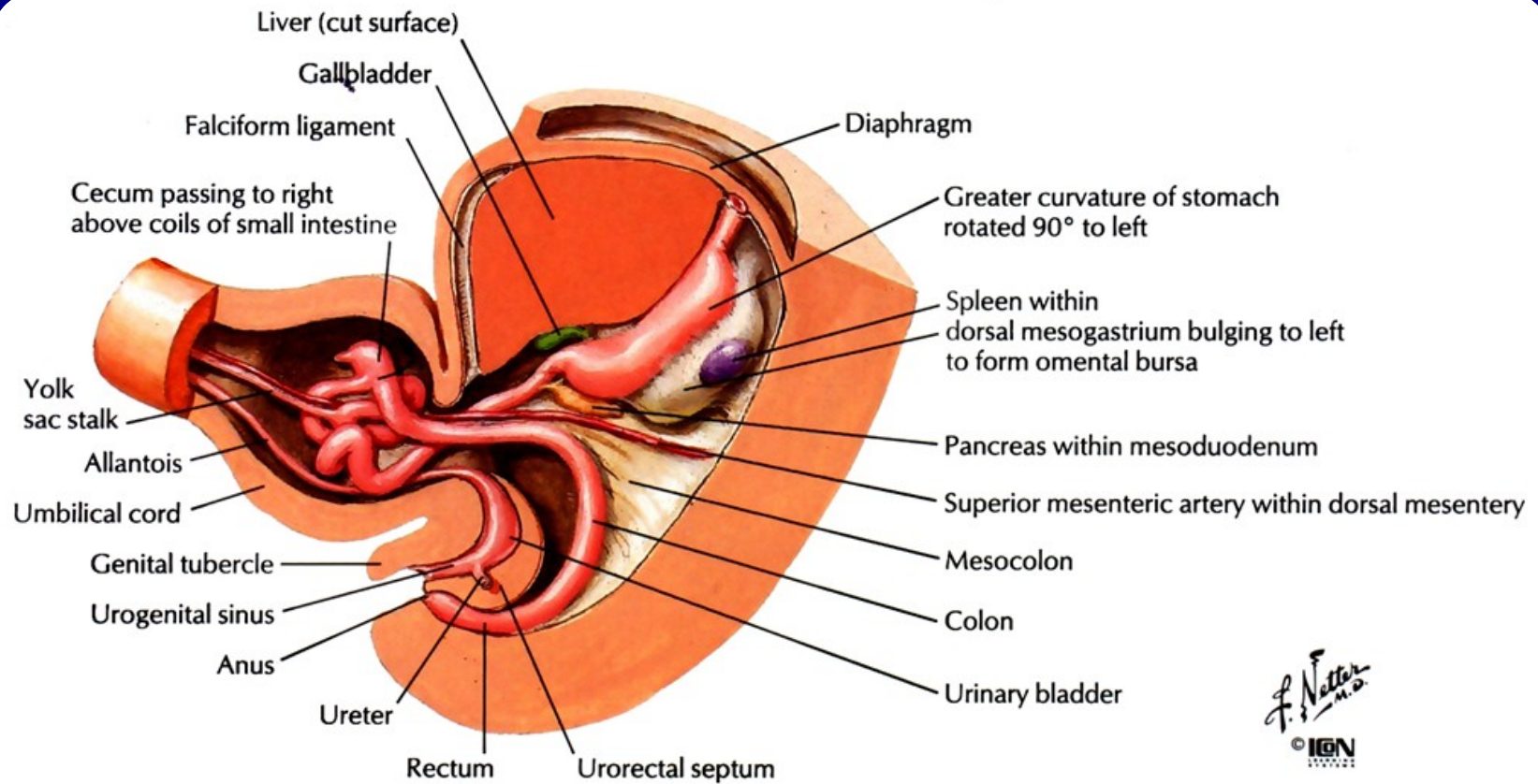




Ultrasound scan of a fetus at 33weeks gestation showing duodenal atresia.

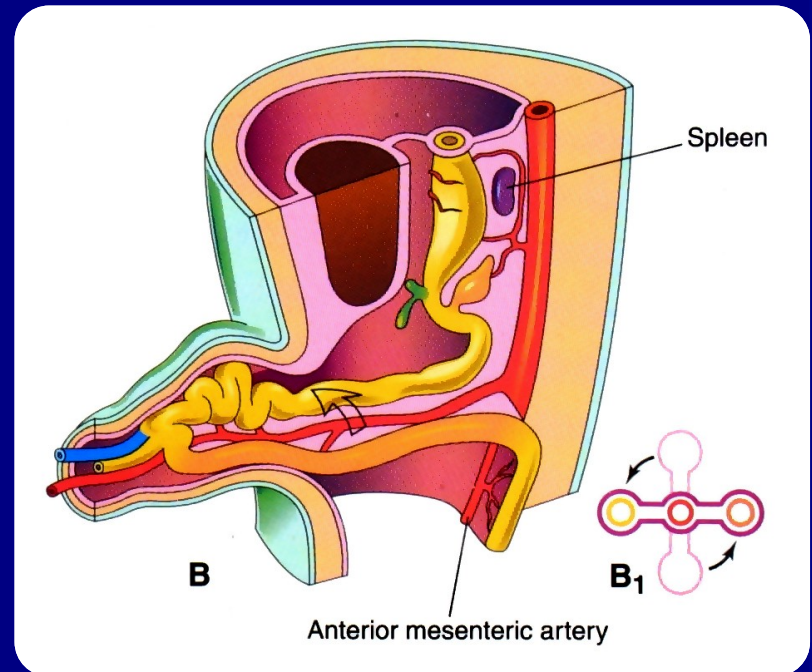
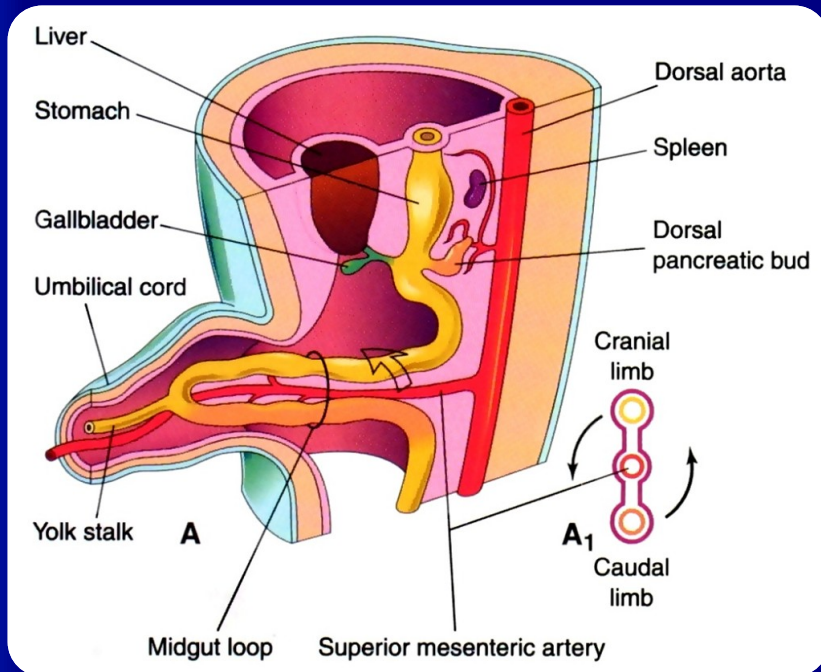


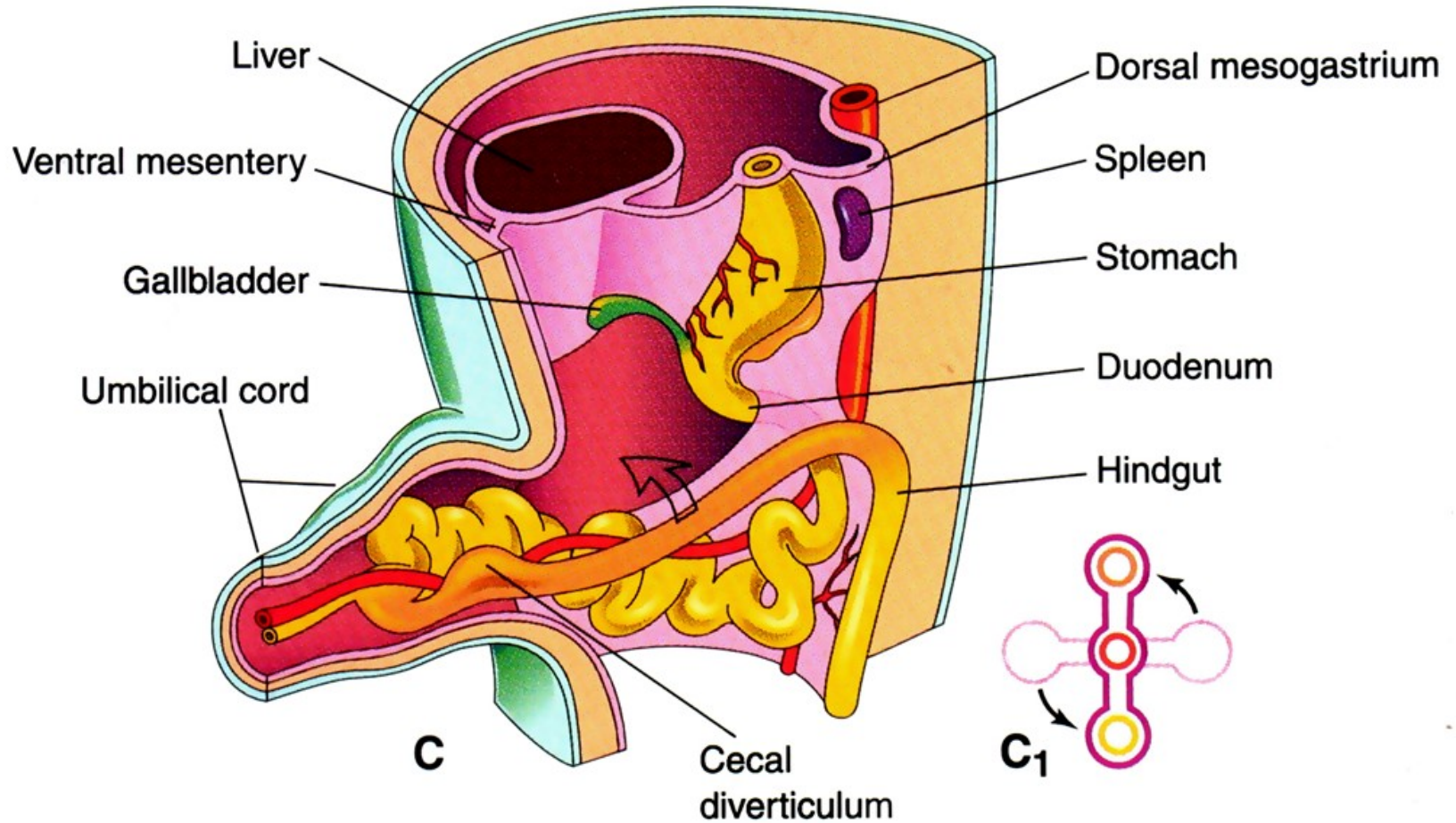
6 weeks

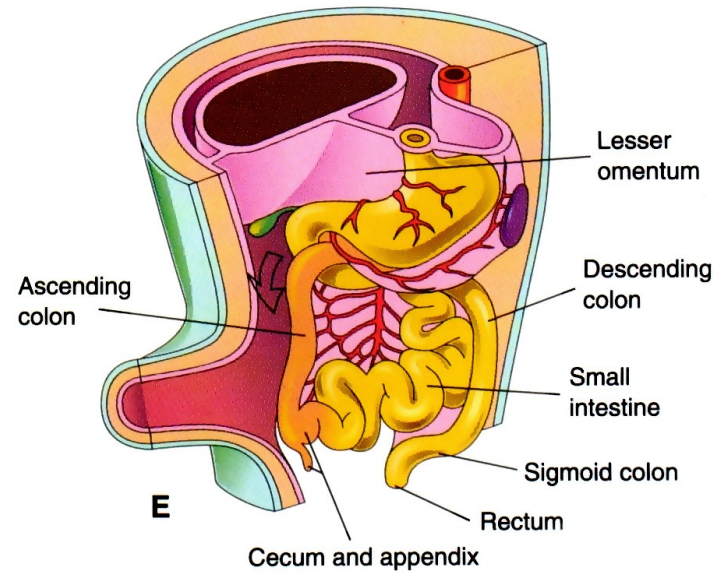
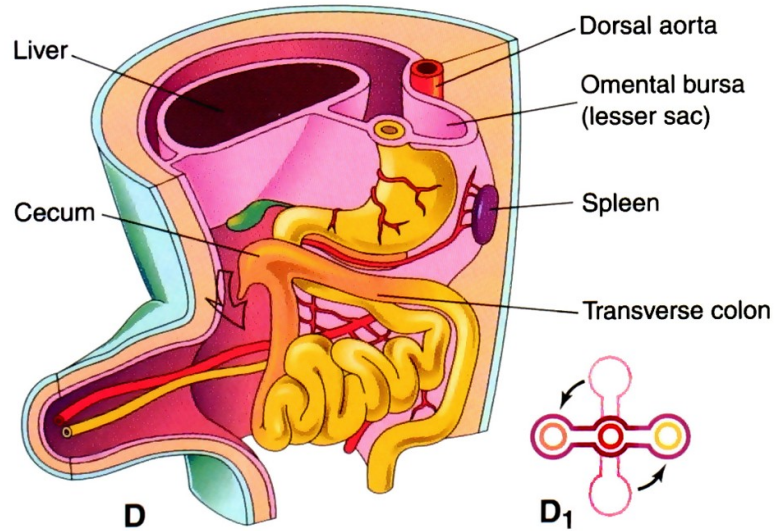


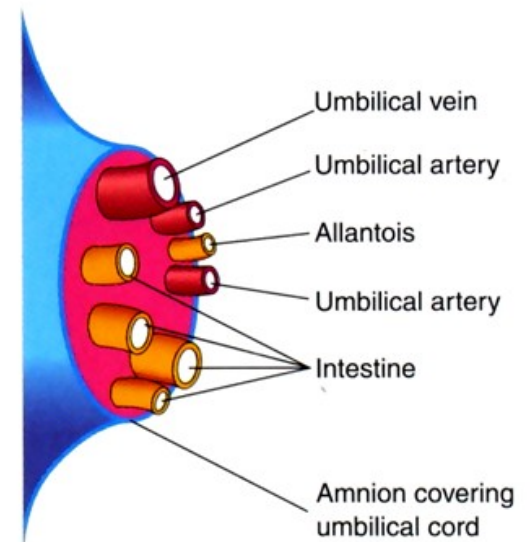
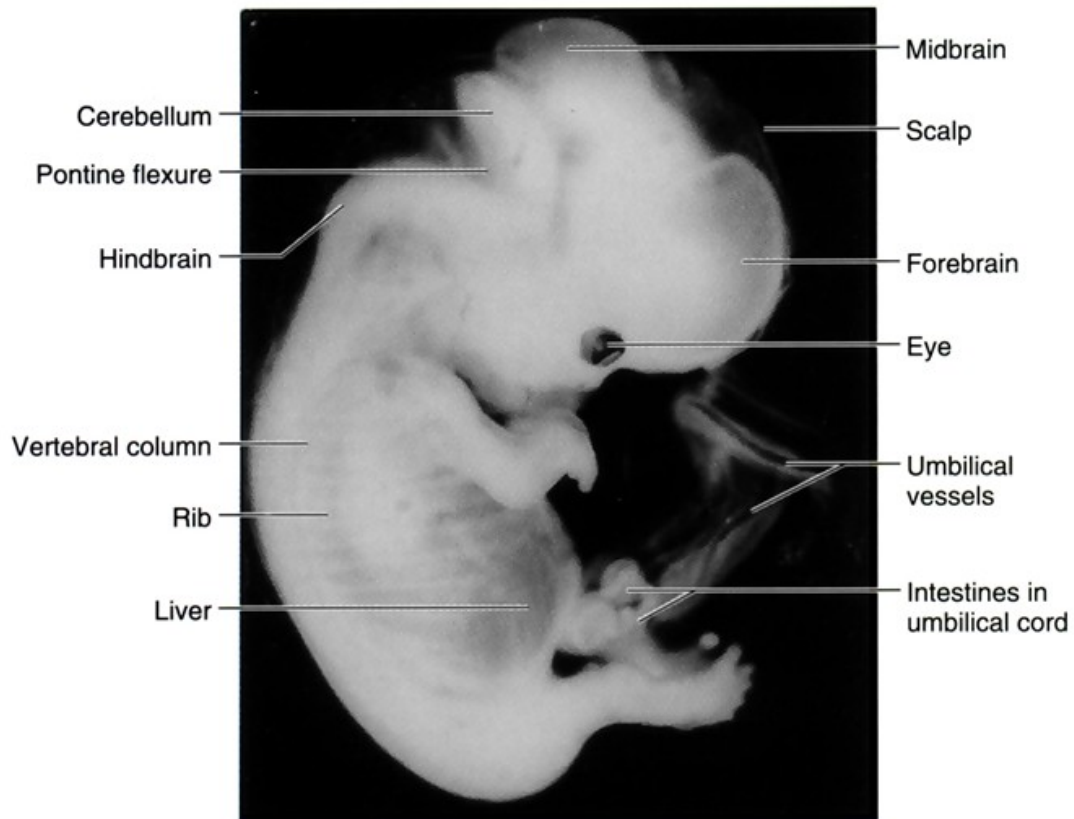
8 weeks



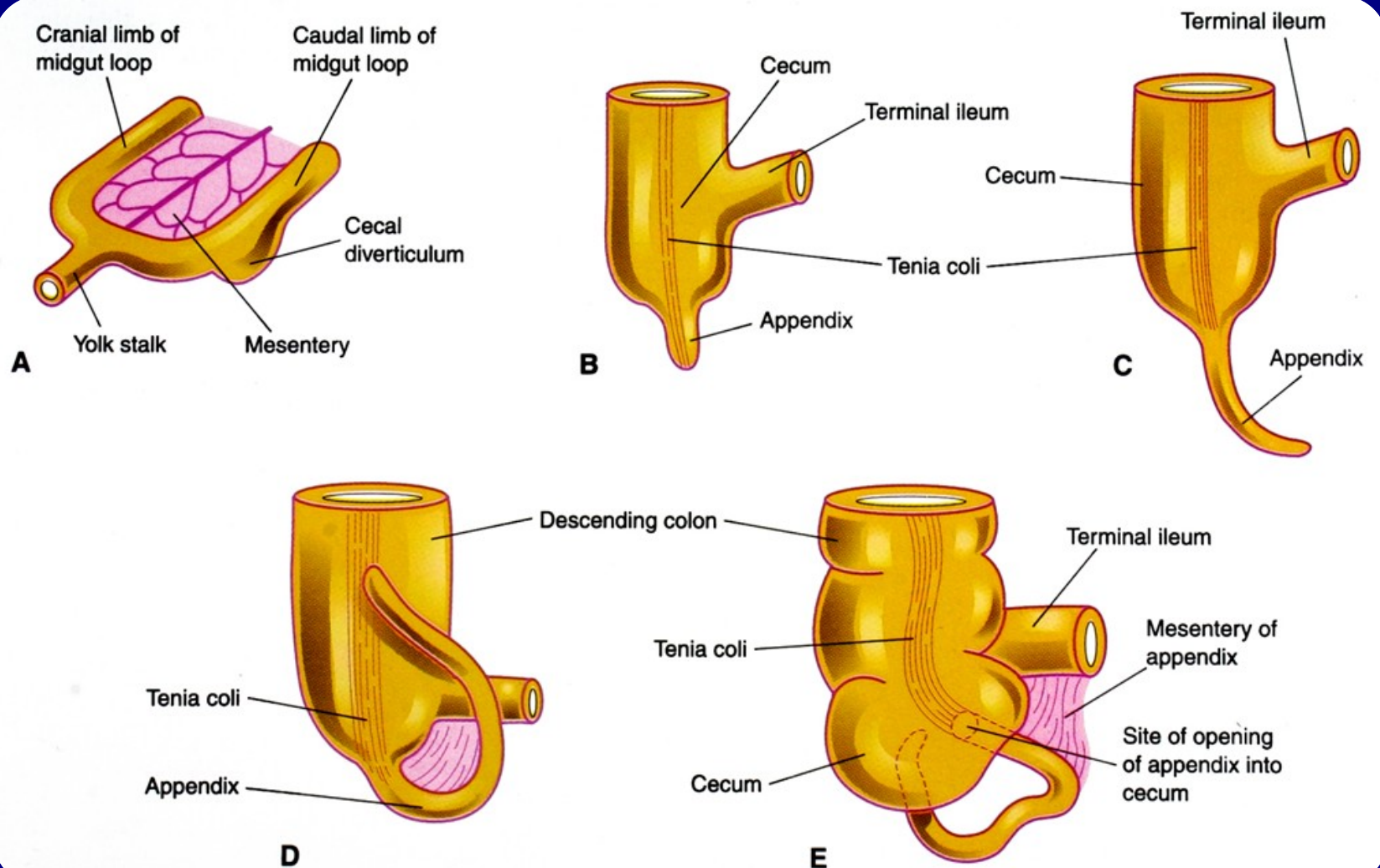




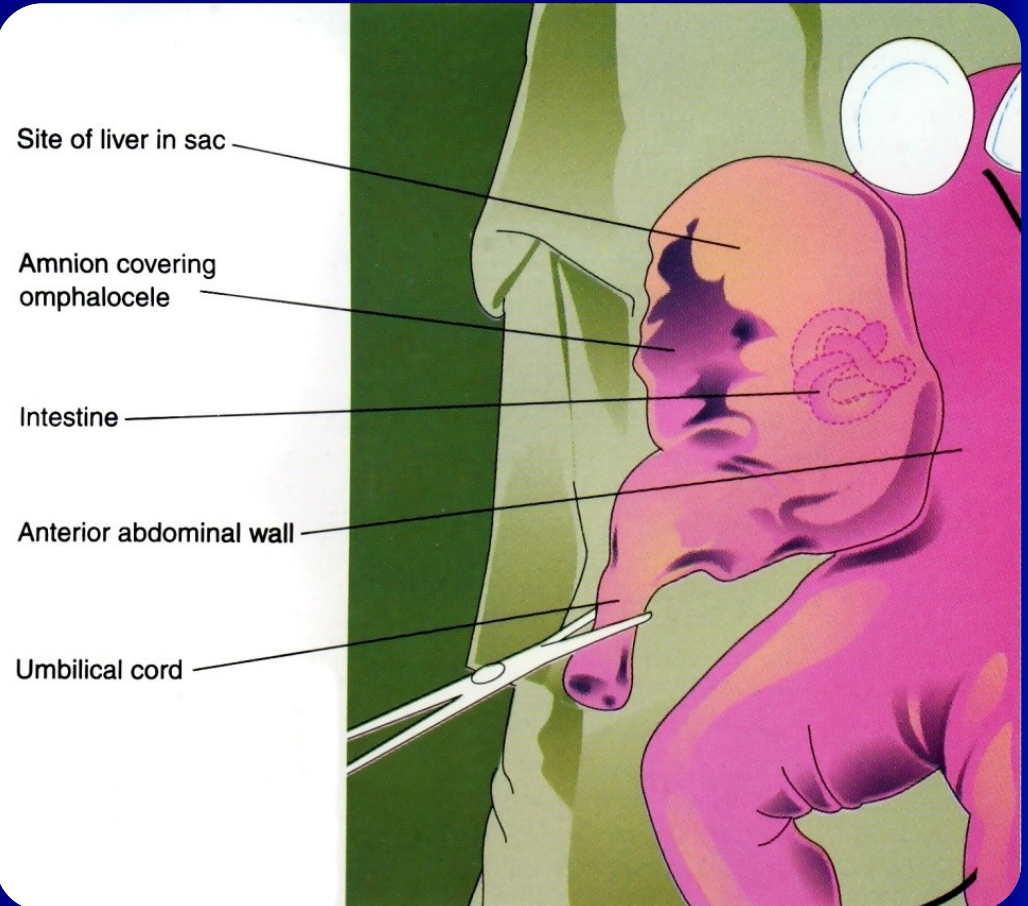
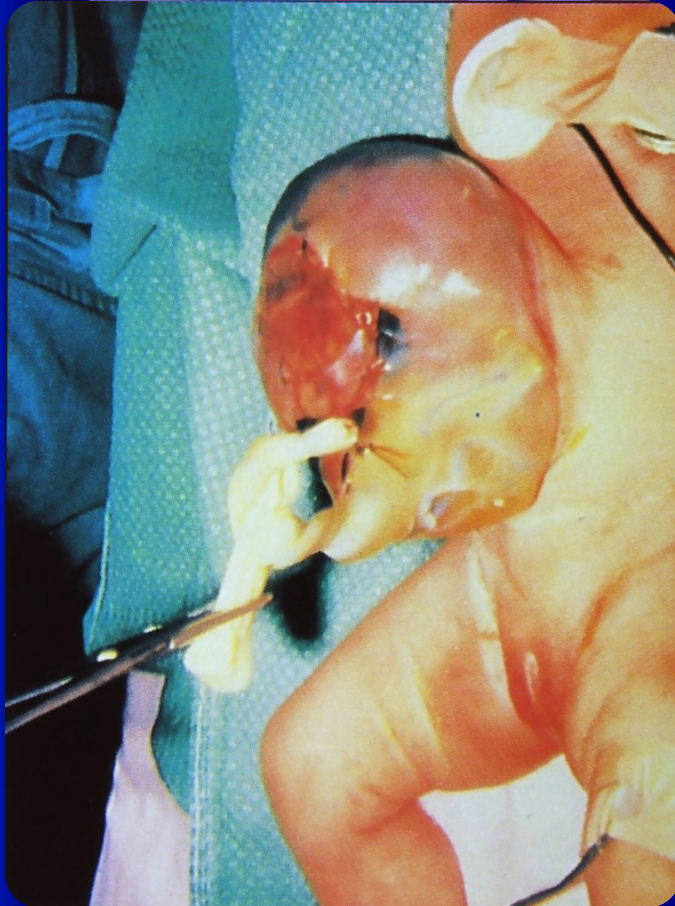






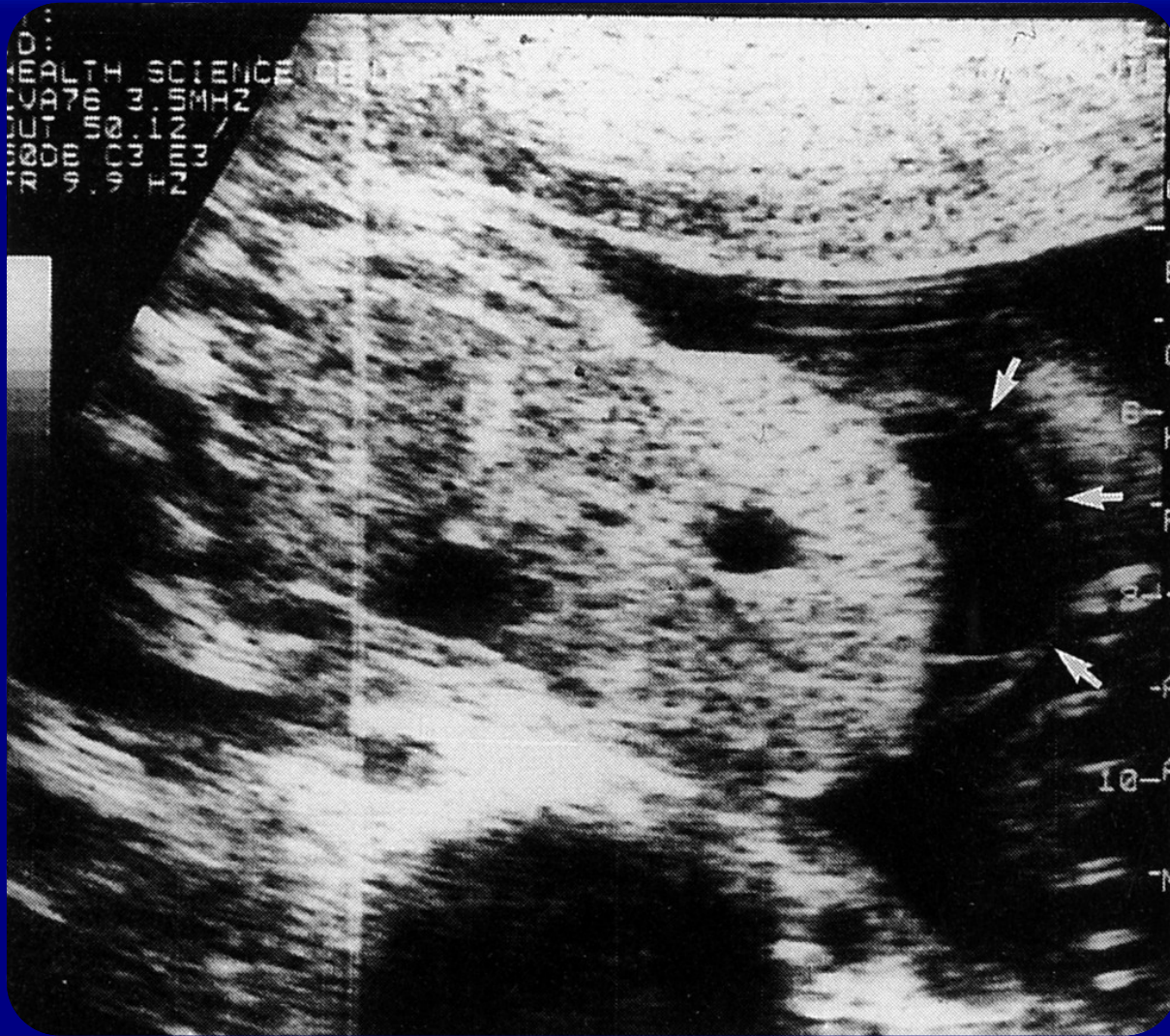


A – 6 weeks. B – 8 weeks. C – 12 weeks. D – At birth

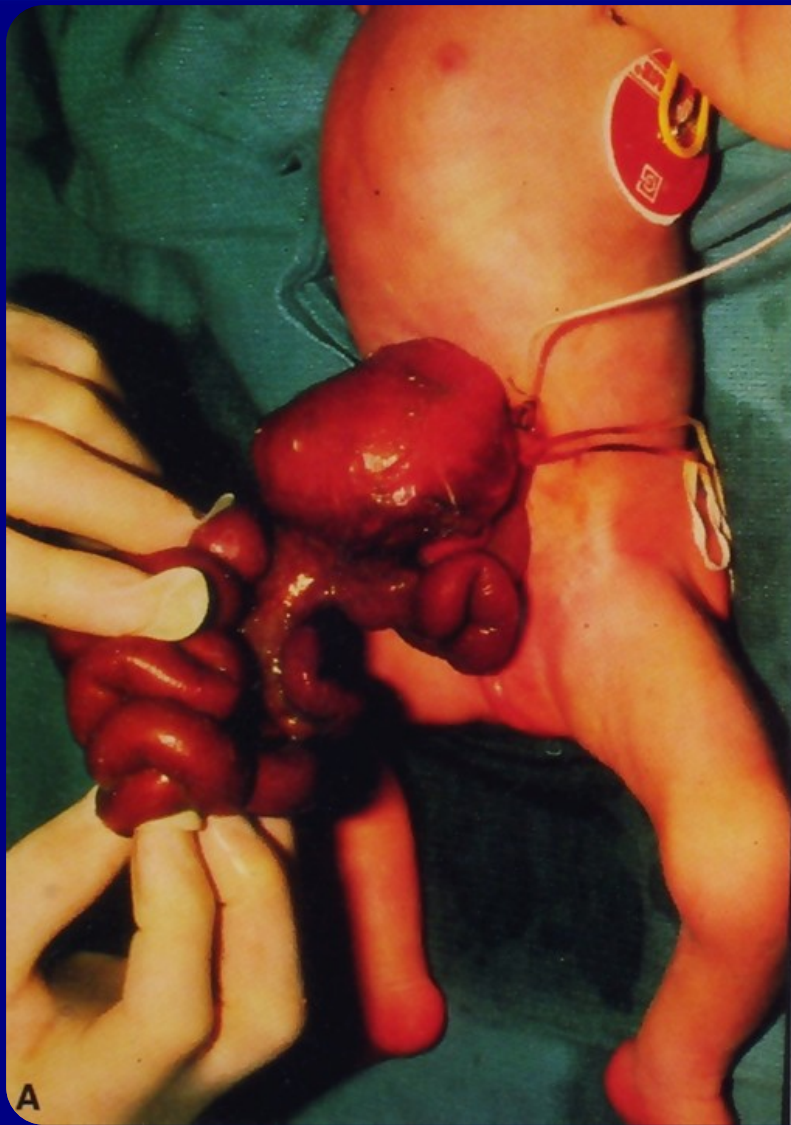


Photograph of an infant with an omphalocele



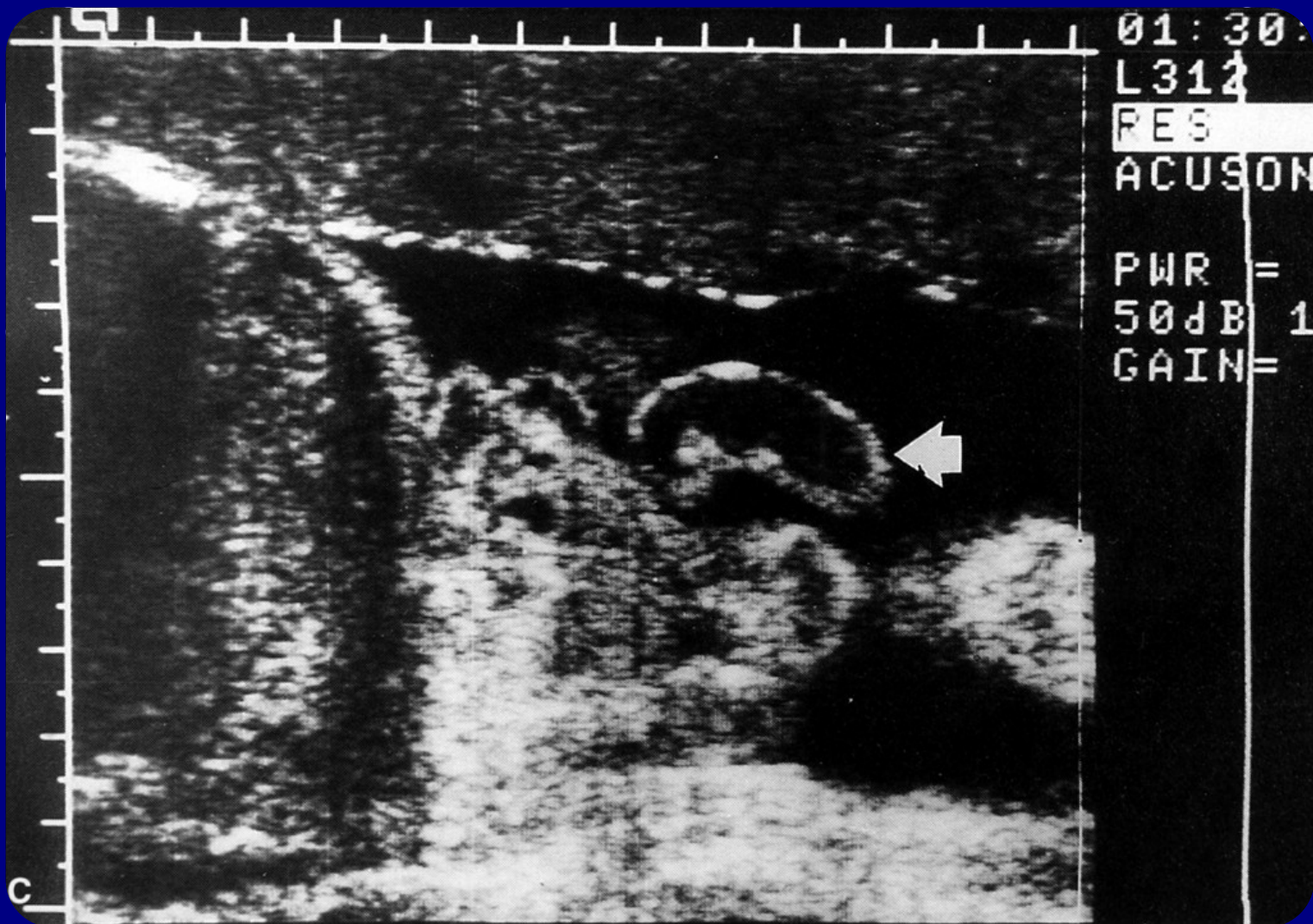


Sonogram of the abdomen of a fetus (28 weeks gestation) showing a large omphalocele, with much of the liver protruding from the abdomen.

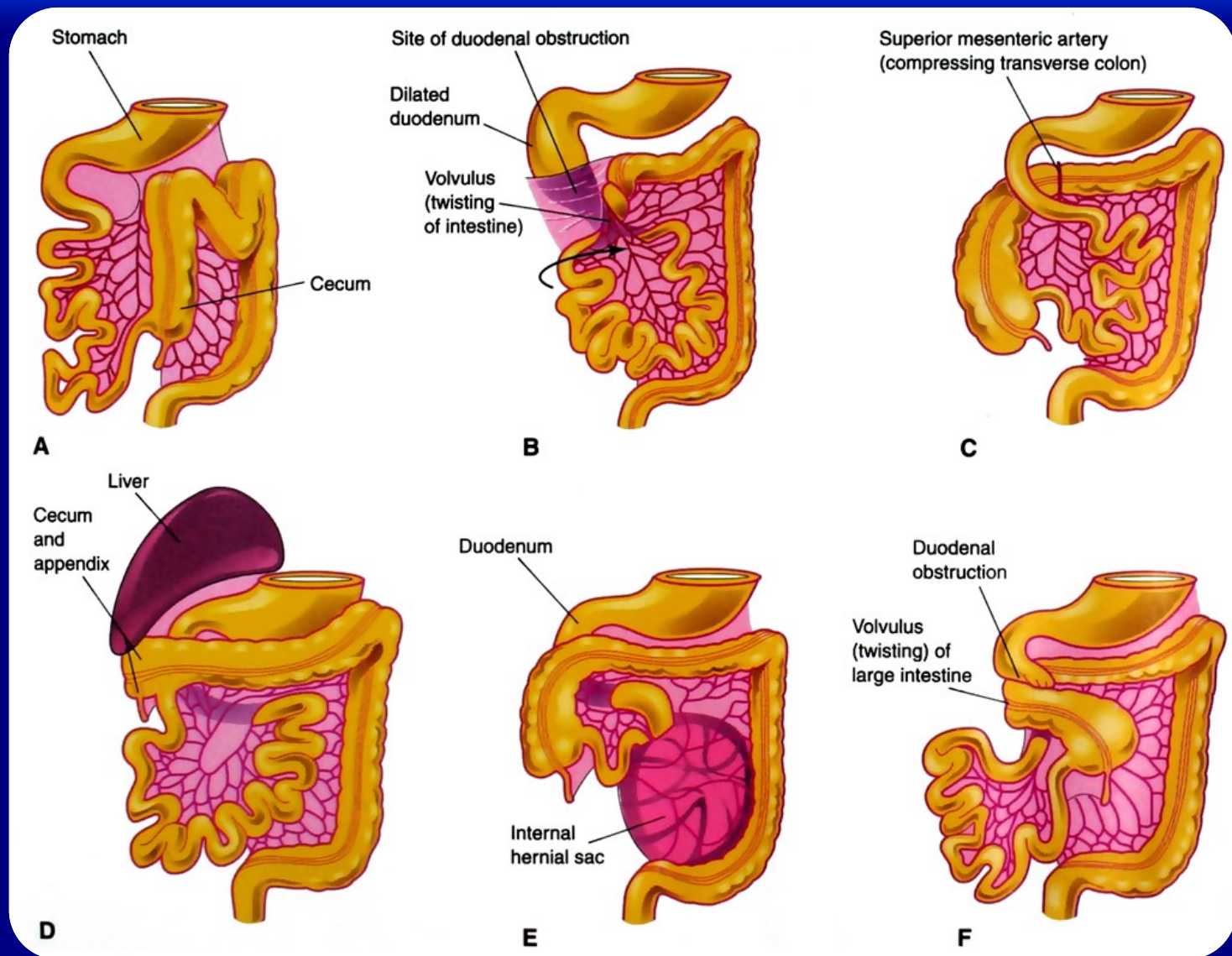


Photograph of a newborn infant with an anterior abdominal wall – gastroschisis



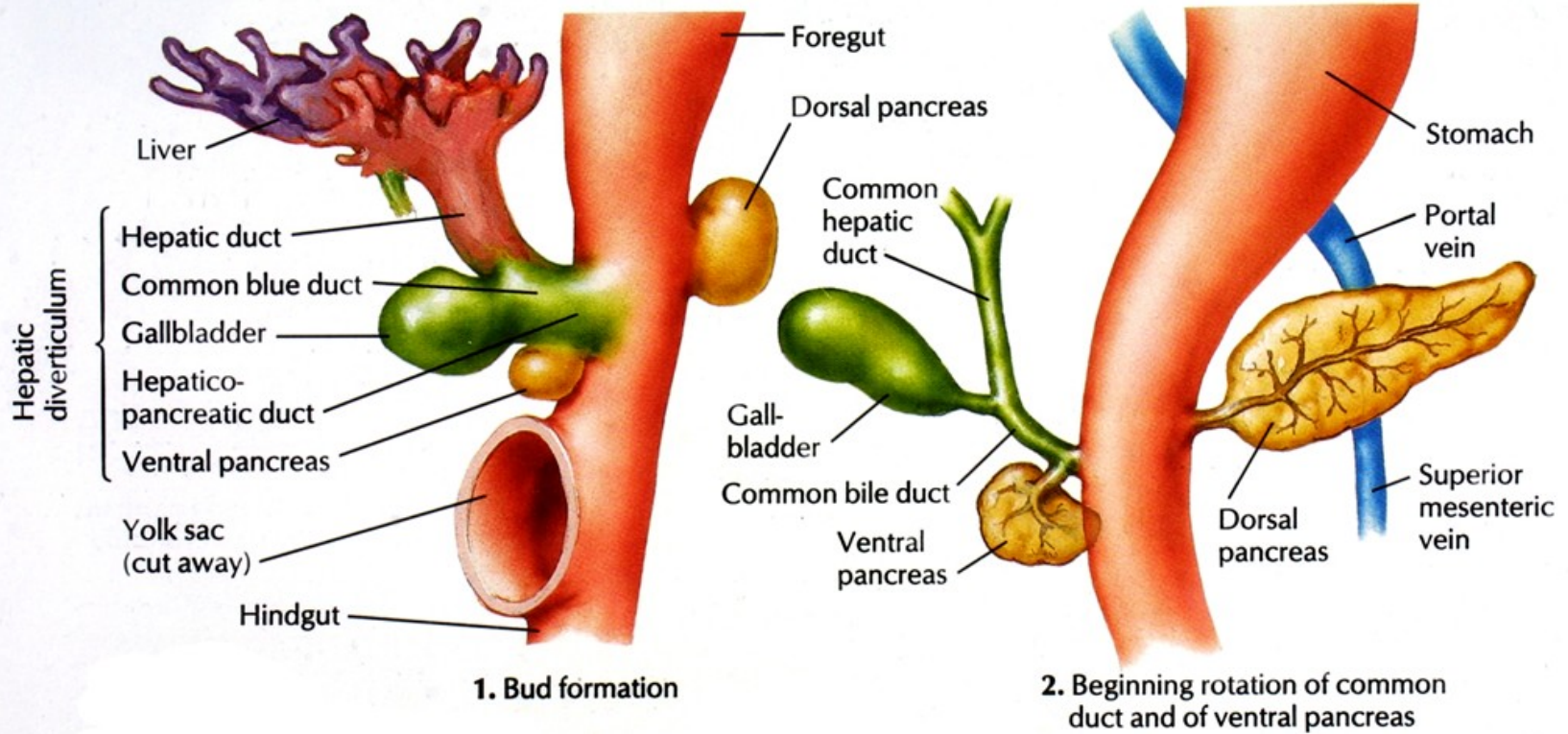


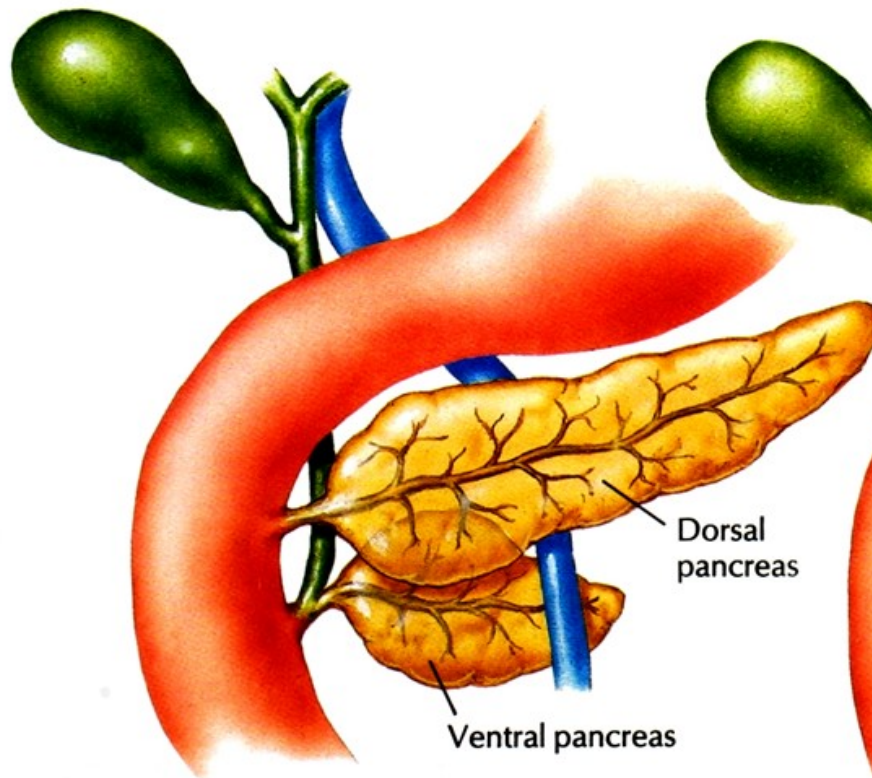
Sonogram of fetus (20 weeks gestation) – loops of small bowel floating freely in the amniotic fluid.



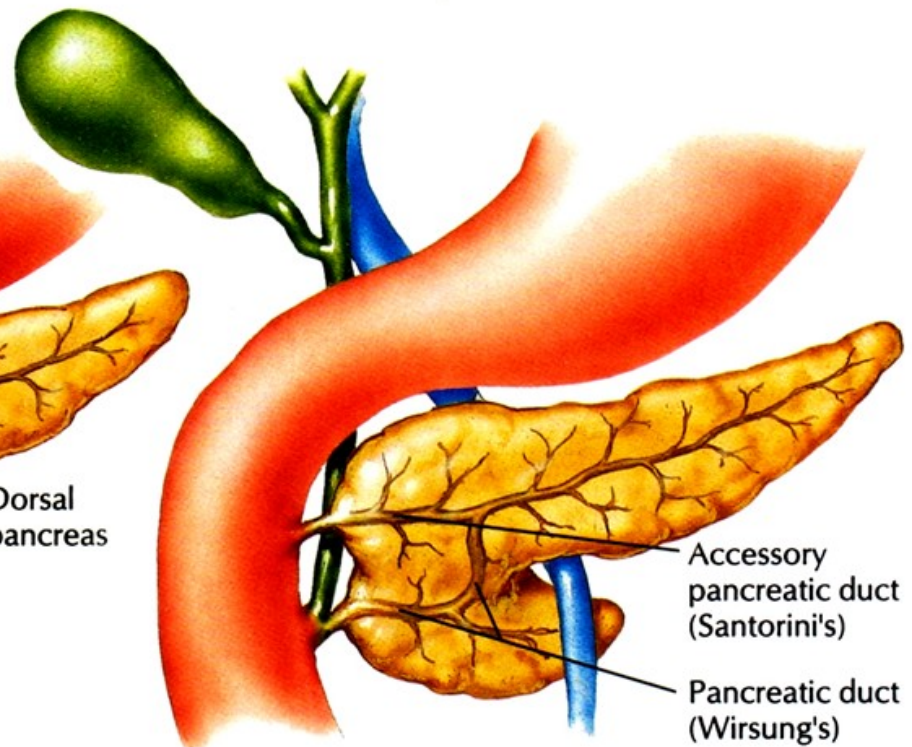
A – Nonrotation. B – Mixed rotation and volvulus. C – Reserved rotation. D – Subhepatic cecum and appendix. E – Internal hernia. F – Midgut volvulus.





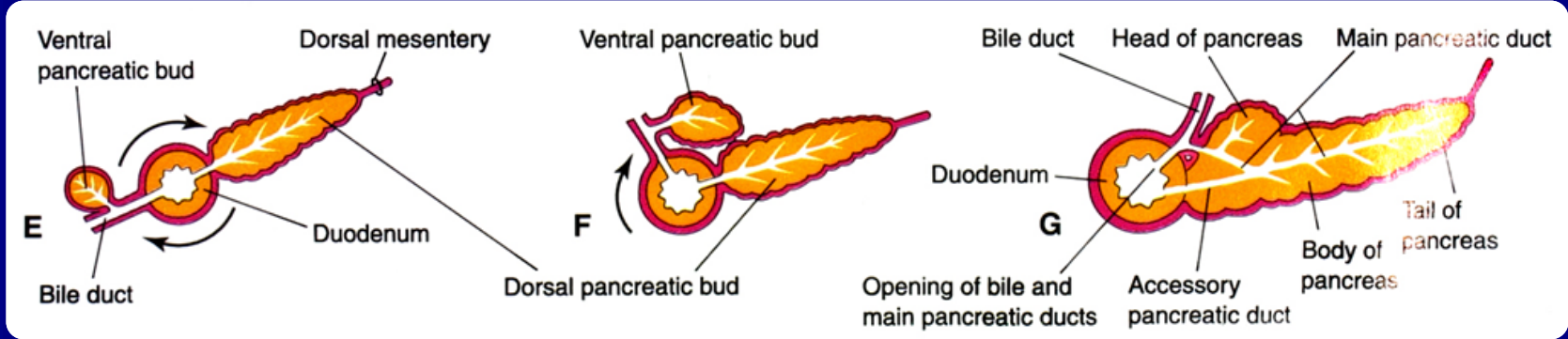


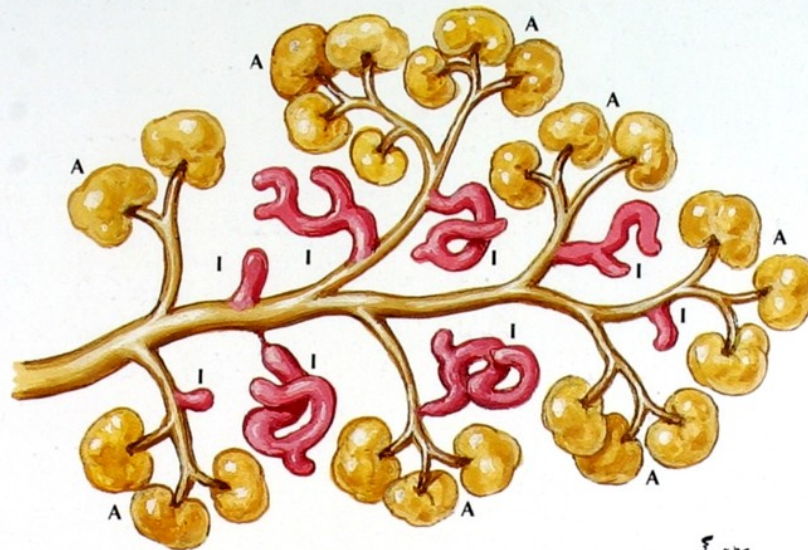
3. Rotation completed but fusion has not yet taken place



4. Fusion of ventral and dorsal pancreas and union of ducts

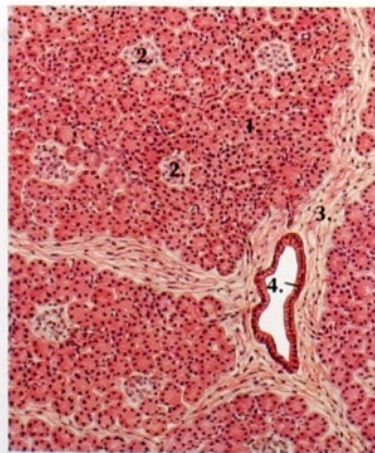




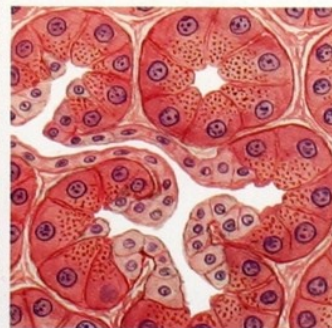


Formation of acini and islets from ducts. A—acini; I—islets in various stages of development

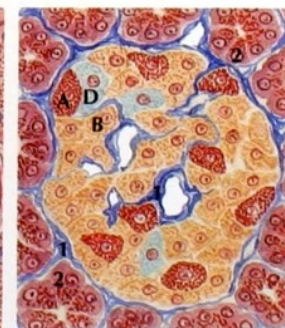
*F. Netter M.D.*  
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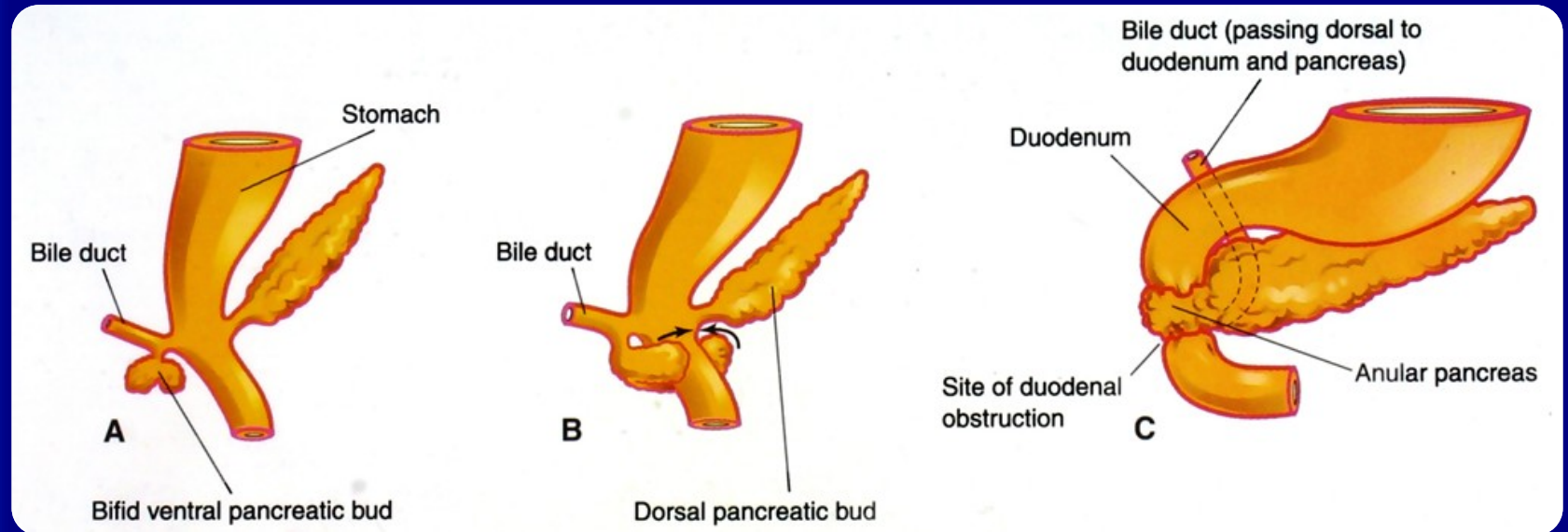
Low-power section of pancreas  
1. Acini, 2. islet, 3. interlobular septum, 4. interlobular duct



High magnification: relationship of intercalated duct and centroacinar cells to acini



Pancreatic islet  
A ( $\alpha$ -), B ( $\beta$ -) and D-cells.  
1. reticulum, 2. acini

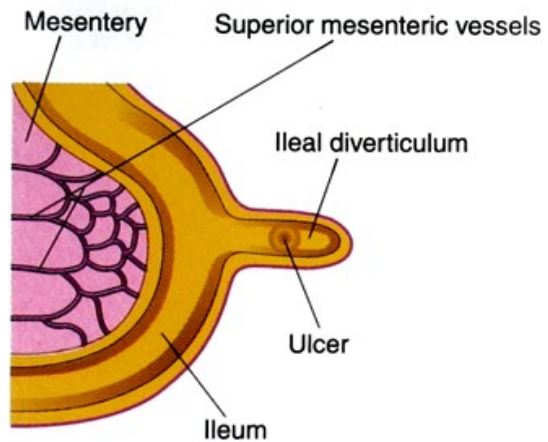


Embryological basis of anular pancreas.

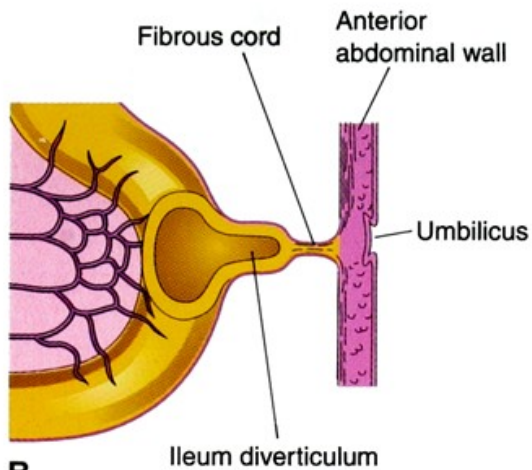


U 2-4% populacji niewielka część przewodu żółtkowo-jelitowego pozostaje w nienaruszonej postaci tworząc uchyłek jelita krętego (uchyłek Meckela). U dorosłego uchyłek ten znajduje się 40-60cm od zastawki krętniczo-kątniczej, naprzeciw przyczepu krezki do jelita. Może zawierać heterotopową tkankę trzustkową lub żołądkową.

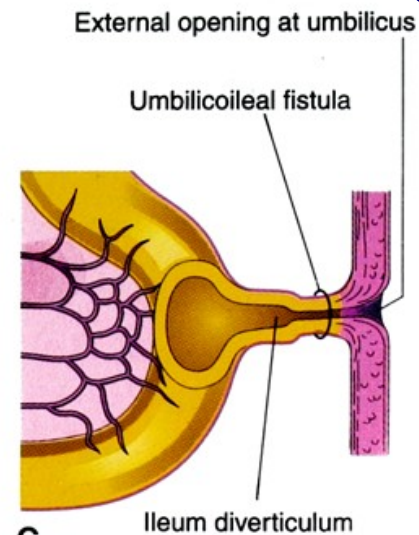
Jakie diagnostycznie dolegliwości mogą wystąpić  
w przebiegu uchyłku Meckela? Jakie powikłania?



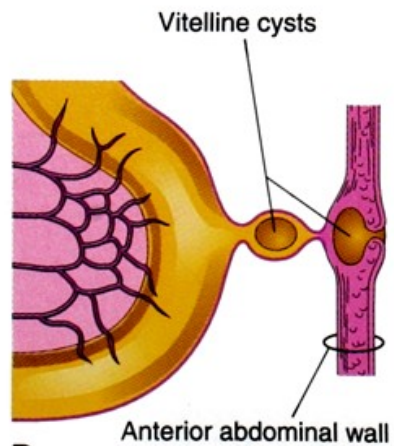
A



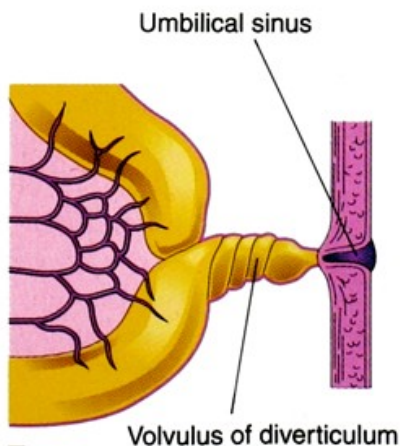
B



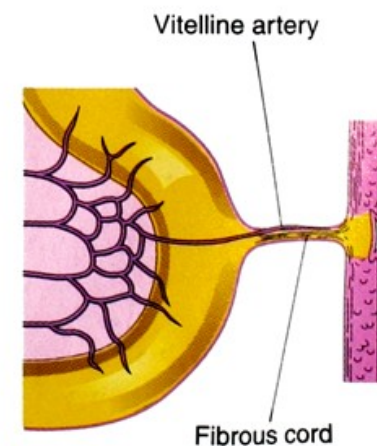
C



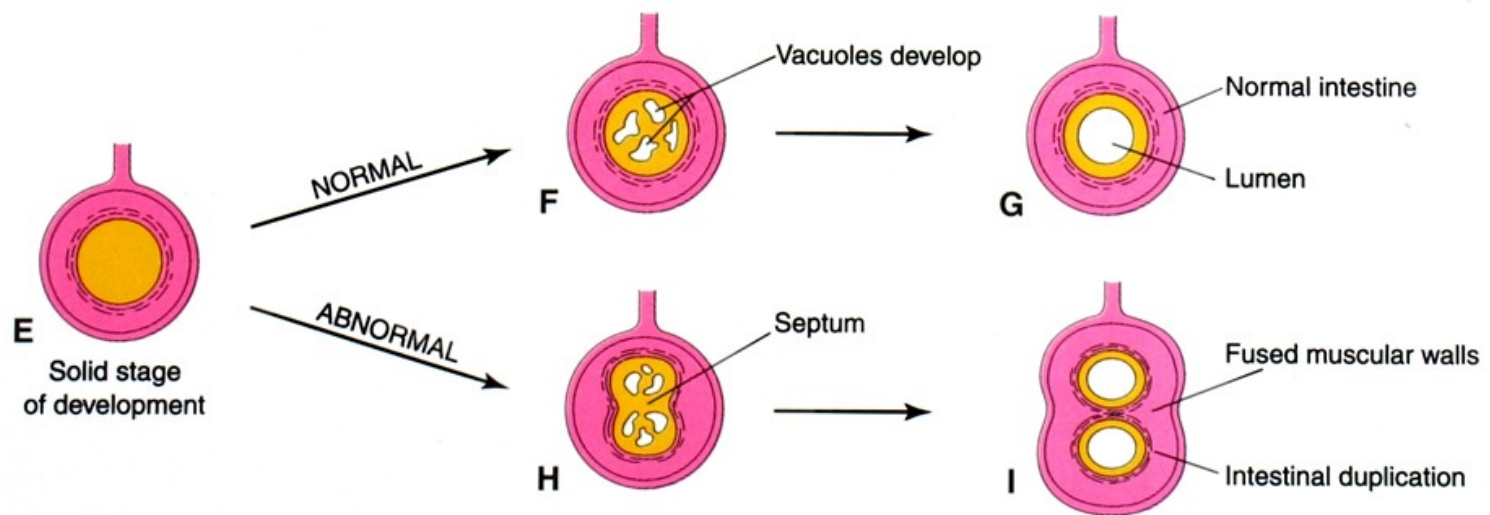
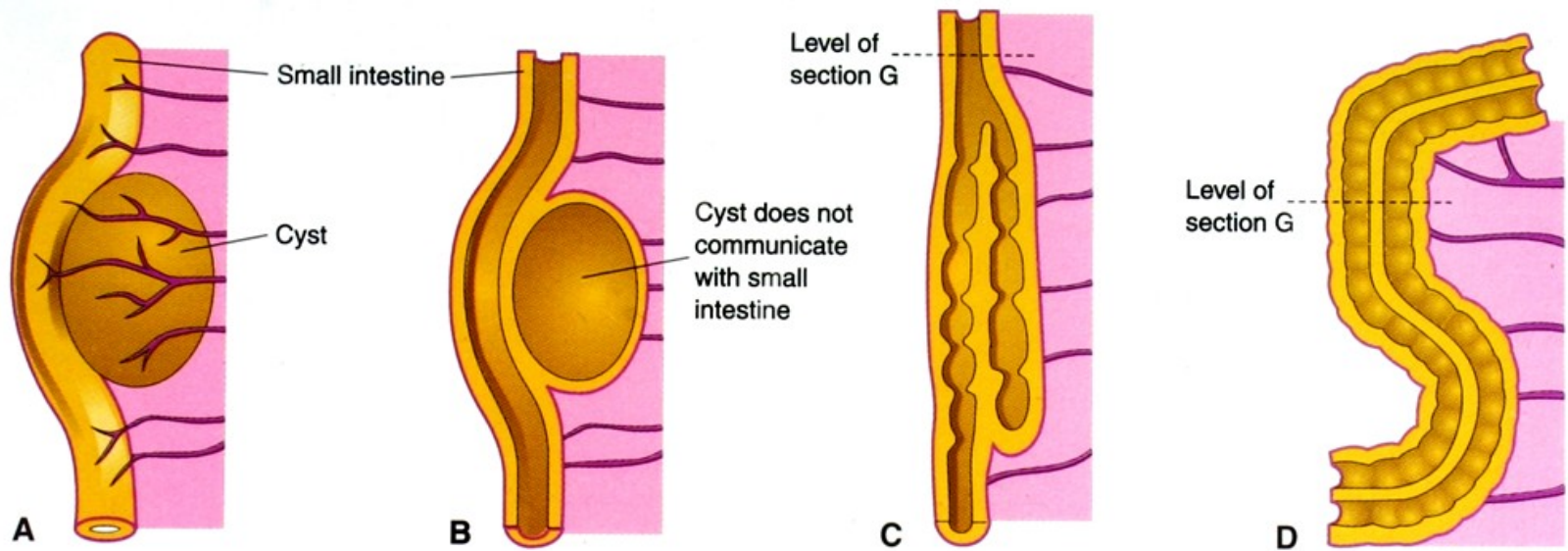
D



E

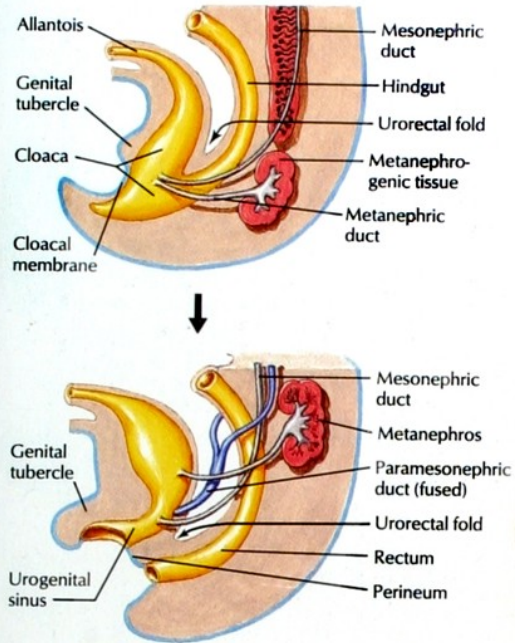


F

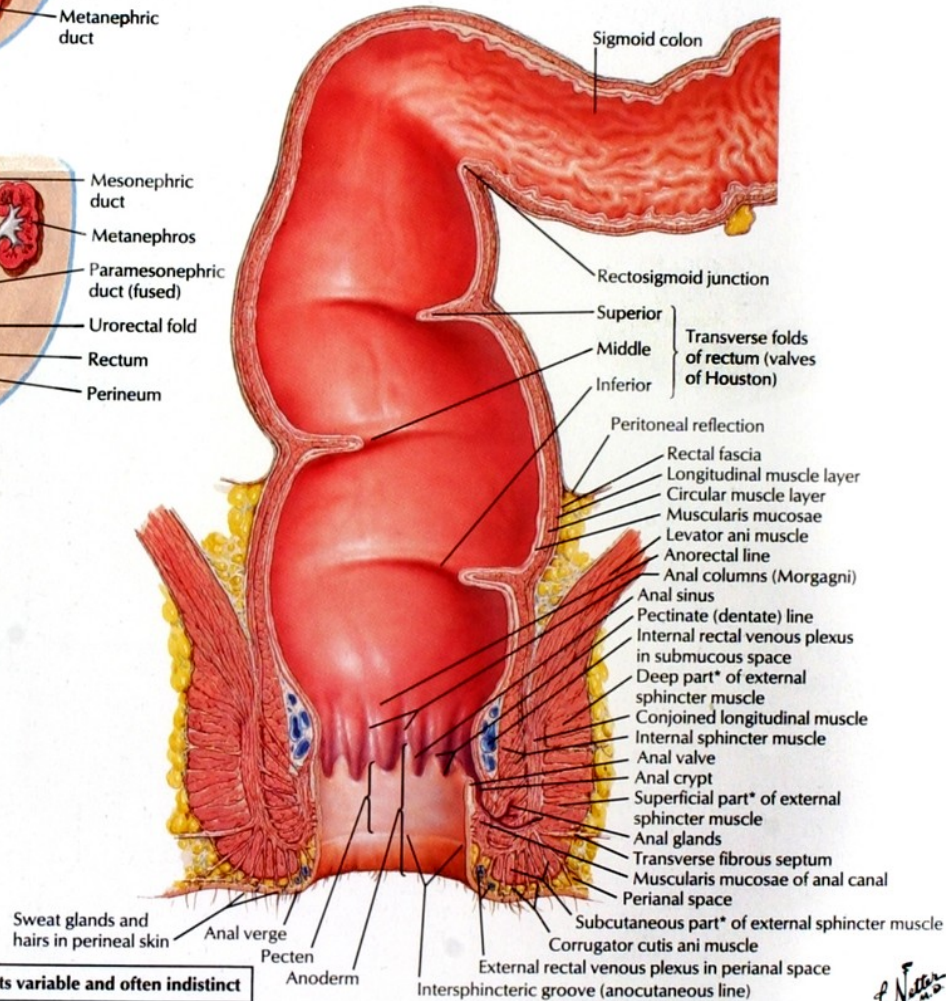




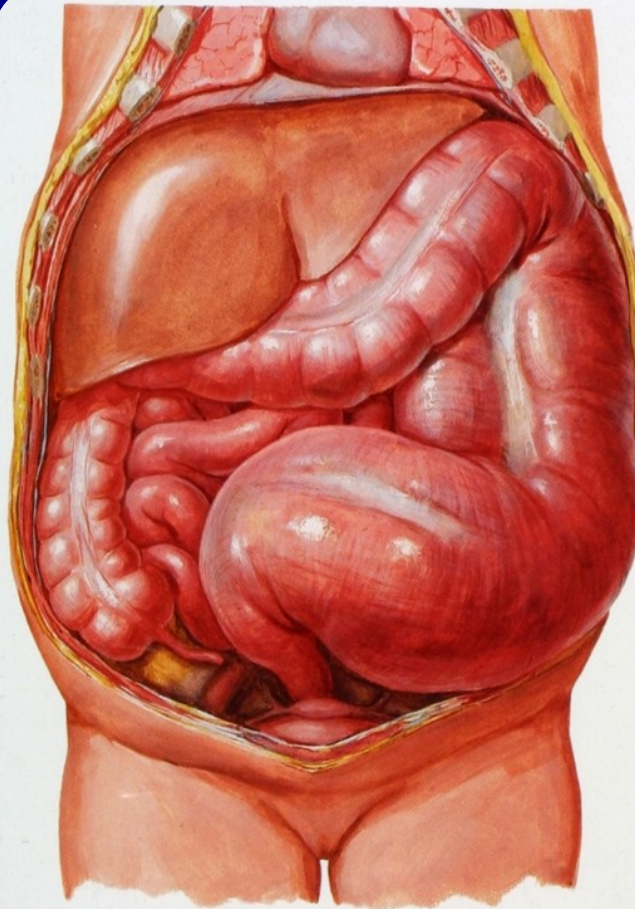
## Development of the hindgut



## Adult rectum and anal canal



\*Parts variable and often indistinct



Tremendous distention  
and hypertrophy of  
sigmoid and descending  
colon; moderate involvement  
of transverse colon;  
distal constricted segment

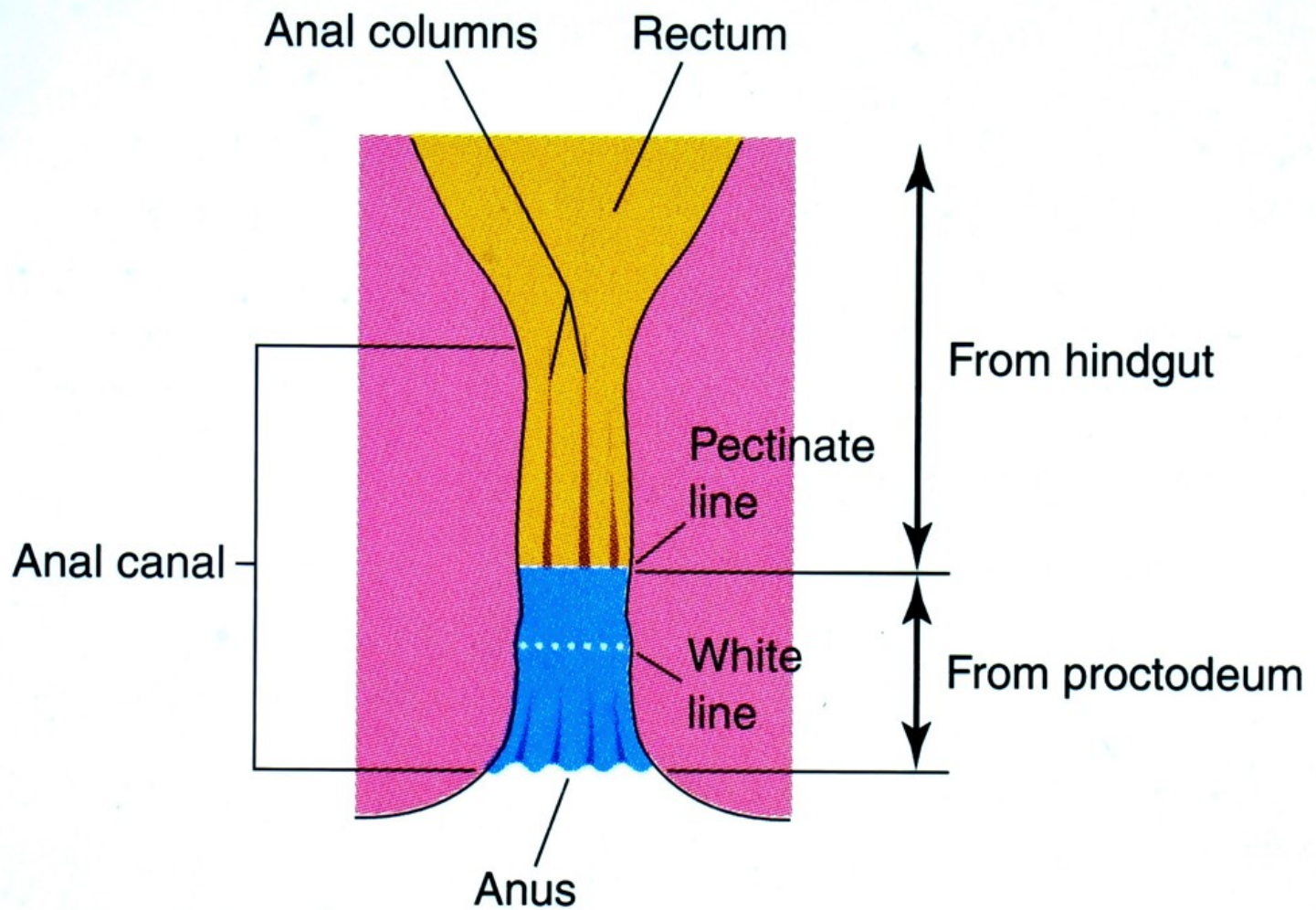


Typical  
abdominal  
distention

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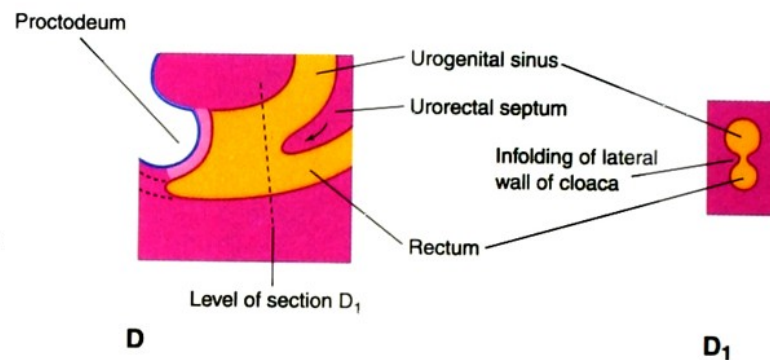
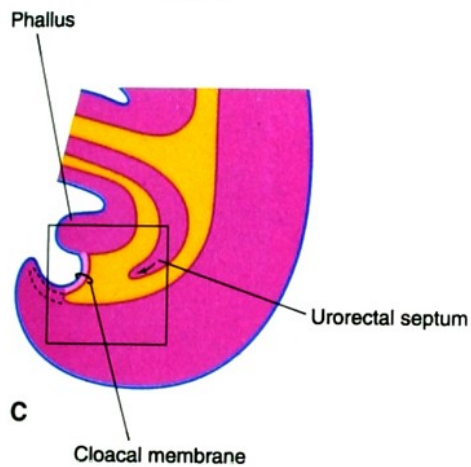
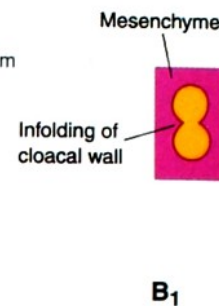
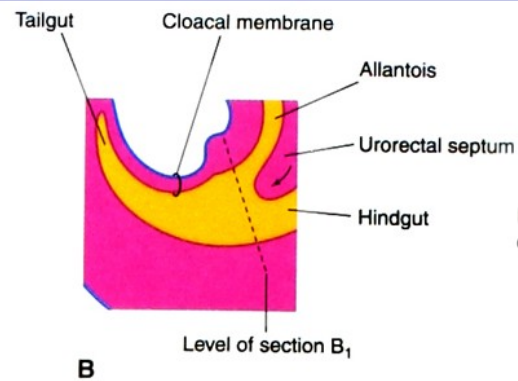
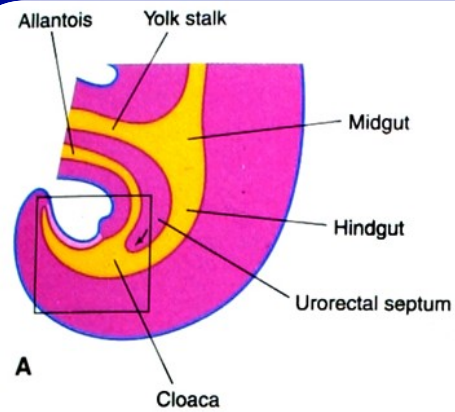




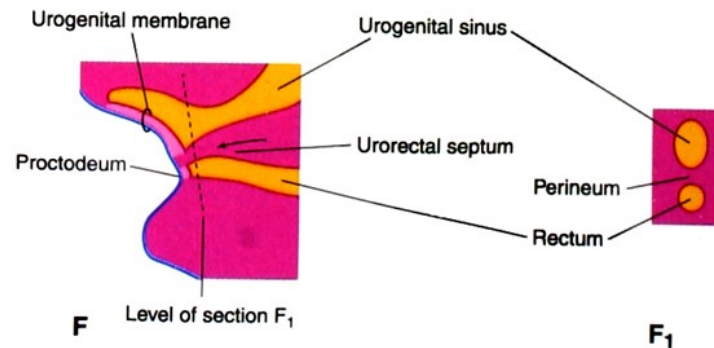
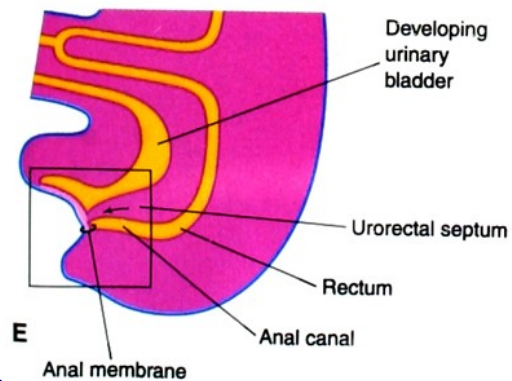








D<sub>1</sub>



F<sub>1</sub>

