

MEDICAL PATHOLOGY
FINAL EXAM
ANSWER ALL QUESTIONS



1. A primary mechanism by which magnesium sulfate induces laxation is:
- A. It acts selectively on rectal smooth muscle to increase its contractile activity.
 - B. It acts as an osmotic agent to increase luminal retention of water, as does lactulose.
 - C. After hydrolysis to ricinoleic acid, it decreases the net absorption of water and electrolytes by intestinal mucosal cells.
 - D. It increases the bulk content of the small intestine as do bran or methyl cellulose.
 - E. It decreases the synthesis of PGE₂ in the intestinal mucosa.
2. What single indicator fully assesses nutritional state?
- A. Serum albumin level
 - B. Triceps skinfold thickness
 - C. Total urinary nitrogen excretion and Nitrogen Balance
 - D. There is no single indicator to assess nutritional status



3. The most common malignant liver tumor in adults is:
- A. Hepatocellular carcinoma
 - B. Lymphoma
 - C. Metastatic tumor
 - D. Hepatic adenoma
 - E. Angiosarcoma



4. A bone marrow transplant patient complains of pain on swallowing and is noted to have small punched out esophageal ulcerations on endoscopy. The most likely cause of the ulcerations is:
- A. Graft versus host disease
 - B. Candida esophagitis
 - C. Gram negative sepsis
 - D. CMV esophagitis

5. Bacterial contamination of the upper small bowel can occur in all of the following **EXCEPT?**:
- A. Pernicious anemia

- B. Stricturing Crohn's disease
- C. Clostridium difficile infection
- D. Scleroderma
- E. Surgically created blind loops to treat obesity



6. Which of the following agents has both antacid and laxative properties:

- A. Bisacodyl
- B. Ranitidine
- C. Magnesium hydroxide
- D. Sucralfate
- E. Metaclopramide

7. All of the following are true about the use of antibiotics **EXCEPT**?

- A. They are of little value in the treatment of bacterial overgrowth.
- B. They can cause diarrhea.
- C. They are not used to treat antibiotic induced diarrhea.
- D. They can lower blood ammonia levels.
- E. They can prolong the Prothrombin time or INR

8. Which gas is present in the lowest concentration in intestinal flatus?

- A. CO₂
- B. Oxygen
- C. Methane
- D. Nitrogen
- E. Hydrogen



9. Treatment of Inflammatory Bowel Disease includes:

- A. Azathioprine and 6-mercaptopurine for treatment of acute flares of Crohn's Disease and Ulcerative colitis.
- B. Methotrexate for Crohn's patients who are steroid-resistant or steroid-dependent.
- C. Cyclosporin, an immunomodulator, is useful for widespread treatment of mild-to moderate Crohn's Disease and Ulcerative Colitis.
- D. Infliximab, a 5-aminosalicylate, that inhibits recruitment of neutrophils into inflamed tissue.
- E. All of the above.

10. A 40 year-old woman takes Ibuprofen 800 mg t.i.d. and Prednisone 20 mg daily to control her rheumatoid arthritis. She was recently diagnosed with a gastric ulcer by endoscopy. Biopsies from the ulcer demonstrated chronic inflammation. *H. pylori* was not present. A blood test was also negative for *H. pylori*. Each of the following is an appropriate treatment for her ulcer **EXCEPT**:

- A. Lansoprazole
- B. Misoprostol
- C. Prevpac (Amoxicillin, Clarithromycin, and Lansoprazole) for 2 weeks
- D. Switching from Ibuprofen to Tylenol once the ulcer has healed
- E. Carafate (sucralfate)



11. *Helicobacter pylori* infection is considered a risk factor for all of the following **EXCEPT**:

- A. Duodenal ulcers
- B. Gastric adenocarcinoma
- C. Autoimmune gastritis
- D. Gastric lymphoma

12. Each of the following is a clinically appropriate test for *H. pylori*, **EXCEPT**:

- A. Histological examination of an antral biopsy in a 45-year old man taking aspirin who has a bleeding duodenal ulcer
- B. Anti-*H. pylori* IgG several weeks after treating a patient with documented infection, to assess eradication
- C. *H. pylori* stool antigen test in a woman found to have a duodenal ulcer on upper GI barium series
- D. A non-radioactive C¹³-urea breath test in a young woman with a strong family history of gastric cancer
- E. Rapid urease test in a patient with a gastric MALT lymphoma

13. The effects of fasting on a patient with common rotavirus diarrhea include:

- A. Rapid repair of the intestinal mucosa
- B. Decreased turnover of intestinal mucosa leading to a shorter recovery time
- C. Possibly decreased symptoms but a prolonged recovery of the intestinal mucosa.
- D. Improved nutritional outcome in developing countries because so much of their food is contaminated anyway.

14. Which of the following statements describes motor function of the colon?

- A. The colon exhibits three contractile patterns: mixing movements, haustral migration and mass movements
- B. Adrenergic innervation to the colon inhibits spike frequency and inhibits contraction
- C. Vagal innervation provides cholinergic and noncholinergic excitatory stimuli to the colon.
- D. All of the above



15. All of the following statements about the treatment of autoimmune hepatitis are correct **EXCEPT**?

- A. If left untreated, 40% of patients die within 6 months
- B. Remission is rarely achieved within 12 months of treatment
- C. Once remission is achieved, relapse is relatively rare
- D. Typical maintenance treatment includes prednisone and azathioprine

Questions 16 - 17 refer to the following scenario:

A patient with dysphagia has the following barium swallow finding:



16. The mechanism of the underlying pathophysiology of this process includes:?

- A. Diminished vagal afferent signals
- B. Reduction or absence of inhibitory and excitatory intramural neurons of the smooth muscle of the esophagus
- C. Marked increased in collagen deposition in the mucosa
- D. Altered pain threshold with noxious stimuli

17. Definitive treatment of this patient could include which of the following:?

- A. Upper Endoscopy and electrocautery
- B. Use of tricyclic antidepressants
- C. Use of calcium channel blockers
- D. Pneumatic balloon dilation

18. Which statement about IgA is true?

- A. IgA utilizes the classic complement pathway to effect bacterial clearance.
- B. The serum IgA is similar to the IgA found in secretions.
- C. Patients with IgA deficiency are usually quite healthy.
- D. Secretory piece is added while the antibody is being manufactured in the plasma cell and is necessary for dimerization.
- E. Does not appear to prevent viral replication in the intestine.

19. All of the following statements are true **EXCEPT**?

- A. Prebiotics can lower serum cholesterol.
- B. Psyllium seed (Metamucil[®]) is a prebiotic.
- C. Probiotics are a non-digestible food ingredient used to stimulate the intestinal flora.
- D. Probiotics are often used to treat and prevent “pouchitis”.
- E. *Bifidobacteria*, an anaerobe, is often used as a probiotic.



20. “Councilman body” describes which of the following:?

- A. Ballooning change of hepatocytes
- B. Cholestasis or feathery degeneration of hepatocytes
- C. Iron accumulation in hepatocytes
- D. Apoptotic or dying hepatocyte
- E. Steatosis



21. Which of the following is NOT a cause of fatty change or hepatic steatosis?:

- A. Diabetes Mellitus
- B. Obesity
- C. Alcohol
- D. Hepatitis B
- E. Hepatitis C

22. The genetics of IBD suggest that:

- A. The NOD2/CARD 15 Gene is strongly associated with extraintestinal manifestations of the Ulcerative Colitis.
- B. We are close to identifying the specific gene that is responsible for ulcerative colitis.
- C. If two parents are carriers there is a 25% risk of any particular child having Crohn's disease.
- D. It is reasonable to believe that as we identify more important genetic determinants we will be able to predict the course and best therapy for patient.
- E. All of the above are correct

Questions 23 – 26 relate to the following scenario:

You are following a 34-year old male with a 16 -year history of Crohn's disease. The patient has had several small bowel resections and is known to have at least one blind loop. The patient was doing well on maintenance therapy with mesalamine (Asacol[®]) until this past week, when he experienced abdominal cramping and diarrhea. He is known to have ileal Crohn's disease. He abdominal exam reveals normal bowel sounds, and no evidence of tenderness or mass. His WBC is normal, his ESR is normal, stool is guaiac negative and X-rays do not suggest active inflammation.

23. The appropriate next step in management would be:

- A. Switch to a different mesalamine preparation (e.g. Pentasa[®])
- B. Trial of antibiotics
- C. Switch to budesonide at 9 mg/day for chronic/maintenance therapy
- D. Surgical referral for resection of the involved segments



24. The 5-aminosalicylates are useful in treating Inflammatory Bowel Disease because:

- A) They inhibit prostaglandin and leukotriene production.
- B) They decrease antibody secretion and lymphocyte function.
- C) They scavenge reactive oxygen species.
- D) They reduce neutrophil and macrophage chemotaxis.
- E) All of the above.

Eight months later he comes to your office for an acute visit. He complains of pain, fevers, nausea and vomiting. He is found to have significant tenderness and a right lower quadrant mass on physical exam. CT scanning shows evidence of a right lower quadrant abscess. He is admitted to the hospital and started on IV antibiotics. Percutaneous drainage of the abscess is attempted, but unsuccessful. He undergoes resection of the distal ileum (~120 cm.), the small bowel segment containing the blind loop, as well as the ileocecal valve. The surgeon feels that all of the active disease and strictured bowel has been resected.

Six weeks after discharge from the hospital, he comes to your office complaining of frequent loose stools. He has no fever or chills, and no abdominal discomfort, and a benign physical exam. His WBC is normal, his ESR is normal, stool is guaiac negative, stool WBC is negative, and stool for *C. Dificile* is negative.

25. The most appropriate treatment for his diarrhea at this time is:

- A. Colesevelam (or a similar drug like Cholestyramine)
- B. Remicade
- C. 6-Mercaptopurine
- D. Prednisone

26. Which part of a Schilling test performed on this patient would be normal?

- A. Part I (B12 alone)
- B. Part II (B12 + intrinsic factor)
- C. Part III (B12 + pancreatic enzymes)
- D. Part IV (B12 + antibiotics)
- E. None of the above



27. Ulcerative colitis is characterized by all of the following **EXCEPT**:

- A. Knifelike fissuring ulcerations in the colonic wall
- B. Primarily superficial involvement of the colonic mucosa
- C. Sparing of the terminal ileum
- D. Increased incidence of dysplasia in longstanding disease

28. Tumor Necrosis Factor-alpha (TNF- α) is believed to have an effect on Macrophages, Endothelium, Fibroblasts and Epithelium. Which of the following statements is correct?

- A. The proinflammatory cytokines released by the macrophages have not been shown to play a role in Crohn's disease
- B. The effect of TNF- α on fibroblasts could account for the therapeutic effect of anti-TNF- α on Crohn's fistula.
- C. The effects of TNF- α on endothelium and epithelium, although impressive, have no implications for the pathophysiology of inflammatory bowel disease.
- D. All of the above

29. All of the following are typical extraintestinal manifestations of Crohn's or Ulcerative Colitis **EXCEPT**?

- A. Uveitis
- B. Non-destructive arthritis of a major joint
- C. Destructive arthritis of the small joints
- D. Osteoporosis
- E. Erythema nodosum and pyoderma gangrenosum



30. A 55-year-old white female, a resident of Rhode Island, complains of mild itching which she has noticed over the past few months. Liver function test results show an elevated Alkaline phosphatase, normal transaminases and bilirubin. Serology: negative viral serologies,

and positive anti-mitochondrial antibody with a titer of 1:512. What is the most likely diagnosis and liver biopsy finding you would expect?

- A. Hepatitis C, portal lymphocytic infiltration
- B. Alcoholic hepatitis, Mallory's hyaline and steatosis
- C. Primary Biliary Cirrhosis, lymphocytic cholangitis
- D. Alpha-1 Antitrypsin deficiency, Eosinophilic globules
- E. Autoimmune hepatitis, interface hepatitis with plasma cells



31. Alcoholic liver disease manifests as:

- A. Alcoholic hepatitis
- B. Cirrhosis
- C. Steatosis or fatty change
- D. All of the above
- E. None of the above



32. Cimetidine and a calcium-containing antacid preparation administered in an appropriate dosage regimen for treating peptic ulcer differ in that:

- A. Only the calcium-containing antacid may increase gastric acid secretion.
- B. Only cimetidine is likely to cause an increase in urinary pH.
- C. Only cimetidine is likely to produce a laxative effect.
- D. Only the antacid is likely to block vagally-mediated increase in gastric acid secretion
- E. Only cimetidine can prevent the rise in gastric pH after the consumption of a meal.

Questions 33 – 36 refer to the following case scenario:

An 80-year old male developed dysphagia secondary to vocal cord paralysis following triple vessel coronary artery bypass grafting (CABG). On post-operative day 3 he was successfully weaned from the ventilator and extubated. Past medical history is significant for coronary artery disease, hypertension, history of TIA with RLE weakness. Following extubation he developed hoarseness, poor cough, and choking with oral intake. He was not short of breath. Physical examination findings: alert and oriented x 3; breathy, raspy voice; neurological/cranial nerves II-XII intact; strength 5/5 bilaterally. A swallowing evaluation demonstrated inability to initiate dry swallow, coughing, and regurgitation immediately after trials of puree and thin liquids, requiring suctioning. A modified barium swallow was obtained which demonstrated aspiration, and it was recommended that the patient remain NPO. Right vocal cord paralysis was confirmed by fiberoptic laryngoscopy. The condition could take 6 months or longer to resolve.

33. What type of enteral access should be placed for nutritional support?

- A. Nasogastric tube (NG)
- B. Postpyloric nasoenteric tube
- C. Percutaneous endoscopic gastrostomy (PEG)
- D. Surgically placed jejunostomy (JT)

34. What type of tube feeding formula is most appropriate?

- A. Polymeric, low residue diet
- B. Polymeric, fiber-containing diet
- C. Elemental, chemically defined diet
- D. Immuno-modulating diet

35. What type of feeding schedule would be most appropriate for this patient at home?

- A. Bolus, intermittent feedings of 4-5 meals per day
- B. 24-hour continuous feeding
- C. Gravity drip during daytime
- D. Cyclic, night-time infusions administered with feeding pump

36. What precautions can be taken to minimize aspiration risk with enteral feeding?

- A. Add blue dye to the enteral formula
- B. Feed patient only in the supine position
- C. Check gastric residuals and hold feedings if residual volume is > 150 ml
- D. Check pH of the fluid aspirated from tube



37. Which is considered the strongest risk factor for colorectal adenocarcinoma?

- A. Germline FAP mutation
- B. Twenty year history of ulcerative colitis
- C. Germline mutation in one of the DNA repair genes
- D. Hirschsprungs disease

Questions 38 - 41:

Match the following clinical situations with their corresponding tests/serologies:

38. Recent immigrant from Mainland China

39. American Medical student

40. IV Drug user

41. Obese Diabetic female

- A. HBsAg(+), HBeAg(+), HBsAb (-), HBcAb(+), AST 124, ALT 134
- B. HBsAg(+), HBeAg(-), HBsAb (-), HBcAb(+), AST 20, ALT 20
- C. HBsAg(-), HBsAb(-), HBcAb(-), AST 60, ALT 73
- D. HBsAg(-), HBsAb(+), HBcAb(-), AST 41, ALT 41



42. Which of the following statements about the treatment of hepatitis B is **NOT** correct?

- A. Entecavir is the most potent inhibitor of HBV replication currently in use
- B. Lamivudine resistance may reach 70% after 4 years of use
- C. HBeAg seroconversion is a useful therapeutic endpoint in HBeAg positive cases
- D. HBeAg negative cases are easier to treat compared to HBeAg positive cases
- E. Entecavir is less efficient if given after lamivudine resistance developed

43. All of the following statements about pancreatic secretion are true **EXCEPT**:

- A. Stimulation of the vagus nerve increases pancreatic bicarbonate and enzyme secretion.
- B. Secretin stimulates secretion of large quantities of pancreatic juice with high bicarbonate and low enzyme concentration.
- C. The primary function of the ductular cell is to secrete bicarbonate and water in the formation of pancreatic juice.
- D. Cholecystokinin potentiates the effect of secretin on pancreatic secretion.
- E. Pancreatic secretions activate pepsin in the bowel lumen.

44. Enzyme initially secreted as a proenzyme by the pancreas :

- A. Colipase
- B. Sterol esterase
- C. Amylase
- D. Carboxypeptidase
- E. Lipase



45. Stimulant laxatives such as senna are effective in the treatment of constipation because:

- A. They rapidly increase osmotic pressure of the small and large intestinal contents and thereby inhibit water absorption.
- B. They increase the bulk contents of the colon because they are indigestible.
- C. They inhibit sodium absorption and promote chloride excretion by the colonic mucosa, and increase colonic motility.
- D. They have an atropine-like effect on the colonic musculature.
- E. They antagonize the effect of PGE₂ on chloride flux in the colonic mucosa.

46. The effect of excluding a part of the small intestine from the dietary stream includes:

- A. Loss of bacterial colonization with resultant increase in the height and function of the excluded bowel.
- B. A decrease in the height and absorptive capacity of the excluded loop.
- C. A decrease in the height and absorptive capacity of the excluded loop that is readily repaired through intravenous feeding
- D. Differentiation of part of the colon into small intestine appearing and functioning mucosa.

Questions 47 - 51 pertain to the following case scenario:

A 45-year old female patient asks for dietary advice to decrease her risk of breast cancer. Her sister was recently diagnosed with breast cancer. Your patient is concerned because her diet has been similar to her sister's over the years and she thought it was healthy. She said that she eats lean chicken or fish for both lunch and dinner daily; she only eats red meat 1-2x month and primarily low fat cuts; she avoids as much dietary fat as she can; she eats salads most days and uses only low-fat or non-fat salad dressing. She does not like vegetables as much as fruit and she tries to eat about 3 pieces of fruit each day. To make up for the lack of vegetables in her diet, she

takes a beta-carotene pill daily. She is 65 in tall (165.1 cm), weighs 140 lbs (63.6 kg), and has a BMI = 23.4. She weighed about 120 when she graduated college.

47. What information would you provide for this patient regarding her body weight?

- A. Her body weight falls within the healthy BMI range. She should avoid weight gain.
- B. Although her body weight falls within a healthy BMI range, she has gained close to 22 lbs since young adulthood, which would increase risk of breast cancer. Suggest some weight loss or at least no further weight gain.
- C. Continue to eat the lower fat diet and see if she can lose some body weight.

What specific information would you provide regarding:

48. Her fruit and vegetable consumption?

- A. Increase her fruit consumption to 5 pieces per day as she is not eating sufficient vegetables.
- B. Explain to her that fruit has not been as consistently related to decreasing cancer risk as vegetables. She should try to eat more dark vegetables and cook them in extra virgin olive oil to help absorb the carotenoids.
- C. Dark fruits and vegetables are more related to lowering cancer risk. She should emphasize consumption of the darker produce.

49. The fat content of her diet?

- A. Continue to eat a diet as low in fat as possible as low-fat diets are consistently related to lowering cancer risk.
- B. Low fat diets are not consistently related to lowering cancer risk and too low a diet may increase risk. Extra virgin olive oil is a dietary fat associated with decreasing cancer risk. Suggest that she include some olive oil daily and use it to prepare her meals.
- C. Include some vegetable oils so that she does not experience essential fatty acid deficiency.

50. Her meat intake?

- A. Congratulate her on using primarily lean cuts of meat. Suggest that she continue this.
- B. Explain that meat has been shown to increase breast cancer risk. Suggest that she further decrease her meat consumption, either the quantity or frequency, and eat more meals that are mainly plant products.
- C. Explain that she needs to make sure that she is getting enough dietary protein each day so her meat servings should be at least 3-4 oz.

51. Her use of a beta-carotene supplement?

- A. Suggest that she continue to take the beta-carotene supplement if she will not eat vegetables.
- B. Suggest that she continue to take the beta-carotene supplement and also add a supplement of vitamin E. Both pills will help to decrease her risk of cancer.
- C. Explain that studies have not shown beta-carotene pills to be of benefit and that there is the potential for harm. Suggest that she stop taking the beta-carotene pill and start to eat dark vegetables. Explain that cooking the vegetables in olive oil will make them taste better and is needed to absorb the carotenoids.

Questions 52 – 54 refer to the following case scenario:

A 54-year old man presents for evaluation of ascites. Paracentesis is performed. Chemistry reveals the following:

Serum Albumin	3.1 mg/dl	(nl 3.5-5.2 G/dl)	Cytology:	Negative
Ascites Albumin	1.1 mg/dl			
Ascites WBC	110	(10% PMN's)		
Ascites RBC	2			

52. Which of the following statements is true?

- A. The labwork suggests that he has Spontaneous Bacterial Peritonitis
- B. The labwork suggests that he could have alcoholic cirrhosis
- C. The labwork suggests that he could have tuberculous peritonitis
- D. The labwork suggests that nephrotic syndrome may be the cause of his ascites

He is treated with 40 mg furosemide and 100 mg spironolactone daily. He presents several weeks later with increasing ascites and bilateral lower extremity swelling while on treatment. His abdomen is softly distended and non-tender. He has 1-2+ pitting edema to the mid-calf. He lives alone and eats primarily canned/prepared foods.

53. What is the next therapeutic step?

- A. Re-emphasize the importance of sodium restriction
- B. Consider transjugular intrahepatic portosystemic shunt (TIPS)
- C. Increase furosemide to 80 mg and spironolactone to 200 mg daily
- D. Start therapeutic paracentesis for refractory ascites

54. All of the following are associated with the formation of ascites in cirrhosis **EXCEPT**?

- A. Increased hydrostatic pressure
- B. Decreased colloid osmotic pressure

- C. Increased capillary permeability
- D. Decreased secretion of atrial natriuretic factor (ANF)
- E. Decreased lymphatic drainage




55. A 49-year-old woman has experienced gradually increasing malaise, icterus, and loss of appetite for the past 6 months. On physical examination, she has generalized jaundice and scleral icterus. She has mild right upper quadrant tenderness and the liver span is normal. Laboratory studies show total serum bilirubin of 7.8 mg/dL, AST 190 U/L, ALT 220 U/L, and alkaline phosphate 26 U/L. A liver biopsy is performed, and microscopic examination of the biopsy specimen shows piece meal necrosis of hepatocytes at the limiting plate, with portal bridging fibrosis and a mononuclear infiltrate in the portal tracts. These findings are most typical of which of the following conditions?

- A. HAV infection
- B. Congestive heart failure
- C. HCV infection
- D. Hemochromatosis
- E. Metastatic breast carcinoma

56. Which of the following statements about chronic pancreatitis is correct?:

- A. There is no role for acid suppression in the treatment of pain or malabsorption
- B. Coated pancreatic enzyme preparations are more effective for the treatment of malabsorption than uncoated preparations
- C. Degradation of CCK in the lumen by digestive enzymes helps to reduce the pain of chronic pancreatitis
- D. Malabsorption usually occurs after loss of 50% or more of the exocrine secretory capacity
- E. It is unusual for chronic alcoholics to have any evidence of pancreatic injury

57. A 50 year-old man presents with diarrhea and epigastric pain. He denies taking any medications at all. Multiple ulcers in the duodenal bulb are noted at endoscopy. His brother has previously been diagnosed with a pheochromocytoma and his mother has a history of medullary carcinoma of the thyroid. At endoscopy the pH of his gastric juice was 6. Which of the following statements is true?

- A. He should undergo secretin stimulation testing
 - B. Surreptitious NSAID use should be considered
 - C. A very high gastrin level would be diagnostic of an underlying gastrin-secreting tumor
 - D. Biopsies for *H. pylori* are unlikely to be helpful in his further management
 - E. A nuclear medicine scan for somatostatin receptors (Octreotide scan) is likely to be positive
58. Which of the following gastric cell types is *not* correctly associated with its secreted product?
- A. ECL cell: gastrin
 - B. Parietal cell: hydrochloric acid
 - C. D cell: somatostatin
 - D. Parietal cell: intrinsic factor
 - E. Chief cell: pepsinogen
59. The pathophysiology of inflammatory bowel disease (Crohn's disease and ulcerative colitis) includes which of the following
- A. Genetic factors
 - B. Environmental triggers
 - C. Immune dysregulation
 - D. All of the above
60. Motor function of the lower esophageal sphincter (LES) is characterized by:
- A. Tonic contraction mediated by the release of ACh from cholinergic nerves
 - B. Contraction in response to a swallow or to gastric distension
 - C. Relaxation mediated by release of nitric oxide from nonadrenergic, noncholinergic neurons.
 - D. All of the above
-  61. Ulcerative colitis is distinguished from Crohn's disease by all of the following **EXCEPT**: (1 pt)
- A. Continuous lesions vs. skip lesions
 - B. Involvement of the full thickness of the mucosa vs. superficial ulcers
 - C. Fissures
 - D. Fistula
 - E. Rectal involvement

62. Which of the following statements about fat and fat digestion/absorption is true?:

- A. Fat soluble vitamins are incorporated into mixed micelles and absorbed directly across the microvillus cell membrane
- B. Triglycerides are resynthesized from fatty acids and monoglyceride in the intestinal epithelial cell and are exported directly into the portal circulation
- C. Pancreatic lipase functions best at a pH of 3
- D. Colipase helps to cleave Prolipase to its active form

Questions 63 – 66 refer to the following case scenario:

A 43-year old male alcoholic patient with biopsy-proven hepatitis C and cirrhosis presents to the hospital with jaundice, massive ascites and significant peripheral edema, and melena. Several months earlier, he was found to have esophageal varices and was started on beta-blocker therapy. He is initially hypotensive, but responds to intravenous fluid. He is confused and is found to have asterixis. Endoscopy reveals bleeding esophageal varices, which are banded. Bleeding ceases. He is started on IV octreotide, and empirically treated with IV ciprofloxacin. He stabilizes. The octreotide and cipro are discontinued, and he is started back on his beta-blockers as well as diuretics and discharged from the hospital.

63. A likely clinical finding in this patient is:

- A. A wedged hepatic venous pressure gradient > 12 mm Hg
- B. Renal sodium wasting
- C. Normal platelet count
- D. Increased systemic vascular resistance

64. Octreotide is useful for treating acute variceal bleeding because:

- A. It causes splanchnic vasodilation
- B. It reduces gastric acid secretion
- C. It inhibits several GI peptides including glucagon and VIP
- D. It is very inexpensive

65. The probable underlying biochemical cause of his confusion is:

- A. Elevated ammonia (NH₃) in the bowel lumen and bloodstream
- B. Decreased central gamma-aminobutyric acid levels
- C. Increased levels of excitatory neurotransmitters
- D. Elevated levels of branched chain amino acids

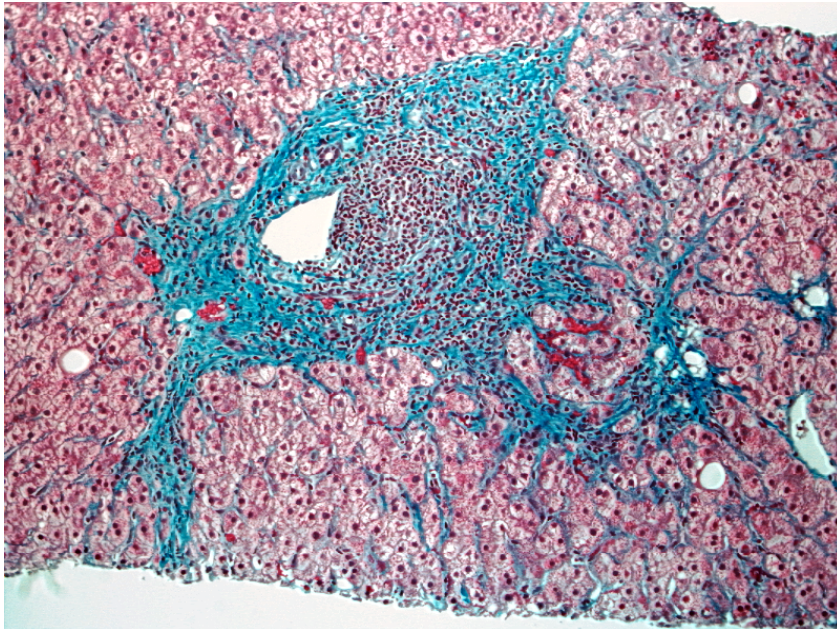


66. Indicate which of the following medications is **NOT** recommended in the treatment of hepatic encephalopathy:

- A. Rifaximine
- B. Metronidazole
- C. Lactulose
- D. Sorbitol
- E. Neomycin



Questions 67-69 refer to the following photomicrograph:



67. The liver biopsy shows the following pattern of injury:

- A. Periportal fibrosis
- B. Steatosis
- C. Central lobular necrosis
- D. Ascending cholangitis



68. This pattern is most consistent with a diagnosis of:

- A. Alcoholic liver disease
- B. Chronic viral hepatitis
- C. Acute hepatic necrosis



69. The blue stain represents:

- A. Inflammatory cells
- B. Hepatoma
- C. Bile
- D. Fibrosis

70. A newborn infant is found to be jaundiced. Total bilirubin is 4.2 mg/dl and the unconjugated fraction is 3.8 mg/dl. Transaminases are normal. The most likely contributor to his jaundice is:

- A. Absent uridine diphosphateglucuronide glucuronosyltransferase (UGT) activity
- B. Mutation of the BSEP gene
- C. Increased bilirubin load associated with premature red cell breakdown or hemolysis
- D. Decreased enterohepatic circulation secondary to a bile salt transport defect



Question 71 refers to the following photograph:



71. A 50-year-old man has severe abdominal pain over the past 2 days. Physical examination shows board-like rigidity of the abdominal muscles, preventing further examination. There is no abdominal distention. A representative gross appearance of the disease process is shown in the figure above. Which of the following is the mechanism most likely to produce this appearance?

- A. Cystic fibrosis gene mutation
- B. Dysregulation of trypsinogen inactivation
- C. Coxsackie B virus infection
- D. Blunt force trauma to the abdomen



72. Which of the following is the most predictable side effect of ribavirin?

- A. Mixed cryoglobulinemia
- B. Elastosis perforans serpiginosa
- C. Hemolytic anemia
- D. Thrombocytopenia
- E. Flu-like symptoms

Question 73 refers to the following case scenario:

A 65-year old woman is evaluated for anemia. Her past medical history is notable for a history of perforated duodenal ulcer with some type of repair. She is found to have a dimorphic population of cells on her smear, with some microcytes and macrocytes, as well as hypersegmented

polymorphonuclear cells. Review of systems reveals intermittent diarrhea and bloating. Physical exam was completely benign; stool was guaiac negative. Evaluation of the anemia reveals:

Folate	3.6 ng/ml	(nl 2 – 9 ng/ml)
Vit B12	165 pg/ml	(nl 230 - 900 pg/ml)
Iron	25 µg/ml	(nl 35-160 µg/ml)\
TIBC	450 µg/ml	(nl 245-400 µg/ml)
Ferritin	20 ng/ml	(nl 30-284 ng/ml)

She is sent for further evaluation. Additional studies are sent which reveal:

Fecal Fat	5.4 g/24 hr	(nl < 7 g/24 hr)
Schilling Test Part I	2% of Vit B12 excreted in urine/24 hours	(nl 7-28% excreted in urine/24 hours)
Schilling Test Part II	18% of Vit B12 excreted in urine/24 hours	
D-Xylose Test	50 mg/ml in blood sample at 2 hours	(nl > 40 mg/ml at 2 hours)
Anti-parietal cell Ab	< 2 I.U.	(nl < 20 I.U.)

73. The most likely diagnostic feature of the cause of her illness would be:

- A. Flattening/loss of gastric folds on an upper endoscopy with atrophy of the oxyntic glands
- B. Pancreatic calcifications on a plain flat plate of the abdomen
- C. Evidence of a Bilroth II anastomosis on an upper GI series with small bowel follow-through
- D. Blunting of the small intestinal villi, with elongation of the crypts and increased intra-epithelial lymphocytes

74. Which of the following statements about Barrett's Esophagus is true:

- A. Barrett's esophagus is most commonly seen in women
- B. Barrett's epithelium can be defined by the presence of intestinal metaplasia in the mucosa of the gastric cardia, adjacent to the distal esophagus
- C. Barrett's esophagus tends to involve skip areas through the proximal and mid-esophagus
- D. Barrett's esophagus with high-grade dysplasia requires aggressive surveillance and/or possible ablation or resection



75. The incidence of esophageal adenocarcinoma is:

- A. Greater in females than males
- B. Has been increasing in developed countries over the past 20 years
- C. More common than squamous cell carcinoma in developing countries
- D. Is directly associated with dietary salt content



76. Which of the following statements about esomeprazole is true:?

- A. It is metabolized extensively by cytochrome p450.
- B. It induces many drug-drug interactions.
- C. Peak plasma concentrations of esomeprazole are lower than omeprazole.
- D. It provides greater inhibition of stimulated gastric acid secretion than omeprazole.



77. GERD is treated with which of the following agents:

- A. Metoclopramide to inhibit transient lower esophageal sphincter relaxations
- B. Loxiglumide to enhance esophageal peristalsis and LES pressure
- C. Sulcrafate for cytoprotection
- D. Lansoprazole for acid suppression
- E. All of the above

78. A 64-year old male presents with dysphagia and weakness. He has difficulty in particular swallowing liquids, and coughs frequently whenever he eats. A modified barium swallow reveals poor food bolus formation and propagation, weakness of the pharyngeal constrictors, and occasional aspiration onswallowing . The most likely diagnosis is:

- A. Myasthenia Gravis
- B. Scleroderma
- C. Diffuse esophageal spasm
- D. Gastroesophageal Reflux Disease

79. Which of the following statements describes motor function of the small intestine?

- A. Segmentation movements are characteristic of small intestinal motor function in the fasting or interdigestive state.
- B. The fed pattern of small intestinal motility is not dependent upon extrinsic neural input.
- C. The migrating motor complex is characterized by three phases of activity ranging from quiescence to forceful propagating contraction.
- D. All of the above

80. Which of the following is true regarding gastric secretion?

- A. Somatostatin stimulates the gastric secretory response following a meal
- B. Basal acid output is mainly dependent on gastrin
- C. Amines stimulate gastrin release from gastric antral G cells
- D. Blocking H₂ receptors inhibits ECL cell function
- E. Removing vagal drive improves gastric emptying



81. Which of the following agents has both prokinetic and antiemetic properties:

- A. Bisacodyl
- B. Ranitidine
- C. Magnesium hydroxide
- D. Sucralfate
- E. Metoclopramide

82. Phasic contractions of gastrointestinal smooth muscle depend upon all of the following **EXCEPT:**

- A. Rhythmic slow wave potentials
- B. Generation of spike potential in association with slow waves
- C. Slow actin-myosin crossbridge cycling
- D. Elevation of cytosolic calcium levels.

83. A significant contributors to the pathogenesis of hepatocellular carcinoma in chronic hepatitis B infection is:

- A. Production of the HBx protein, a transcriptional transactivator
- B. Concurrent alcohol consumption

- C. Programmed cell death (apoptosis) of hepatocytes
- D. Integration of viral DNA into host mitochondrial DNA



84. Which of the following is the correct definition of sustained viral response in the treatment of chronic hepatitis C?

- A. Undetectable viral load 6 months after the completion of therapy
- B. Undetectable viral load at the completion of therapy
- C. At least 2 log decrease in viral load 6 months after the completion of therapy
- D. Normalized transaminase levels and undetectable viral load at the completion of therapy



Questions 85 – 89 (True/False)

Answer **true (A)** or **false (B)** for each of the following: (5 points each)



85. Low grade dysplasia in the esophagus may progress to high grade dysplasia or carcinoma for up to 10 years and thus requires intensive follow-up



86. Herpes simplex virus often infects the esophagus as an opportunistic infection in non-immunosuppressed patients



87. Extension into the lamina propria distinguishes adenocarcinoma of the stomach from high-grade dysplasia



88. *Helicobacter pylori* is a non-invasive spiral-shaped gram positive rod that infects the stomach and is a risk factor for peptic ulcer disease and carcinoma



89. Chronic gastritis is a wastebasket term for multiple etiologies including autoimmune disease caused by anti-parietal cell antibodies

90. All of the following statements about celiac disease are true **EXCEPT**?

- A. These patients must avoid grains such as buckwheat, sorghum and maize.
- B. Patients often have antibodies to transglutamate
- C. Many patients have antigliadin antibodies
- D. There is any increased incidence of intestinal lymphoma and esophageal cancer.
- E. Patients can have a higher incidence of insulin dependent diabetes and osteopenia.



91. Treatment of Irritable Bowel Syndrome includes which of the following?:

- A. Loperimide for constipation-predominant patients.
- B. Anticholinergic agents for pain and distension.
- C. Alosetron to enhance colonic transit and sensation.
- D. Tegaserod to inhibit small and large intestinal and colonic motility and slow colonic transit.
- E. All of the above.



92. Which of the following statements about antiemetic agents is correct?:

- A. Ondansetron is a D_2 antagonist that blocks dopaminergic receptors in the chemoreceptor trigger zone, and solitary tract nucleus.
- B. Metoclopramide is useful for patients treated with highly emetogenic anti neoplastic therapy because it antagonizes both D_2 and $5-HT_3$ receptors.
- C. Antihistamines, such as meclizine, are useful for patients treated with mild to moderate emetogenic chemotherapeutic agents like fluorouracil or methotrexate.
- D. Nabilone enhances the antiemetic efficacy of granisetron.



93. Known common risk factor for developing hepatic adenoma includes:

- A. Hepatitis A virus
- B. Hemochromatosis
- C. Aflatoxin
- D. Oral contraceptives
- E. Methotrexate

94. Drugs which cause isolated indirect (unconjugated) hyperbilirubinemia ,such as rifampicin or probenecid, probably cause jaundice by:

- A. Taking up binding sites on circulating albumin
- B. Down-regulating uridine diphosphate glucuronide glucuronosyltransferase (UGT) function
- C. Causing mutations of the phospholipid export pump (MDR3)
- D. Competitively inhibiting binding with ligandin, allowing back diffusion of unconjugated bilirubin into the sinusoids and bloodstream

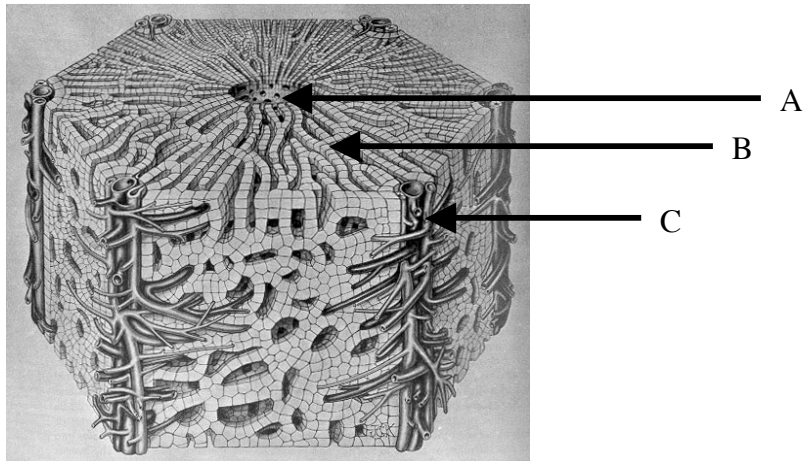
95. Which of the following sphincters relaxes in response to gastrointestinal hormones or neuropeptides?:

- A. Upper esophageal sphincter
- B. Diaphragmatic “external sphincter”
- C. Sphincter of Oddi
- D. External Anal Sphincter



Questions 96 – 100 refer to the following diagram:

Select a letter from the diagram of the liver that is associated with each of the following terms, conditions or locations. Each letter can be used more than once or not at all.



96. Location of damage with passive congestion (right-sided heart failure).



97. Site of inflammation during chronic viral hepatitis (HBV)



98. Lowest oxygen tension



99. Sinusoids



100. Affected by primary biliary cirrhosis