We are going to continue what we took previously about the stomach.

The submucosa of the stomach is highly vascular & has nerve plexus which is called submucosal missenser's plexus that is close to muscularis externa .

**\* missenser's nerve plexus is always the closest to muscularis externa.**

***\*muscularis externa of the stomach :***

\*We have an extra layer which is the inner most oblique .

(so we have inner most oblique > middle circular > outer longitudinal)

\*instead of two we have three layers .

\*the inner most oblique of smooth muscle is the thickest in fundus + body of the stomach .

\*the middle circular is thickened in the pyloric sphincter ,at the same time the outer layer becomes poorly developed (thin) .

\*the entire stomach is enclosed with serousa because the stomach is an intraperitoneal organ .

***\*notes about the histological parts of the stomach:***

**RECALL :pyloric and antrum have the same histology**

1-parietal + chief cells are numerous in fundus + body .

2-parietal cells are found in the neck of gastric gland & isthmus .

3-chief cells are in the basal part of gastric gland.

4-parietal + chief cells are absent in cardiac region.

5-chief cells are absent in pyloric region whereas parietal cells exist in few number (are hard to find) , so instead of them we have **mucous neck cells** as the main type of cells .

6-main type of cells in the gland of cardiac region ,antrum and pyloric region is **mucous neck cells with few DNES** ( DNES are rare everywhere ).

7-gastric pits are **shallow** in fundus + body .

**shallow means less than one fifth of the mucosal thickness**

8- gastric pits in cardiac region are **deep** ( but do not exceed one half of mucosal thickness ),yet they are deeper than those in fundus and body . whereas they are the **deepest**  in the pyloric region (the depth of pits reach more than one half of mucosal thickness ).

\*\*in fundus + body there is branching in pits into straight gland (the pit does not lead straightly to gland ,first it is branched then leads to gland ).

\*\*in pyloric + antrum we have branching & coiling of the gland (the gland is not straight ).

\*\*in cardiac there is no branching , just slight coiling.

**Trilaminar appearance is critical for fundus and body.**

\*\*mucous neck cells are in the gastric gland while in the pit there is surface mucus cells & in basal part of it we have stem cells with surface mucus cells.

Once we reach the gastric gland, the main type of cells is mucus neck cells.

\*\*intracellular canaliculi in parietal cell/tubulovasicular system ***:***

system of canals , they appear inside the cell but in fact they are outside the cell .

\*all secretions of the acids will be within the ducts which will in turn empty outside.

\*\* when PAS (carbohydrates) stains positive ,we expect surface mucus cells and surface neck cells. (strength of the stain is more dark in surface cells of pits but in gland is lightly stained ).

\*mucus produced by mucus neck cells is **less glycosylated** so it appears more lightly stained.

\*secretions of mucus neck cells are more watery therefore less viscous because they are less glycosylated. **The more glycosylated the more viscous**.

***\*\*\*small intestines:-***

\*composed of : duodenum , jejunum and ileum .

\*duodenum : its beginning and its end are intraperitoneal while the rest is extraperitoneal , therefore its covered with adventitia except **the beginning and the end are covered with serousa** .

\*jejunum + ilium : intraperetoneal covered with serousa .

\*\*there are some surface modifications in the small intestines in order to increase the surface area , these modifications are :

**1-plica circularis** :

Is a permanent elevation of mucosa & submucosa ,found in all small intestine but **more numerous in the jejunum** .

\*permanent means it stays even if the tube is filled up while temporary ( like plica semilunaris in large intestines ) it disappears if it’s full .

**2-villi :-**

Finger-like projections of lamina propria and epithelium ,**they are much frequent & taller in duodenum** .

**3-microvilli :-**

Finger-like projections at the level of absorptive cell , its surface has evaginations, they are also called brush borders. Found to increase the surface area.

**4-intestinal glands :-**

Invaginations like gastric glands but without pits (directly gland ).

***\* cells in the small intestines:-***

we have two types of cells : enterocytes and goblet cells

**\*enterocytes/surface absorptive cells :-**

tall columnar cells with basal oval nuclei , their apical surface represent brush border which is microvilli .

**\***goblet cells increase in number distally ,Which means in jejunum more than duodenum, in ileum more than jejunum and in large intestines more than small intestines ,as a result in distal parts more than the other parts .

\*DNES cells are also found but they are rare as we said previously .

\*M cells are found in parts where lymphatic nodules reach the surface, covered with squamous like cells and they function as antigen presenting cells.

**\*intestinal gland :-**

They are invaginations of surface epithelium into the lamina propria ,increase surface area of intestines and open into intervillar space . The upper part of the gland is occupied by enterocytes and goblet cells . Basal part of the gland contains Paneth cells,DNES and stem cells .

\*paneth cells secrete lysozymes to maintain intestinal flora , have the same properties of serous cells ( round nuclei,pyramidal in shape and have apical secretory granules but paneth cells have large secretory granules that appear eosinophilic).

**\*stem cells here are in the basal part of the gland while in stomach are in the basal part of pits** .

EXTRA NOTE : Lacteal vessel is a large lymphatic vessel found in the core of the villus.

**\*brunner ‘s glands :-**

**Found in submucosa of duodenum.**

Secret mucous that is rich in bicarbonate to neutralize the acidity of chime that comes from stomach.

\*plica circularis : structure that is elevated at the level of submucosa.

***\*Ileum :-***

in submucosa we have many lymphatic nodules which are called **payers patches** , some of them might reach the surface and once they reach the surface they become covered with M cells .

\*large intestines don't have microvilli while small intestines have.

*PS: the doctor is going to label the slides during the lab .*

