Warren Alpert Medical School of Brown University

Bio 351/280

Gastroenterology
Integrated Pathophysiology/Pharmacology
Systemic Pathology

Final Exam

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Questions 1-3 related to the following case scenario:
A forty-year old male who had been a heavy drinker for many years presented to his physician complaining of recurrent abdominal pain. The pain was intermittent at first but had now become continuous, was localized to the epigastric region, and radiated through to the back. He had lost weight over the past 2 years and was noted to be very thin. Sudan stain of the stool was positive. He was mildly hyperglycemic and had an elevated glucose tolerance test. A diagnostic test was performed with IV secretin.

1. The use of IV secretin in this case is to:
   A. Assess for associated alterations in serum gastrin level
   B. Determine insulin responsiveness to oral glucose
   C. Assess pancreatic exocrine function
   D. Determine pain management strategies

2. Additional stool samples are positive for undigested fecal fibers. This suggests that he has lost what degree of pancreatic function?
   A. 10-20%
   B. 40-50%
   C. 75%
   D. > 90%

3. A CT scan is performed to further evaluate his pain, and a 3 cm. pseudocyst with homogenous fluid is found in the tail of the pancreas. A few parenchymal calcifications are present, but the pancreatic duct appears normal.
   A. All pseudocysts must be surgically or endoscopically drained
   B. The pseudocyst must acquire an epithelial lining before drainage can be considered.
   C. His pain is caused by the pseudocyst and is not related to the pancreas itself
   D. Clinical monitoring with serial CT scans may be the most appropriate management for this patient

4. A 12-year old boy is referred to a genetic counselor for testing. He has had evidence of growth retardation and work-up reveals normal carbohydrate absorption and fat malabsorption. He has also had several bouts of bronchitis and one full-blown case of pneumonia over the past year. Sweat chloride testing is abnormal. Genetic testing might reveal:
   A. Alterations in chromosome 5q21 (APC) gene
   B. Mutations of the CFTR gene
   C. Mutation of the mismatch repair gene hMLH1
   D. Mutation of the CARD15/NOD 2 gene
5. After a bout of the “flu”, a 25-year-old man notices several painful 0.3-cm, clear vesicles on his upper lip. The vesicles rupture, leaving shallow, ulcers that heal over the course of 4 weeks without scarring. Several months later, after a skiing trip, similar vesicles develop, with the same pattern of healing. Which of the following findings is most likely to be associated with these lesions?

A. Positive serologic test for herpes simplex virus type 1
B. Biopsy showing squamous epithelial hyperkeratosis
C. Peripheral blood smear showing atypical lymphocytes
D. Cytologic scraping showing budding cells with pseudohyphae
E. Biopsy showing mononuclear inflammatory infiltrate

6. A 38-year-old man has had upper abdominal pain for 3 months. For the past week he has had nausea. On physical examination a stool sample tested for occult blood is positive. An upper GI endoscopy reveals no esophageal lesions, but there is a solitary 2 cm diameter shallow, sharply demarcated ulceration of the stomach. Which of the following statements regarding this lesion is most appropriate?

A. It is probably located in the antrum
B. It is probably malignant
C. It is probably associated with increased gastric acid production.
D. Because of its small size, a biopsy is not necessary
E. A gastrinoma of the pancreas is probably present

7. Which of the following is NOT a complication of a gastric ulcer:

A. Hemorrhage
B. Peritonitis
C. Barrett's esophagus
D. Pyloric stenosis
E. Penetration into the omentum

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

A. The magnesium-containing antacid may increase gastric acid secretion if it is not
formulated in combination with an aluminum salt.
B. Cimetidine is likely to cause an increase in urinary pH.
C. **The magnesium-containing antacid is likely to produce a laxative effect if it is not formulated in combination with an aluminum salt.**
D. The antacid is likely to block vagally-mediated increase in gastric acid secretion
E. Cimetidine can prevent the rise in gastric pH after the consumption of a meal.

Questions 9-10 refer to the following scenario:
A 33-year old woman presents for evaluation of symptoms of at least 2 years duration. She notes intermittent diarrhea, lasting several days, alternating with several days of constipation, most days of most weeks. Her weight has been stable. Her appetite is good. She does have some crampy abdominal pain primarily in the left lower quadrant, usually relieved by a bowel movement. She has no nocturnal symptoms. Physical examination, CBC, ESR, Stool cultures, stool for ova and parasites, stool for occult blood, stool for WBC’s, stool for fecal fat, and thyroid function studies are normal. Colonoscopy reveals scattered a few diverticuli in the sigmoid colon but is otherwise unremarkable.

9. The most appropriate course of action at this time might be to:

A. Start Prednisone  
B. Start oral antibiotics covering for gram negative enteric flora  
C. **Start fibre and increase her fluid intake**  
D. Start a 5-HT3 antagonist such as odansetron

10. A process which may contribute to her illness might be:

A. Small hard stools with high pressure in the colon lumen  
B. **Inadequate activation of regions of the brain associated with antinociception**  
C. CARD15/NOD2 gene mutation  
D. Hypoperfusion of the affected region of bowel

11. A 24-year-old male Brown medical student tests his stool for *H. pylori* using the stool antigen test and finds a positive result. All of the following are true about this discovery **EXCEPT:**?

A. The lifetime chance of developing a peptic ulcer is 10%  
B. Most likely he acquired this infection as a baby  
C. It is still safe for him to shake hands with his professors  
D. **He has a 1 in 20 chance of developing gastric cancer**  
E. The causative organism expresses urease, catalase and oxidase enzymes
12. A 54-year-old man has complained for 5 months of upper abdominal pain accompanied by nausea. He does not have hematemesis. On physical examination the only finding is a stool sample positive for occult blood. Upper GI endoscopy is performed and gastric biopsies are taken. On microscopic examination the biopsies reveal acute and chronic mucosal inflammation along with the presence of *Helicobacter pylori* organisms. The presence of these organisms is most likely to be associated with which of the following?

A. Mucosal invasion with septicemia  
B. **Duodenal peptic ulceration**  
C. Development of pernicious anemia  
D. Hypochlorhydria with atrophic gastritis

13. Which of the following statements regarding treatment of *H. pylori* infection are true:

A. Proton pump inhibitors are administered twice daily.  
B. Two or three different antimicrobial agents are administered 2 to 4 times daily  
C. Bismuth-containing compounds provide some antimicrobial activity.  
D. Fourteen days of treatment is superior to 10 days of treatment for eradication of *H pylori*.  
E. **All of the above**

14. All of the following statements are true **EXCEPT**:

A. The pH of the stomach is lowest during the night  
B. **Intrinsic factor is secreted by gastric D cells**  
C. Mucous and bicarbonate are secreted by glandular surface mucosal cells  
D. Proton pump inhibitors at standard doses keep the gastric pH around 4 to 6.  
E. Gastrin is synthesized as a large molecule and then cleaved into smaller biologically active fragments

Questions 15–16 refer to the following scenario:
A 52-year old woman is referred for evaluation of abnormal liver function tests that were found as part of a comprehensive physical examination. She is overweight and has non-insulin requiring diabetes. Physical exam is unremarkable. She may have one or two glasses of wine on the weekends, but denies other alcohol use. Lab results are as follows:
Bilirubin: 1.1 mg/dl (0.2 – 1.2)
ALT: 83 U/L (7 – 40)
AST: 77 U/L (7 – 40)
Alk Phos: 127 U/L (30-115)

Hepatitis A IgG (+); Hepatitis A IgM (-)
Hepatitis BsAg, BsAb, BcAb all (-)
Hepatitis C Antibody (+); Hepatitis C PCR (-)

ANA 1:20 (Normal ≤ 1:20)
Anti-Smooth muscle Antibody (-)
Ceruloplasmin, Iron studies, alpha-1-antitrypsin are all normal

15. The most likely diagnosis is:
   A. Non-alcoholic steatohepatitis
   B. Hepatitis A
   C. Hepatitis C
   D. Autoimmune Hepatitis

16. The most appropriate course of therapy would be:
   A. Gamma-globulin
   B. Alpha-interferon
   C. Switch to long-acting insulin to manage her diabetes
   D. Weight loss
   E. Prednisone

Questions 17 – 21. Please match the following. (This question will be counted as 1 pt, each match in the list below counts as 0.2 pts). Each letter should be used once.

17. Alcoholic hepatitis
18. Wilson’s disease
19. Alpha-1 antitrypsin deficiency
20. Hepatitis B
21. Hemochromatosis

A. Ground glass inclusion
B. Diabetes, cirrhosis, cardiac failure
C. Mallory’s hyaline
D. Low serum ceruloplasmin
E. Repeated infections, emphysema

Answers:

22. Marker of severe acute pancreatitis:
23. Gut peptides have which of the following physiologic actions?:

A. Peptides may be present in presynaptic nerve terminals or endocrine cells, but never both
B. **Gut peptides may be detected circulating in the blood**
C. The actions of neuropeptides can be elicited by intravenous infusion of the peptide
D. The effects of a hormonal peptide cannot be antagonized at the receptor level

24. Which of the following statements about hepatic adenoma is CORRECT?

A. More common in males
B. Contains a central stellate scar
C. Associated with cirrhotic liver
D. **Risk of rupture and fatal hemorrhage is present**
E. High rate of malignant transformation

25. During phase III of the migrating motor complex (MMC), which of the following occurs?:

A. The fundus receptively relaxes
B. The pylorus contracts to prevent gastric emptying and allow grinding of gastric contents
C. **Contractions propagate indigestible material from the stomach into the small bowel**
D. Contractions become unorganized and non-propagated

26. Loperamide and diphenoxylate are like morphine in that a single therapeutic dose of each produces:

A. Analgesia.
B. **Slowed transit of intestinal contents.**
C. More rapid gastric emptying.
D. Euphoria.
E. Increased colonic secretion of chloride ion.

27. All of the following statements about intestinal flatus are true EXCEPT:

   A. It often contains considerable oxygen in habitual air swallowers
   B. It can have an unpleasant odor from hydrogen sulfide and other sulfur containing compounds
   C. It consists mainly of nitrogen
   D. It contributes to global warming
   E. It can be explosive when cautery is used at the time of colonoscopy

28. A 78-year-old woman with a previous history of a peptic ulcer that bled comes to see you because she has developed dyspepsia while taking ibuprofen. All of the following are reasonable choices EXCEPT:

   A. Test for *H. pylori* and eradicate if present
   B. Consider switching to a COX-2 selective non-steroidal anti-inflammatory drug
   C. Co-prescribe a proton pump inhibitor
   D. Perform endoscopy
   E. Screen her family members for peptic ulcer disease

29. Both famotidine and cimetidine are likely to:

   A. Cause constipation.
   B. Inhibit both basal (fasting) acid secretion and acid secretion stimulated by food.
   C. Inhibit the cytochrome p450-mediated metabolism of some drugs.
   D. Irreversibly inactivate the H⁺ K⁺ ATPase of the parietal cell
   E. Enhance gastrointestinal motility.

30. A 47 year-old male with a previous history of a parathyroid adenoma comes to see you because he has developed severe epigastric pain despite taking Maalox®. Routine laboratory investigations are normal with the exception of an elevated serum calcium (serum albumin level is normal). Which of the following statements is NOT TRUE?

   A. Family history may be important
   B. Diarrhea is likely related to antacid consumption
   C. He should be tested for visual field defects
D. Fasting secretin levels are not typically elevated
E. The responsible gene is on chromosome 11

31. A 70-year old woman presents to her physician complaining of fatigue and dyspnea on exertion. She is found to be anemic, with an elevated MCV, and a dimorphic population of cells (microcytic and macrocytic). A few hypersegmented PMN’s are also seen. Gastric biopsies would be most like to show the absence of which cell type?

A. Mucous neck cells
B. Chief cells
C. Parietal cells
D. G cells
E. Goblet cells

32. Which of the following statements about intrinsic factor is correct?

A. It is hydrolyzed by pepsin
B. Intrinsic factor-vitamin B12 binding is inhibited by an alkaline pH
C. It is secreted by the chief cells of the gastric mucosa
D. It is hydrolyzed by pepsin
E. It has a lower binding affinity for vitamin B12 than the salivary R protein (Haptocorrin)

Questions 33-34 related to the following case scenario:
A 42-year old woman has noted dysphagia to solid and more recently liquids. A barium swallow is obtained and shows the following:
33. The underlying pathophysiology of this process involves:

A. Increased activity of excitatory cholinergic fibers
B. Reduction or absence of inhibitory intramural neurons of the smooth muscle of the esophagus
C. Marked increased in collagen and collagen matrix deposition throughout
D. A strong genetic component with increased intra-familial risk

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

A. Pyloroplasty
B. Use of metoclopramide to enhance contractility
C. Use of calcium channel blockers
D. Laparoscopic myotomy of the lower esophageal sphincter

35. A 53-year old male with Laennec’s cirrhosis presents with worsening abdominal distension, fatigue, and shortness of breath. He is found to have “shifting dullness” on abdominal exam. Factors which may contribute to this process include:

A. Increased hydrostatic pressure in splanchnic capillary beds
B. Increased renal sodium excretion
C. Increased plasma oncotic pressure
D. Decreased plasma catecholamines
36. Alcoholic hepatitis is associated with which of the following morphological change?

A. Steatosis  
B. Ballooning degeneration  
C. Mallory’s hyaline  
D. Neutrophilic inflammation  
E. All of the above

37. Hepatic encephalopathy can be improved by which of the following?:

A. Colonic acidification  
B. Gastrointestinal bleeding  
C. Renal failure  
D. Constipation

Questions 38-39 relate to the following vignette:  
A 41-year old obese woman notes intermittent abdominal pain, primarily in the right upper quadrant. She has a rather benign past medical history, and her review of systems is otherwise negative. She has had four children. The pain is most commonly exacerbated by eating a fatty meal.

38. The hormone most likely associated with the increase in her symptoms after a meal is:

A. Gastrin  
B. Cholesystokinin  
C. Pepsin  
D. Secretion  
E. Peptide YY

39. The most likely contributor to her problem is:

A. Hemolysis  
B. Parasitic infection of the biliary tree  
C. Excess hepatic secretion of cholesterol into the bile  
D. Increased bile salt secretion into the bile

40. Physiologic effects of Cholecystokinin include which of the following?: 
A. Promotes gallbladder relaxation/accomodation
B. Promotes Sphincter of Oddi relaxation
C. **Potentiates the effects of Secretin**
D. Increases gastric acid secretion

41. A 55-year-old man has developed abdominal pain and jaundice over a period of several weeks. On physical examination, there is right upper quadrant pain but no abdominal distention. An abdominal CT scan shows a markedly thickened gallbladder wall. A cholecystectomy is performed, and sectioning shows a slightly enlarged gallbladder containing a fungating, 4X7 cm firm, lobulated, tan mass. Which of the following findings is most likely associated with this mass?

   A. Amebic dysentery
   B. Ulcerative colitis
   C. Clonorchis sinensis infection
   D. Primary sclerosing cholangitis
   E. Cholelithiasis

42. A nurse presents to employee health complaining of nausea, fatigue, and relatively acute onset of jaundice. She recalls a needle stick injury approximately 6 weeks ago that she did not report. The source patient may have had hepatitis C. The best test to diagnose acute Hepatitis C in this patient would be:

   A. First generation Hepatitis C ELISA
   B. Second generation Hepatitis C ELISA
   C. Hepatitis C RIBA Assay
   D. **Hepatitis C RNA by PCR**

43. The normal pylorus, antrum, and duodenum work in a coordinated fashion. The normal mechanisms lead to which of the following:

   A. **Material passing into the duodenum is < 2 mm in size**
   B. Indigestible material is ground in the antrum and passed into the duodenum during the digestive phase
   C. Hypertonic material passing into the duodenum accelerates gastric emptying
   D. Fat in the stomach accelerates gastric emptying

44. Which statement about the enterohepatic circulation of bile salts is true?

   A. The bile salt pool is recirculated only at each meal
   B. In the normal individual, 50% of the bile salt pool must be resynthesized and
replaced daily
C. The rate of bile salt synthesis is subject to feedback inhibition, inversely proportionate to the amount of bile salts resorbed
D. Bile salts are stored and diluted in the gallbladder

45. Peptide which plays a role in stimulating appetite:
   A. Leptin
   B. Gherlin
   C. CCK
   D. PYY

46. Pancreatic lipase requires which of the following for efficient action?:
   A. Emulsification of fats by bile salts
   B. Activation by enterokinase
   C. pH of the lumen < 3
   D. Intact villi/small bowel brush border

Questions 47-48 refer to the following photomicrographs:

47. The histologic pattern in (A) on the left shows which of the following features:
   A. Pancreas with saponification and pseudocyst formation
   B. Pancreatic ductal carcinoma with aggressive invasion and desmoplastic response
   C. Pancreas with extensive fibrosis and atrophy with only residual ducts and one islet, and a sprinkling of a few isolated acinar and chronic
inflammatory cells
D. Pancreas with acute inflammation, hemorrhage, and fat necrosis

48. The histologic image on the right (B) is an example of:

A. **Inspissated eosinophilic ductal secretions consistent with chronic alcoholism**
B. A 10 cm pseudocyst after an episode of acute pancreatitis
C. A necrotic islet
D. Ascending cholangitis
E. Pancreatic adenocarcinoma

49. In Hirschsprung’s disease, distension of the rectum will cause:

A. Reflex contraction of the external anal sphincter
B. Reflex relaxation of the internal anal sphincter
C. Rebound contraction of both the internal and external sphincters
D. Retrograde mass movement in the direction of the proximal colon
E. **None of the above**

50. Marker of severe acute pancreatitis:

A. Elevated serum Amylase
B. Elevated serum Lipase
C. **Intravascular volume depletion and metabolic acidosis**
D. Pancreatic edema on CT scan

Questions 51-52 refer to the following scenario:
A 64-year old woman presents to her physician complaining of dyspepsia. Her only medication is naproxyn sodium, which she takes for osteoarthritis. She has never had any surgery. Esophagastroduodenoscopy reveals ulcerations at the bulb and second portion of the duodenum. pH of the gastric fluid is 7.5. A fasting gastrin level is drawn the next morning, and returns at 1200 pg/ml.

51. The best explanation for her elevated gastrin level is:

A. Drawing the gastrin level after distension of the stomach
B. Zollinger-Ellison Syndrome
C. **Atrophic gastritis**
D. Somatostatinoma
E. Starting PPI therapy on the day of the endoscopy
52. Gastric biopsies from this patient would be most consistent with which photomicrographs?

A. A and C
B. B and C
C. A and B
D. Not present on any image
E. Present on all three images

53. All of the following statements about the intestinal M-cell are true EXCEPT:

A. It is found overlying colonic lymph follicles
B. It usually contains abundant lysozymes
C. It is usually devoid of microvilli
D. It appears to arise from undifferentiated stem cells near the bottom of intestinal crypts
E. It appears to facilitate passage of bacteria, viruses, and other macromolecules through the intestinal mucosa

54. Contributor to immune tolerance in the gut:

A. Mature/activated dendritic cells
B. TH2 immune response
C. Absence of costimulatory factors during antigen presentation
D. Effect of ZOT or zonulin on the zona occludens
E. Parenteral exposure to antigens

Question 55 refers to the following photomicrograph:
55. The above histological changes are associated with which of the following diseases:

A. Esophageal varices  
B. Alcoholism  
C. Chronic Hepatitis B infection  
D. All of the above  
E. None of the above

Questions 56-57 refer to the following scenario:
A 23-year old medical student was experimenting in the lab. He measured his immunoglobulin levels and found that his serum IgA level was below the limit of detection.

56. Which of the following is true about secretory IgA?

A. It is usually secreted as a monomer  
B. Secretory piece binds to the Fc or constant domain of the IgA molecule  
C. Secretory IgA activates the classical complement pathway  
D. Secretory IgA prevents colonization and invasion by viruses and bacteria

57. The medical student should be told that:
A. **He is not at significant risk of developing infections because of secreted IgM**
B. He needs gamma globulin injections
C. He is at significant risk for developing celiac disease
D. This condition is exceedingly rare and he probably made a mistake when performing the assay

58. Effect of probiotics on the immune response:

A. Decrease innate immunity
B. **Generation of anti-inflammatory cytokines**
C. Increased colonization by pathogenic bacteria
D. Induction of IgG antibody production

59. Water in feces is:

A. Predominantly free water, not absorbed from the gut lumen
B. Approximately 25% of the total stool weight
C. Bound primarily to dietary fiber
D. **Contained primarily within the fecal bacterial load**

60. An icteric patient with sickle cell disease might be expected to have:

A. Bilirubinuria
B. Absence of urinary urobilinogen
C. Cholesterol stones
D. **Unconjugated hyperbilirubinemia**

61. Which of the following statements is true?

A. Prebiotics can raise serum cholesterol.
B. Psyllium seed (Metamucil®) is a probiotic.
C. **Prebiotics are a non-digestible food ingredient used to stimulate the intestinal flora.**
D. Probiotics are often used to treat and prevent Crohn’s disease.
E. *Bifidobacteria*, an aerobe, is often used as a probiotic.

Questions 62 – 66. Match the following with the correct laboratory abnormalities
62. C282Y mutation  A. Chronic hepatitis B
63. IgM antibody to HAV  B. Autoimmune hepatitis
64. Positive HBsAg, IgG core antibody  C. Hemochromatosis
65. Anti-nuclear antibody, transaminitis  D. Successful hepatitis B vaccination
66. Antibody to Hepatitis B surface antigen  E. Acute Hepatitis A

Answers:

67. A 37-year old female nurse presents complaining of several months of large volume, watery diarrhea. Stool cultures, stool for ova & parasites, stool WBC are all negative. Her weight has been stable. Family history is negative. Flexible sigmoidoscopy is negative.

Stool electrolytes reveal the following:

\[ \text{Na}^+ = 80 \text{ mEq/L} \quad \text{K}^+ = 60 \text{ mEq/L} \quad \text{Stool Osmolarity} = 285 \text{ mOsm/kg H}_2\text{O} \]

(Normal Serum Osmolarity = ~ 285-295 mOsm/kg H\(_2\)O)

The likely mechanism of her diarrhea is:

A. **Secretory diarrhea**
B. Osmotic diarrhea caused by a non-absorbable substance
C. Inflammatory diarrhea
D. Factitious diarrhea

68. Normal gut luminal bacteria inhibit pathogenic bacteria by which of the following mechanisms?:

A. Increased luminal oxygen tension
B. Production of cyclohexamine, which is toxic to pathogenic bacteria
C. Promoting bacterial adherence
D. **Degradation of bacterial toxins**

69. A patient is evaluated for dysphagia. Barium swallow shows pooling of contrast in the valleculae, poor clearance of the pharynx, and rare, silent aspiration. Contrast that passes into the mid- and distal-esophagus appears to transit appropriately. The most consistent diagnosis is:
A. Scleroderma-like motility disorder  
B. Achalasia  
C. Amyotrophic lateral sclerosis  
D. Diffuse esophageal spasm

70. A 58-year-old man has had increasing difficulty swallowing for the past 6 months. He has lost 5 kg in the past 2 months. No abnormal physical examination findings are noted. Upper GI endoscopy reveals a nearly circumferential mass with overlying ulceration in the mid esophageal region. Biopsy of the mass reveals pink polygonal cells with marked hyperchromatism and pleomorphism. Which of the following is the most likely risk factor for development of his disease?

A. Iron deficiency  
B. Helicobacter pylori infection  
C. Chronic alcoholism  
D. High fruit diet

71. A 27-year-old male presents with diarrhea and abdominal cramping. He is finishing a course of amoxicillin for sinusitis. Factors which may contribute to his diarrhea include:

A. Overgrowth of non-pathogenic bacteria  
B. Parasympathetomimetic activity of the antibiotic  
C. Impaired carbohydrate metabolism in the colon  
D. Reduced brush border disaccharidases

72. A 25-year-old man complains of a low volume but chronic, foul smelling diarrhea for the past year. He has no nausea or vomiting. On physical examination there is no abdominal pain or masses and bowel sounds are present. His stool is negative for occult blood. Laboratory studies include a quantitative stool fat of 10 g/day. Upper GI endoscopy is performed with biopsies of the duodenum. The biopsies reveal the absence of villi, increased surface intraepithelial lymphocytes, and hyperplastic appearing crypts. Which of the following therapies is most likely to be useful for this man?

A. Antibiotics  
B. Gluten-free diet  
C. Selective vagotomy  
D. Corticosteroids  
E. Segmental duodenal resection
73. 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 PGE$_2$ on chloride flux in the colonic mucosa.

74. Which of the following statements about stool wetting agents are true:

A. They act as surfactants to lower the surface tension of stool.
B. They soften the stool by mixing aqueous and fatty substances
C. They stimulate intestinal fluid and electrolyte secretion, by increasing cAMP and altering intestinal mucosal permeability.
D. They interfere with the absorption of fat soluble substances like vitamins.
E. All of the above.

75. Which of the following statements describes motor function of the stomach?:

A. The pacemaker in the antrum of the stomach determines the frequency, velocity and direction of the phasic contractions of the antral pump.
B. Phasic contractions of the corpus provide a grinding and retropulsive force that breaks down food particles.
C. Delivery of a high calorie meal to the small intestine contracts the antrum and decreases the tonic contraction of the corpus.
D. All of the above

76. Motor function of the gastric reservoir is characterized by?:

A. Receptive relaxation in response to a swallow
B. Adaptive relaxation due to gastric distension
C. Decreased tonic contraction due to the delivery of lipids to the duodenum  
D. All of the above

77. Pancreas divisum:
A. Is a common post-ERCP complication  
B. Requires surgical revision, even if symptomatic  
C. **Is a congenital anomaly which may increase the risk of pancreatitis**  
D. Causes a common channel with the common bile duct

78. A primary mechanism by which castor oil induces laxation is:
A. It stimulates sodium absorption, inhibits chloride excretion by the colonic mucosa, and decreases colonic motility.  
B. It acts as an osmotic agent to increase luminal retention of water, as does magnesium hydroxide.  
C. **After hydrolysis to ricinoleic acid, it decreases the net absorption of water and electrolytes by intestinal mucosal cells and stimulates colonic motility.**  
D. It increases the bulk content of the small intestine.  
E. It decreases the synthesis of PGE2 in the intestinal mucosa.

79. Which of the following statements describes motor function of the colon?:  
A. Vagal innervation provides cholinergic and noncholinergic inhibitory stimuli to the colon.  
B. **The colon exhibits three contractile patterns: mixing movements, haustral migration and mass movements**  
C. Adrenergic innervation to the colon stimulates spike frequency and stimulates contraction  
D. All of the above

80. A 23-year old woman complains of several months of non-bloody diarrhea and flatulence. She has lost 12 pounds during this time. Stool Wright stain (for WBC) is negative. Stool sudan stain (fecal fat) is positive. Breath hydrogen testing with lactose shows a late peak in breath hydrogen excretion. D-xylose test shows diminished excretion of D-xylose in the urine at 5 hours. The most appropriate next test would be:
A. Secretin stimulation test to assess pancreatic exocrine function
B. Anti-Endomysial or Tissue Transglutaminase assay
C. Colonoscopy to exclude ulcerative colitis
D. Serum VIP level

81. 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

82. Which of the following defects is responsible for the acid reflux in patients with gastro-esophageal reflux disease

A. Hiatus hernia
B. Gastric acid
C. Lower esophageal sphincter weakness
D. Transient lower esophageal sphincter relaxation
E. All of the above

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

A. Metoclopramide to inhibit transient lower esophageal sphincter relaxations
B. Baclofen to enhance esophageal peristalsis and LES pressure
C. Bismuth-containing compounds for cytoprotection
D. Esomeprazole for acid suppression
E. All of the above

84. Which layer is typically thickened in reflux esophagitis?

A. Basal layer of the epithelium
B. Keratin layer of the epithelium
C. Muscularis mucosae
D. Spiny layer of the epithelium
E. Venous muscular tunic
85. What is the preferred location for a transnasal enteric feeding tube in a patient with delayed gastric emptying?

A. Stomach
B. Duodenum
C. **Jejunum**
D. Ileum

86. A polymeric formula should be prescribed for a patient who requires tube feeding who has:

A. Pancreatic insufficiency
B. Malabsorption
C. **Intact gastrointestinal tract**
D. Short bowel syndrome

87. A patient undergoes colonoscopic examination for hematochezia. A polyp is identified within the colon and resected. Which of the following diagnoses for the polyp is associated with the greatest need for continued periodic screening by colonoscopy?

A. **Tubular adenoma**
B. Hyperplastic polyp
C. Juvenile polyp
D. Hamartomatous polyp
E. Inflammatory pseudopolyp

88. Treatment of Irritable Bowel Syndrome includes:

A. Loperamide for treatment of pain and bloating.
B. Alosetron for treatment of constipation-predominant patients.
C. Tegaserod to inhibit small bowel and colonic transit
D. **Anticholinergics and antidepressants for treatment of pain and distention.**
E. All of the above

89. A 70-year old otherwise very healthy male is admitted to the Oncology service for treatment of carcinoma of the body of the pancreas. He develops acute upper
gastrointestinal bleeding, and is found to have gastric varices on upper endoscopy. CT scan shows the pancreatic tumor, and adjacent splenic vein thrombosis. Which of the following is correct?

A. His wedged hepatic venous pressure (WHVP) gradient is > 12 mm Hg
B. Placement of a TIPSS will reduce his risk of recurrent variceal bleeding
C. Diuretics and beta-blockers will reduce his risk of recurrent hemorrhage
D. Splenectomy may be required to prevent recurrent bleeding

90. Which of the following agents is not useful in the treatment of chemotherapy-induced vomiting?:

A. Dexamethasone.
B. Meclizine
C. Odansetron.
D. Haloperidol
E. Dronabinol

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

A. Granisetron is a D₂ antagonist that blocks dopamine receptors in the chemo-receptor trigger zone, and solitary tract nucleus.
B. Metoclopramide is useful for patients treated with highly emetogenic anti-neoplastic therapy because it antagonizes both D₂ and 5-HT₃ receptors.
C. Diphenhydramine is useful for patients treated with mild to moderate emetogenic chemotherapeutic agents like fluorouracil or methotrexate.
D. Dexamethasone enhances the antiemetic efficacy of meclizine.

Questions 92 - 95 refer to the following scenario:
You are a lab technician working in a liver disease clinic. Unfortunately, the labels have come off of the blood samples drawn that day. You must match sets of LFT’s to the specific patient diseases:

[Normal values: Bili 0.2-1.2 mg/dl, Alk Phos 30-115 U/L; SGOT (AST) = 7-40 U/L; SGPT (ALT) = 7-40 U/L]
92. Carcinoma of the head of the pancreas  

A. Bili = 1.2, Alk Phos = 117  
   AST = 42  ALT = 45

93. Acute Hepatitis B  

B. Bili = 13.1, Alk Phos = 133  
   AST = 445  ALT = 532

94. Chronic Hepatitis C  

C. Bili = 6.5, Alk Phos = 453  
   AST = 64  ALT = 85

95. Primary Biliary Cirrhosis  

D. Bili = 1.8, Alk Phos = 221  
   AST = 42  ALT = 44

92-C, 93-B, 94-A, 95-D

96. In the differential diagnosis between ulcerative colitis and Crohn’s disease the following is least relevant:

A. Small intestinal involvement  
B. Skip lesions  
C. **Chronic anemia**  
D. Vitamin B12 deficiency

97. Which of the following statements regarding the use of the 5-aminosalicylates for the treatment of Inflammatory Bowel Disease is true?:

A. Therapeutic effects of the 5-aminosalicylates are not seen until 3, 4 or more months of therapy.  
B. They decrease production of proinflammatory cytokines possibly by decreasing the nuclear translocation of NF-kB.  
C. **They are effective for use in mild to moderate disease and as maintenance therapy.**  
D. The side effects of the sulfa –containing sulfasalazine are not dose-related and are due to a hypersensitivity reaction.

98. Which of the following is felt to be causal in inflammatory bowel disease?:

A. Anxiety
99. Treatment of Inflammatory Bowel Disease includes:

A. Azathioprine and 6-mercaptopurine for treatment of acute flares of Crohn’s Disease and Ulcerative colitis.
B. Cyclosporin for treatment of select Crohn’s and Ulcerative colitis patients with severe, acute flares unresponsive to other therapies.
C. Methotrexate, an immunomodulator, for initial therapy 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.

100. Which of the following statements regarding treatment of Inflammatory Bowel Disease is true:

A. The activities of the enzymes that biotransform the thiopurine derivatives vary among individuals and determines the therapeutic response and side effects of these agents.
B. Budesonide, a new corticosteroid administered as an enteric-coated agent for oral delivery to the ileum has few systemic side effects due to first pass metabolism in the liver.
C. Mesalamine is formulated in coated granules that release 5-ASA slowly in a pH–dependent manner to deliver agent to the terminal ileum and/or colon
D. Infliximab is an antibody directed against TNF used in treatment of Crohn’s disease patients with moderate to severely active disease resistant to other therapies.
E. All of the above.

101. 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 dependent upon extrinsic neural input.
C. The migrating motor complex is characteristic of small intestinal motor function in the fed or digestive state.
D. All of the above

102. Which of the following statements regarding carcinoid tumors is true:

A. Carcinoid tumors are often seen in patients with a history of ulcerative colitis.
B. The overall 5yr survival rate is poor (less than 20%)
C. Carcinoid tumors represent the most common small intestinal neoplasm
D. Appendiceal carcinoids frequently metastasize regardless of their size

Questions 103-107 refer to the following clinical scenario:
A 58 year-old man with a history of chronic alcohol use and chronic hepatitis C infection repeatedly non-responding to combined interferon and ribavirin therapy is admitted to the hospital with increasing abdominal girth, right upper quadrant tenderness, and a 15 pound weight gain over the last 3 months. The patient had a liver biopsy 5 years ago showing grade 3, stage 4 chronic hepatitis. He has no prior history of jaundice, ascites, gastrointestinal bleeding, or confusion. He never had an endoscopy. He continues to drink alcohol.

Physical exam reveals shifting dullness in the abdomen, with palpable spleen tip, but no apparent hepatomegaly. There is no jaundice. There are multiple spider nevi and palmar erythema. There is no leg edema. The neurological exam is non-focal with no asterixis.

Laboratory values:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albumin</td>
<td>3.1 g/dL</td>
<td>(3.5 – 5.0)</td>
</tr>
<tr>
<td>ALT</td>
<td>46 U/L</td>
<td>(5 – 40)</td>
</tr>
<tr>
<td>AST</td>
<td>54 U/L</td>
<td>(5 – 40)</td>
</tr>
<tr>
<td>Alkaline phosphatase</td>
<td>130 U/L</td>
<td>(30 – 130)</td>
</tr>
<tr>
<td>Total bilirubin</td>
<td>1.8 mg/dL</td>
<td>(0.2 – 1.2)</td>
</tr>
<tr>
<td>Direct bilirubin</td>
<td>0.5 mg/dL</td>
<td>(0.0 – 0.2)</td>
</tr>
<tr>
<td>INR</td>
<td>1.80</td>
<td></td>
</tr>
<tr>
<td>Platelet count</td>
<td>112,000/L</td>
<td>(150,000-450,000)</td>
</tr>
<tr>
<td>Alpha fetoprotein</td>
<td>4 ng/mL</td>
<td>(&lt;20)</td>
</tr>
</tbody>
</table>
Ultrasound reveals an echogenic, shrunken liver, splenomegaly, and moderate amount of ascites.

103. All of the following statements regarding the patient’s condition are correct EXCEPT:?

A. Abstinence from alcohol could significantly improve his liver disease even at this stage
B. Serum sodium level is very likely increased due to sodium avidity and retention
C. The median survival of this patient is about 2 years without liver transplantation
D. There is an at least 25% chance that the patient has gastroesophageal varices
E. This patient has a Child’s B functional stage of his cirrhosis

104. All of the following statements about the laboratory findings are correct EXCEPT:?

A. Low platelet count is suggestive of portal hypertension
B. The INR would likely not correct with PO vitamin K administration
C. The INR would likely not correct with IM vitamin K administration
D. Low alpha fetoprotein level makes hepatocellular carcinoma very unlikely
E. AST>ALT is not unusual for chronic hepatitis C in the cirrhosis stage

105. All of the following should be considered next in his management EXCEPT:?

A. Diagnostic paracentesis to exclude spontaneous bacterial peritonitis
B. Re-treatment of hepatitis C with pegylated interferon and ribavirin
C. Upper endoscopy to assess for the presence of gastroesophageal varices
D. Referral to a liver transplant center for evaluation
E. Repeat abdominal ultrasound with Doppler interrogation to exclude portal vein thrombosis

106. A subsequent EGD reveals grade 1 esophageal varices with no red signs. Which of the following statements would be correct?

A. Primary prophylaxis with cardioselective beta blockers is indicated
B. Secondary prophylaxis with non-cardioselective beta blockers is indicated
C. Repeat EGD in 1 year is recommended for varix surveillance
D. Banding is indicated as primary prophylaxis
E. Sclerotherapy is indicated as primary prophylaxis

107. The patient is admitted to the hospital and becomes confused and agitated 3 days later. Hepatic encephalopathy is diagnosed after a blood ammonia level of 163 mg/dL is
found. All of the following statements regarding hepatic encephalopathy in this patient are correct EXCEPT?

A. Placement of TIPS would likely make it worse  
B. Constipation would likely make it worse  
C. Oral lactulose is the treatment of choice  
D. Oral neomycin may be harmful if reabsorbed from the colon  
E. Daily protein intake needs to be restricted to no more than 30 g

108. All of the following medications are recommended in the treatment of hepatic encephalopathy EXCEPT?:

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

109. Which of the following scenarios is most appropriate for the recommendation of tube feeding?

A. When a patient has inadequate oral intake for 2 – 4 days  
B. When a patient has severe diarrhea, dehydration, and electrolyte abnormalities  
C. At the time of diagnosis of severe acute pancreatitis  
D. When a patient has dysphagia secondary to radiation to the head and neck region

110. What are the benefits of enteral formulas with soluble fiber?

A. Fiber aids the absorption of vitamins and minerals  
B. Soluble fiber is converted by bacteria in the gut to short chain fatty acids and can serve as a fuel source to colonocytes  
C. Fiber provides a source of glutamine  
D. Fiber prevents clogging of a feeding tube

111. A patient develops diarrhea within one week of initiating enteral nutrition. What is the most likely cause of diarrhea?
A. Sorbitol containing medications administered via the feeding tube
B. Lactose intolerance
C. Fat malabsorption
D. Dumping syndrome secondary to hypertonic feedings

112. A 20-year-old man is healthy but has a family history of colon cancer at a young age. There are no abnormal physical examination findings. He undergoes colonoscopy and there are over 200 tubular adenomas ranging in size from 0.2 to 1 cm on gross inspection and microscopic examination of biopsies. Which of the following genetic diseases is he most likely to have?
   A. Hereditary non-polyposis colon carcinoma syndrome
   B. Von Hippel Lindau syndrome
   C. Peutz-Jehgers syndrome
   D. Adenomatous polyposis coli
   E. Multiple endocrine neoplasia

113. What is the amount of alcohol in a standard unit of drink (12 oz. of beer, one oz. of liquor or 4 oz. of wine)?
   A. 1-2 gm.
   B. **10-12 gm**
   C. 30-40 gm
   D. 50-60 gm
   E. 100-120 gm

114. Which of the following drugs is the LEAST likely to cause cholestasis as part of drug-induced liver injury?
   A. Chlorpromazine
   B. Oxypenicillins
   C. Tricyclic antidepressants
   D. Birth control pills (estrogen/progesterone)
   E. **Acetaminophen**

115. All of the following are contraindications for initiating parenteral nutrition **EXCEPT**:
A. Hemodynamic instability
B. Hyperglycemia (blood glucose > 300 mg/dL)
C. Hyperosomolality (serum Osm > 350 mOsm/kg)
D. Severe prolonged ileus

116. The indication for initiating parenteral nutrition in hospitalized patients is:
   A. Weight loss of 10%
   B. Hypoalbuminemia
   C. To prevent adverse effects of protein-energy malnutrition in patients unable to consume adequate protein and energy for a prolonged period of time via the GI tract
   D. Failed swallowing evaluation

117. Which of the following best describes the cause of refeeding syndrome?
   A. A shift from glucose as the primary fuel during starvation, to fat as the primary fuel during refeeding, resulting in hepatic steatosis
   B. A shift from fat as the primary fuel during starvation to glucose as the primary fuel during refeeding, resulting in glucose-induced hypophosphatemia, hypokalemia, and hypomagnesemia, often accompanied by fluid retention and congestive heart failure
   C. Excessive volume of parenteral nutrition leading to severe hypertension and heart failure
   D. Hyperglycemia leading to non-ketotic osmotic diuresis and dehydration

118. Absorption of sodium by the intestine can be associated with:
   A. The apical chloride channel
   B. Taurodeoxycholate
   C. Glucose
   D. Two chloride ions which enter the cell via the basolateral membrane

119. A 51-year-old man comes to his physician for a routine examination. There are no abnormal physical examination findings except for a stool sample positive for occult blood. Colonoscopy is performed and there is a 1 cm polyp on a narrow stalk located in the descending colon at 30 cm from the anal verge. The polyp is resected and on microscopic examination shows crowded, tubular, atypical colonic-type glands. The stalk of the polyp is covered with normal colonic epithelium. Which of the following is the most likely diagnosis?
A. **Adenomatous polyp**  
B. Inflammatory fibroid polyp  
C. Peutz-Jehgers polyp  
D. Ulcerative colitis  
E. Hyperplastic polyp

120. A 60 year-old man with chronic obstructive pulmonary disease began taking amoxicillin-clavulanate because of an exacerbation of pulmonary symptoms 2 weeks ago. One week later, he developed jaundice, nausea and abdominal pain.

On physical examination today, the liver has a smooth edge. Liver span is 13 cm by percussion.

Laboratory data:
- AST: 145 U/L (5-40)
- ALT: 271 U/L (5-40)
- Alkaline phosphatase: 850 U/L (30-115)
- Total bilirubin: 10 mg/dL (0.2-1.2)
- Direct bilirubin: 6.2 mg/dL (0.0-0.3)
- Amylase: 40 U/L (28-128)

Which of the following is the most appropriate initial diagnostic test?

A. Anti-mitochondrial antibody  
B. Peripheral blood smear  
C. Viral hepatitis serology  
D. Ultrasound of abdomen  
E. Liver Biopsy

Question 121 refers to the photograph below:
121. A 58-year-old man visited his dentist for routine dental examination. The dentist noticed lesions with the clinical appearance shown. The past medical history showed no major medical problems. Which of the following etiologic factors most likely contributed to the development of these lesions?

A. Dental Caries  
B. Herpes simplex virus type 1  
C. Eating smoked and pickled foods  
D. Chronic sialadenitis  
E. Smoking tobacco

122. A 27-year-old singer-songwriter has been experiencing hoarseness in his voice while singing at a couple of clubs a night to earn enough to avoid homelessness. He presents to the Haight_Ashbury free clinic because he has noticed that his voice quality has become progressively hoarser over the past year. On physical examination, he is afebrile. There are no palpable masses in the head and neck area. He does not have a cough or significant sputum production, but he has been advised on previous visits to give up smoking. Which of the following is most likely to produce these findings?

A. Croup  
B. Epiglottitis  
C. Reactive nodule  
D. Squamous cell Carcinoma  
E. Squamous papillomatosis
Question 123 refers to the following scenario:
A 45-year-old man with chronic alcoholism has a 3-day history of fatigue and confusion. For the past 2 weeks, he has had fever and myalgias for which he is taking over the counter acetaminophen. He has no history of injection drug use, blood transfusions or known exposure to anyone with hepatitis. On physical examination, T 98.6 F, positive findings are spider angiomata, mild splenomegaly and asterixis.

Laboratory studies:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin</td>
<td>15.8 gm/dL</td>
</tr>
<tr>
<td>Platelet count</td>
<td>90,000/mm³</td>
</tr>
<tr>
<td>ALT</td>
<td>5000 U/L</td>
</tr>
<tr>
<td>AST</td>
<td>8000 U/L</td>
</tr>
<tr>
<td>Total bilirubin</td>
<td>2.0 mg/dL</td>
</tr>
<tr>
<td>Direct bilirubin</td>
<td>1.0 mg/dL</td>
</tr>
<tr>
<td>INR</td>
<td>2.0</td>
</tr>
<tr>
<td>Serum creatinine</td>
<td>1.9 mg/dL</td>
</tr>
</tbody>
</table>

123. Which is the least likely diagnosis?

A. Acetaminophen toxicity  
B. Acute hepatitis A  
C. Budd-chiari syndrome  
D. Primary biliary cirrhosis (PBC)  
E. Ischemic hepatitis or Shock liver

124. Which of the following is the correct definition of end-of-treatment 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 12 months after the initiation of therapy

Question 125 refers to the following photomicrographs:
125. A 23-year-old man has had difficulty breathing through his nose for 2 years. This problem has become progressively worse over the past 2 months. Physical examination shows glistening, translucent, polypoid masses filling the nasal cavities. Histologic examination of the excised masses shows respiratory mucosa overlying an edematous stroma with scattered plasma cells and eosinophil, shown above. Which of the following laboratory findings is most likely to be present in this patient?

A. Elevated serum hemoglobin A1C level  
B. **Increased Serum IgE level**  
C. Nuclear staining for Epstein-Barr virus antigens  
D. Tissue culture positive for Staphylococcus aureus  
E. Positive antinuclear antibody test result

126. A well-known media-darling “Iron Chef” is about to take a well deserved 4-week sabbatical from cooking. His personal assistant notices on his last day of work that the chef’s eyes appear yellow. He has noted some fatigue and nausea, but attributed it to his heavy work schedule.

He is found to have biochemical evidence of Hepatitis with the following serologies:

<table>
<thead>
<tr>
<th>Serology</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A IgG</td>
<td>Negative</td>
</tr>
<tr>
<td>Hepatitis A IgM</td>
<td>Positive</td>
</tr>
<tr>
<td>Hepatitis BsAg</td>
<td>Negative</td>
</tr>
<tr>
<td>Hepatitis BsAb</td>
<td>Positive</td>
</tr>
<tr>
<td>Hepatitis BcAb</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Which of the following statements is true?

A. Everyone who has eaten in his restaurant in the past 4 weeks should be vaccinated with an agent that confers active immunity  
B. **His risk of infecting patrons when he returns to work from his sabbatical is quite low**
C. He is at significant risk of developing a chronic infection
D. This infection has a high rate of morbidity in pregnant women

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

A. Mixed cryoglobulinemia
B. Neutropenia
C. **Hemolytic anemia**
D. Thrombopenia
E. Flu-like symptoms

128. A 45-year-old woman presents with fever, chills, and bouts of colicky right upper quadrant pain for the past week. On physical examination, her skin is icteric and there is scleral icterus. Laboratory studies show a total serum bilirubin concentration of 7.1 mg/dL and direct bilirubin concentration of 6.7 mg/dL. An abdominal ultrasound scan shows cholelithiasis, dilation of the common bile duct, and two cystic lesions, 0.8 cm and 1.5 cm, in the right lobe of the liver. Which of the following infectious agents is most likely to produce these findings?

A. Clonorchis sinensis
B. **Escherichia coli**
C. Cytomegalovirus
D. Entamoeba histolytica
E. Cryptosporidium parvum

129. The Hepatorenal Syndrome is characterized by:

A. Low urine specific gravity
B. High urine sodium
C. Hyaline and RBC casts in the urine
D. **Renal cortical vasoconstriction**

130. All of the following statements about ursodeoxycholic acid are correct **EXCEPT**?
A. It is a useful agent for dissolution of cholesterol gallstones
B. It has anti-apoptotic activity in cholangiocytes
C. **It competes with hydrophobic bile acids due to its minimal first pass effect**
D. It displaces hydrophobic bile acids in the terminal ileum

131. All of the following statements about hemochromatosis are true EXCEPT:

A. **Autosomal dominant inheritance**
B. Common mutation is C282Y
C. Females present later than males
D. Diabetes, heart failure and cirrhosis are common manifestation
E. Early detection with phlebotomy will lead to normal life expectancy

132. A 20 year-old asymptomatic male, was found on a routine health exam to have the following lab results:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total bilirubin</td>
<td>4.5 mg/dL</td>
<td>(0.2-1.2)</td>
</tr>
<tr>
<td>Direct bilirubin</td>
<td>0.2 mg/dL</td>
<td>(0.0-0.2)</td>
</tr>
<tr>
<td>AST</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>ALT</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Alkaline Phosphatase</td>
<td>Normal</td>
<td></td>
</tr>
</tbody>
</table>

Regarding this gentleman’s medical condition, which statement is correct?

A. **Bilirubin is usually undetectable in the urine**
B. Biliary dilation is commonly observed on ultrasound
C. It is caused by a molecular defect of transport protein at the canalicular membrane
D. Cirrhosis and hepatocellular carcinoma can develop after several decades of disease
E. Insulin resistance plays an important role in the pathogenesis

133. Risk factors for hepatocellular carcinoma includes all EXCEPT:

A. Hepatitis C
B. Alcoholic liver disease
C. Hemochromatosis
D. Aflatoxin
E. **Herpes virus**
134. Contributors to portal hypertensive ascites include which of the following:?

A. Decreased portal hydrostatic pressure  
B. Increased intravascular oncotic pressure  
C. Sodium avidity  
D. Decreased peritoneal resorption  
E. Peripheral vasoconstriction

135. The least common site for an intestinal adenocarcinoma is the:

A. Rectum  
B. Sigmoid colon  
C. Transverse colon  
D. Ascending colon  
E. Small intestine

136. On endoscopy of the stomach, if the antrum is obviously inflamed but the fundus seems much less involved, the cause is probably?

A. Alcohol  
B. Aspirin / NSAIDS  
C. Autoimmunity  
D. *Helicobacter pylori*  
E. Acid-reflux

137. A 48 year-old male has a 1-year history of impotence. He otherwise feels well except for mild fatigue and arthritis of both hands. On physical examination, degenerative changes are noted in the metacarpophalangeal joints bilaterally. Labs include:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting plasma glucose</td>
<td>126 mg/dL</td>
</tr>
<tr>
<td>ALT</td>
<td>65 U/L</td>
</tr>
<tr>
<td>AST</td>
<td>60 U/L</td>
</tr>
</tbody>
</table>

Which test would be most appropriate as part of his ongoing evaluation?

A. Measurement of serum alpha-1-antitrypsin level and phenotype  
B. Measurement of alpha fetoprotein  
C. Measurement of ceruloplasmin
138. All of the following statements about the treatment of hepatitis B are correct EXCEPT?:

A. Nephrotoxicity is a major side effect of adefovir
B. Lamivudine resistance may reach 70% after 4 years of use
C. HBeAg seroconversion is a useful therapeutic endpoint in HBe+ cases
D. HBV resistance to interferon therapy is relatively rare
E. Entecavir is less efficient if given after lamivudine resistance developed

139. A 39-year-old woman has experienced substernal burning pain following meals for the past 15 years. On physical examination there are no abnormal findings. Upper GI endoscopy is performed and there are 1 to 3 cm long tongues of erythematous mucosa extending from the gastroesophageal junction at the Z line up into the lower esophagus. Biopsies are performed of this region and microscopic examination shows areas of gastric cardiac-type mucosa and intestinalized mucosa. Which of the following interpretations is most appropriate for this woman’s findings?

A. She has a congenital anomaly
B. Her risk for squamous cell carcinoma is increased
C. She has chronic gastroesophageal reflux
D. Formation of a diverticulum may occur
E. She has iron deficiency anemia

140. A 35-year-old HIV positive woman known has had pain on swallowing for the past week. No abnormal physical examination findings are noted. Upper GI endoscopy is performed. There are 3 sharply circumscribed 0.3 to 0.8 cm ulcers in the lower esophagus. She is most likely to have infection with which of the following organisms?

A. Helicobacter pylori
B. Candida albicans
C. Mycobacterium avium-complex
D. Cytomegalovirus
141. All of the following statements about the use of interferon-alpha in the treatment of chronic hepatitis C are correct EXCEPT:

A. It has no direct effect on viral replication
B. It enhances macrophage activity
C. Its pegylated form has weaker activity, but longer half-life
D. It is much more effective in genotype 2 than genotype 1 infection

142. You are following a 34-year old male with a 6-year history of Crohn’s disease. The patient was doing well on maintenance therapy with mesalamine (Asacol\textsuperscript{®}) until about 6 months ago, when he experienced a flare of abdominal pain, malaise, and diarrhea. Upper GI/Small Bowel follow-through showed changes consistent with active Crohn’s disease in the ileum and distal jejunum. The patient responded to IV steroids and was switched over to oral prednisone. You have tried to taper the patient several times, but he becomes symptomatic whenever you drop his dose below 20 mg. The appropriate next step in management would be:

A. Surgical referral for resection of the involved segments
B. Continue Prednisone at 20 mg for maintenance therapy
C. Start 6-mercaptopurine
D. Switch to a different mesalamine preparation (e.g. Pentasa\textsuperscript{®})

143. Which pair of risk factors is most important in the development of esophageal squamous cell carcinoma?

A. Tobacco use, high fat diet
B. High fat diet, ingestion of smoked meats
C. Alcohol abuse, tobacco use
D. Ingestion of smoked meats, tobacco use

144. All of the following statements about the treatment of Wilson’s disease are correct EXCEPT:

A. Elastosis perforans serpiginosa is a frequent side effect of zinc therapy
B. Zinc is only useful for maintenance treatment in Wilson’s disease
C. D-penicillamine or trientine are useful chelators of tissue copper
D. D-penicillamine may induce autoimmune conditions
E. Both zinc and D-penicillamine may induce metallothioneins

145. A 64-year-old man presents vomiting blood to the emergency room. He has a 35-year history of drinking alcohol to excess. On examination, he has ascites, mild jaundice, and an enlarged spleen. He also displays gynecomastia, spider telangiectasias of the skin, and testicular atrophy. Prominent hemorrhoids and a normal-sized prostate are detected on rectal examination. Emergency upper endoscopy shows dilated, bleeding blood vessels in the esophagus. Sclerotherapy is performed to control the bleeding.

Laboratory studies shows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na⁺</td>
<td>136 mmol/L</td>
<td>(135-145)</td>
</tr>
<tr>
<td>K⁺</td>
<td>6.0 mmol/L</td>
<td>(3.5 – 5.0)</td>
</tr>
<tr>
<td>Cl⁻</td>
<td>92 mmol/L</td>
<td>(95-105)</td>
</tr>
<tr>
<td>CO₂</td>
<td>23 mmol/L</td>
<td>(24-32)</td>
</tr>
<tr>
<td>Total Protein</td>
<td>5.8 g/dL</td>
<td>(6.0-8.5)</td>
</tr>
<tr>
<td>Albumin</td>
<td>3.4 g/dL</td>
<td>(3.5-5.2)</td>
</tr>
<tr>
<td>AST</td>
<td>137 U/L</td>
<td>(5-40)</td>
</tr>
<tr>
<td>ALT</td>
<td>108 U/L</td>
<td>(5-40)</td>
</tr>
<tr>
<td>Alkaline phosphates</td>
<td>181 U/L</td>
<td>(30-115)</td>
</tr>
<tr>
<td>Bilirubin, total</td>
<td>5.4 mg/dL</td>
<td>(0.2-1.2)</td>
</tr>
<tr>
<td>Bilirubin, direct</td>
<td>3.0 mg/dL</td>
<td>(0.0-0.3)</td>
</tr>
<tr>
<td>Prothrombin time</td>
<td>20 sec</td>
<td>(Control = 12 sec)</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>25%</td>
<td>(42-52%)</td>
</tr>
<tr>
<td>WBC count</td>
<td>12,790/mm³</td>
<td>(4.0-11.0)</td>
</tr>
</tbody>
</table>

Despite therapy, the patient lapsed into a coma and died. Which of the following morphologic changes in the liver is most likely to be found on autopsy?

A. Liver is shrunken with a wrinkled capsular surface and microscopically shows massive irregular areas of necrosis without any obvious pattern
B. Liver is diffusely nodular with small uniform nodules and microscopically shows diffuse fibrosis encircling regenerative nodules; liver cells contain PAS-positive, globular cytoplasmic inclusions.
C. **Liver is diffusely nodular with small, uniform nodules and microscopically shows diffuse fibrosis encircling nodules of regenerative hepatocytes; liver cells contain fat globules**
D. Liver is markedly enlarged, yellow, and greasy and microscopically shows preservation of the architecture and marked fatty change
E. Liver is diffusely nodular and intensely green with small, uniform nodules and microscopically shows prominent bile stasis and fibrous bridging between portal areas.
146. CCC DNA is important in the viral life-cycle of the Hepatitis B virus because:

A. It forms cute curlicues in the cytoplasm of infected hepatocytes  
B. **This covalently closed circular DNA remains in the nucleus of an infected hepatocyte for the life of the cell and is the template for viral transcripts**  
C. It is the transcriptional transactivator which is pro-oncogenic  
D. It is reverse transcribed to become the defective Hepatitis D (Delta) virion

147. A centrally obese 55 year old male patient with Type 2 diabetes and the following lipid profile- total cholesterol= 455 mg/dL, HDL cholesterol= 32 mg/dL, and triglycerides= 1962 mg/dL:

A. Likely has a Type IV hyperlipoproteinemia, and should be started on atorvastatin (at maximal dose), and have his diabetic control improved.  
B. **Likely has a Type V hyperlipoproteinemia, and should be started on fenofibrate (at 145-160 mg once daily), and have his diabetic control improved.**  
C. Likely has a Type IIB hyperlipoproteinemia, and should be started on simvastatin (at maximal dose), plus ezetimibe, and have his diabetic control improved.  
D. Likely has a Type III hyperlipoproteinemia, and should be started on atorvastatin (at maximal dose), and have his diabetic control improved.  
E. Likely has a Type IV hyperlipoproteinemia, and should be started on niacin (at maximal dose) plus colesevelam, and have his diabetic control improved.

148. The intensity of LDL-lowering therapy required (i.e., target LDL levels when on treatment) is best determined by:

A. The patient’s pre-treatment LDL level  
B. The patient’s tolerance of HMG CoA reductase inhibitor (statin) drugs.  
C. **The patient’s pre-treatment risk of developing coronary heart disease (i.e., Framingham Study risk index).**  
D. The patient’s family history of dyslipidemia  
E. The patient’s pre-treatment HDL level
149. Which statement is true of niacin?

A. Niacin is the most effective drug for raising HDL levels
B. Niacin is contraindicated in patients taking atorvastatin.
C. Niacin is contraindicated in patients taking the combination of fenofibrate and colesevelam.
D. Niacin has no effect on glucose tolerance.
E. Niacin is the most effective drug for reducing VLDL levels.

150. Given the following lipid profile for patient TT- total cholesterol= 646 mg/dL, HDL= 29 mg/dL, triglycerides= 853 mg/dL, your best clinical course of action would be:

A. Calculate the LDL level from the data presented and start treatment with rosvastatin at maximal dose
B. Order a direct LDL level, and while results are pending, start patient on simvastatin at maximal dose, plus ezetimibe.
C. Order a direct LDL level, and while results are pending, start treatment with gemfibrozil 600 mg twice daily
D. Order a direct VLDL level, and while results are pending, start patient on colesevelam plus pravastatin at maximal dose
E. Calculate the VLDL level from the data presented and start treatment with long acting niacin at maximal dose tolerated, plus atorvastatin.

151. Which of the following statements best describes the most consistent effect(s) of obesity/excess weight gain on clinical lipid/lipoprotein parameters?

A. A proportional increase in LDL and HDL cholesterol
B. An increase in Lp(a) [lipoprotein (a)] levels
C. An increase in triglycerides, a (related) decrease in HDL cholesterol levels, and a mild increase in LDL levels.
D. A marked increase in LDL levels, with no effect on triglycerides.
E. A reduction in both HDL levels and VLDL levels, with an increase in Lp(a) levels.
152. A unique advantage of colesevelam is its:

A. Ability to lower LDL and VLDL in hypertriglyceridemic subjects
B. **Lack of systemic absorption**
C. Potent LDL lowering effect (almost 40% reduction) when used as monotherapy
D. Independent effect on Lp(a)
E. Potent HDL raising effect (20-25%).

153. A patient’s direct LDL is 70 mg/dL, with a total cholesterol of 235 mg/dL, HDL of 30 mg/dL, and triglycerides of 675 mg/dL. Which of the following statements is most accurate?

A. The patient’s VLDL/triglycerides is over 0.35, consistent with a Type III hyperlipoproteinemia, and treatment with colesevelam, plus pravastatin at the maximal dose, is the best empirical option.
B. The patient has a Type IIB hyperlipoproteinemia, and treatment with simvastatin at the maximal dose, plus ezetimibe is the best empirical option.
C. The patient’s VLDL/triglycerides is over 0.35, consistent with a Type III hyperlipoproteinemia, and treatment with niacin is the best empirical option.
D. **The patient’s VLDL/triglycerides is approximately 0.20, consistent with a Type IV hyperlipoproteinemia, and treatment with fenofibrate is the best empirical option, being alert to increases in LDL with treatment.**
E. The patient’s mildly elevated total cholesterol merits treatment with colesevelam as monotherapy.