Brown Medical School

Bio 351/280

Gastro-Pathophysiology
Systemic Pathology
Organ System Pharmacology

Final Exam
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Course Leaders

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Double sided
1. Laxatives such as methylcellulose 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, on chloride flux in the colonic mucosa.

2. Serum albumin is a good predictor of which of the following in surgical patients?
   A. Mortality
   B. Weight loss
   C. Renal function
   D. Intestinal absorption

3. Question 3 relates to the following case scenario and photomicrograph:
   A 39 year old woman presents with abdominal cramps and diarrhea for the past 6 weeks. On further questioning she admits to short periods of time during which she had these symptoms in the past. Colonoscopy reveals uninterrupted, diffuse reddening of the mucosa with superficial ulcerations from the rectum to the splenic flexure. A high power view of a mucosal biopsy is seen below.
All of the following statements are correct EXCEPT: (5 points)

A. The patient is at increased risk for adenocarcinoma of the colon
B. The biopsy shows crypt abscesses which are essentially pathognomonic of ulcerative colitis
C. For all practical purposes, the lesions of ulcerative colitis are confined to the colon
D. The other inflammatory bowel disease (which this patient does not have) shows skip lesions which are sharply demarcated from surrounding normal mucosa and can result in the formation of fistulas
E. Genetic susceptibility and gut flora are thought to play a role in causation of inflammatory bowel disease

4. All of the following statements about gut bacteria are true EXCEPT:

A. The largest concentration of bacteria reside in the colon
B. Intestinal motility facilitates growth of anaerobic bacteria in the small bowel
C. The low pH of the stomach often prevents bacteria from reaching the small bowel
D. Competition for nutrients in the colon often limits the growth of pathogenic bacteria
E. The distal small bowel contains many aerobic organisms (> 10^9/ml)

5. All of the following statements about gut bacteria are true EXCEPT:

A. The predominant flora in the colon is spore-forming anaerobes
B. The concentration of organisms approaches 10^{11}/ml in the stool
C. The low oxygen tension enhances the growth of microbial pathogens
D. Clostridia difficile, a pathogen, can often be found in infant stools

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

A. Metronidazole
B. Ranitidine
C. Magnesium hydroxide
D. Sucralfate
E. Metaclopramide

7. All of the following are seen in germ free animals EXCEPT:

A. Shortened villi
B. Large cecums
C. Decreased IgA secretion
D. Normal circular and longitudinal muscle layers
E. Small to absent lymphoid follicles

8. All of the following are true about intestinal gas EXCEPT:
A. Intestinal gas can be flammable
B. Oxygen (O₂) in high concentrations can be found in the colon of "air swalloes"
C. Most nitrogen (N₂) in the bowel comes from diffusion from the blood
D. Lactulose can increase intestinal gas
E. Gastric gas is mostly nitrogen

9. Which of the following statements best describes treatment of Inflammatory Bowel Disease:

A. Azathioprine and 6-mercaptopurine are immunosuppressive agents that are used for treatment of acute flares of Crohn’s Disease and Ulcerative colitis.
B. The 5-aminosalicylates are used in treatment of Crohn’s patients who are steroid-resistant or steroid-dependent and resistant to other therapies.
C. Cyclosporin is an immunomodulator that is used in treatment of mild-to moderate Crohn’s Disease and Ulcerative Colitis.
D. Infliximab is a monoclonal antibody directed against TNFα that is used in treatment of moderate to severely active Crohn’s Disease resistant to other therapies.

10. Parietal cells have all of the following EXCEPT:

A. Transmembrane H⁺/K⁺-ATPases
B. A chloride antiport protein on the basal membrane
C. Tubulovesicular membranes
D. Histamine–containing granules
E. Mitochondria

11. Both famotidine and cimetidine are likely to:

A. Cause constipation.
B. Increase the activity of pepsin in the gastric lumen.
C. Inhibit the cytochrome p450-mediated metabolism of some drugs.
D. Block vagally-mediated increase in gastric acid secretion
E. Enhance gastrointestinal motility.

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 in a young man who had ulcers as a child
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 severe heartburn
E. Rapid urease test in a patient with a gastric MALT lymphoma
13. NSAID-induced ulcers:

A. Are always painful
B. Rarely bleed
C. Are less common in patients infected by \textit{H. pylori}
D. Only involve the stomach
E. May present acutely with peritonitis

14. \textit{H. pylori}:

A. Hydrolyses urea to \textit{NH}_3 and \textit{CO}_2
B. Is a gram-positive spiral shaped bacterium
C. Lives inside gastric epithelial cells
D. Is usually symptomatic
E. May be transmitted by blood products

15. Gastrin secretion may be increased by all the following \textbf{EXCEPT}:

A. Calcium-containing Tums
B. Somatostatin
C. \textit{H. pylori}
D. Gastrin-releasing peptide
E. Vagal stimulation

16. Eradication of \textit{H. pylori}:

A. Significantly improves dyspeptic symptoms in most patients
B. Has been demonstrated to decrease gastric cancer risk
C. Decreases the recurrence rate of duodenal ulcers
D. Improves GERD symptoms
E. Is successful in 50-60\% of patients treated with a two-antibiotic regimen

17. Stress-associated ulcers:

A. Are due to excessive \textit{H. pylori} growth in immunocompromised patients
B. Can be prevented by antacids
C. Cannot be prevented by the use of strong acid suppressing medications in hospitalized patients
D. Are a common cause of abdominal pain in Brown students at exam time
E. Are caused by tissue hypoxemia

18. Wilson disease can be treated by:

A. Correcting the genetic mutation leading to increased copper intake using D-penicillamine
B. Increasing urinary copper excretion using D-penicillamine
C. Chelating copper from parenchymal tissues (eg: liver) using zinc acetate
D. Increasing urinary copper excretion using adefovir
E. Using the virtually adverse-event free D-penicillamine
Questions 19 - 20 refer to the following scenario:
A patient with dysphagia has the following barium swallow finding:

19. The motility tracing in this patient will most likely show:
   A. Hypertensive peristalsis with normal LES tone and relaxation
   B. Normal peristalsis with low LES pressure and normal relaxation
   C. Non-peristaltic common cavity waves with elevated LES pressure and impaired LES relaxation
   D. Non-peristaltic esophageal motility with low LES pressure and impaired relaxation

20. Which of the following studies must be performed in this patient prior to considering treatment?
   A. Upper Endoscopy
   B. Electromyography
   C. Abdominal fat pad aspirate
   D. Full thickness esophageal biopsy

21. All of the following statements about IgA are true EXCEPT:
   A. IgA is the predominant immunoglobulin in the intestine
   B. Most circulating IgA is monomeric
   C. Serum IgA binds and activates complement
   D. IgA reduces macromolecular absorption
   E. Complete absence of IgA is compatible with health
22. All of the following statements about the paracellular (zonulin) pathway are true EXCEPT:

A. It is the dominant pathway for passive solute flow across the intestinal barrier
B. Tight junctions represent the major barrier to passive solute flow
C. The zonulin system is important in colonic transfer of water
D. Increased permeability of the tight junction may be important in type 2 diabetes
E. Vibrio cholera toxin can lead to the opening of the tight junction

Question 23 refers to the following case scenario and photomicrograph:
A 55-year old man presents with acute thrombophlebitis in the left leg. He has a history of mild weight loss and epigastric distress. Serum bilirubin and liver enzymes are within reference ranges. A microscopic section of a mass in the pancreas is shown below.

23. Which of the following statements is most likely to be correct? (5 points)

A. In this case, the tumor was probably in the head of the pancreas
B. This tumor is invasive but has no relationship to stimulation of collagen deposition
C. The thrombophlebitis in this case was coincidental
D. Dysplasia, of varying degree, is likely to be found elsewhere in the pancreas of this patient
E. This lesion carries an association with HIV infection
24. Which of the following is a true statement about IL-10?

A. It inhibits T_{H2} cells along with TGF-β.
B. It stimulates T_{H1} cells
C. It is produced by gut epithelial cells
D. It regulates the tight junction
E. It stimulates Null Killer (NK) cell function

Questions 25 – 28: Matching
Match the following:

25. pANCA
26. Tissue Transglutaminase Ab
27. Anti-parietal cell Ab
28. IgA Deficiency

A. Pernicious Anemia
B. Ulcerative Colitis
C. Giardia Infection
D. Celiac Disease
E. Chronic Granulomatous Disease

Questions 29 – 33 relate to the following scenario:
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®) until about 6 months ago, when he experienced a flare of abdominal pain, malaise, and diarrhea. He is known to have active Crohn’s disease in the ileum. 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.

29. The appropriate next step in management would be:

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

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

A. They inhibit prostaglandin and leukotriene production.
B. They decrease production of proinflammatory cytokines possibly by decreasing the nuclear translocation of NF-κB.
C. Leukopenia is the limiting factor in the use of the 5-aminosalicylates.
D. The side effects of the sulfa-containing sulfasalazine are not dose-related and are due to a hypersensitivity reaction.

31. The inflammatory response in Crohn’s disease tends to be mediated by:

A. increased T_{H2} cells with downregulation of IL-2, IFN-γ, and TNF-α production
B. increased T_{H2} cells with downregulation of IL-4 and IL-10 production
C. increased T_{H2} cells with upregulation of IL-2, IFN-γ, and TNF-α production
D. increased T_{H1} cells with upregulation of IL-2, IFN-γ, and TNF-α production
E. increased T_{H1} cells with upregulation of IL-4 and IL-10 production
Several weeks later he comes 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) 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 minimal if any abdominal discomfort.

32. The most likely cause of his diarrhea at this time is:
   A. Recurrence of Crohn’s disease in another segment of bowel
   B. C. Difficile colitis
   C. Effect of dihydroxy bile acids on the colonic lumen
   D. Bacterial overgrowth in the small bowel

33. 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
Questions 34 - 38: Matching
Match the entity in the following entities with the pathological findings (A-E). (1 point each)

34. Primary biliary cirrhosis
35. Secondary biliary cirrhosis
36. Chronic cholecystitis
37. Biliary atresia
38. Primary sclerosing cholangitis

A. Liver biopsy from an infant showing marked bile duct proliferation, portal tract edema and fibrosis, and cholestasis
B. Liver biopsy showing fibrosing chronic inflammation of bile ducts with progressive atrophy of bile duct epithelium and obliteration of the lumen; concentric periductal fibrosis
C. Thickened wall with fibrosis, inflammatory infiltrate consisting of lymphocytes, plasma cells, and macrophages, and Rokitansky-Aschoff sinuses
D. Portal tracts infiltrated by a dense accumulation of lymphocytes, plasma cells, macrophages, and eosinophils. Occasional non-caseating granulomas may be seen.
E. Distended small and large bile ducts containing inspissated bile pigment; extensive bile lakes

39. A calcium-containing antacid preparation administered in an appropriate dosage regimen may:

A. Cause an increase in gastric acid secretion.
B. Cause an increase in excretion of a basic drug.
C. Produce a laxative effect.
D. Prevent the rise in gastric pH after the consumption of a meal.
Questions 40 – 43 refer to the following case scenario:
PR is an 80-year old female who has fallen at home and broken her hip. She has mild dementia and lives alone. Based on records from a prior visit, she has had a 15-pound weight loss in the past few months. She is admitted to the hospital and undergoes a hip repair. Following surgery a soft diet is prescribed, but she refuses to eat it.

40. Her nutritional status can be best determined by which of the following techniques?
   A. Laboratory evaluation including serum albumin and transferrin levels
   B. Nitrogen balance
   C. History of dietary intake, weight change, gastrointestinal symptoms, performance status, and physical exam
   D. Bone densitometry

Nutrition consult is called. They note the following:
Review of Systems
General: Demented, somewhat combative
GI: No specific complaints
Neurologic: No sensory loss
Musculoskeletal: No muscle or joint pain

Vital Signs
Temperature: 37.2°C Heart rate: 80 Respiratory rate: 14 Blood Pressure: 120/80 mm Hg
Height: 5'5" Weight: 110 lbs Usual Body Weight: 125 lbs BMI: 18.3 kg/m²

Physical Examination
General: Demented woman lying in bed in no physical distress
Head/neck: Minimal temporal wasting
Mouth: Dry membranes but otherwise normal
Cardiac: RRR; no rubs, gallops, or murmurs
Chest: Clear to auscultation
Abdomen: Soft, non-tender, non-distended; bowel sounds present
Extremities: No edema; mild atrophy of interosseous muscles; hip fracture repair wound clean, dry, and intact
Neurologic: Oriented to person, but not time and place

Laboratory Data
Albumin: 3.5 g/dL (3.5-5.8)
Hemoglobin: 13.5 g/dL (13.5-17.5)
Hematocrit: 40% (40-52)
BUN: 13 mg/dL (10-20)
Creatinine: 0.8 mg/dL (0.8-1.3)

41. Using the components of the Subjective Global Assessment (SGA), this patient would be classified as:
   A. Well nourished
   B. Nutritionally at risk
   C. Malnourished
42. What are reasonable recommendations for PR’s initial dietary management?

A. Determine her food likes and dislikes and cater to them, using small fractionated meals.
B. Supplement her diet with oral meal replacements such as Ensure or Boost.
C. Let her eat Big Macs and milkshakes if she likes them.
D. All of the above are reasonable to try.

43. After one week in the hospital, PR develops pneumonia, probably due to aspiration of food. She has labored breathing and a decreased state of consciousness. Her voluntary intake of food is negligible. How would you provide nutrition to PR?

A. Wait until she recovers, then have a nurse assist her with eating
B. Continue to encourage drinking of Ensure or Boost when she is alert
C. Place a feeding tube for enteral nutrition support
D. Give 5% dextrose in water (D5W) and multivitamins intravenously

True/False (44 – 49)
Are the following true (A) or false (B)? (1 point each)

44. In acute pancreatitis it is not unusual for fat necrosis to be found in sites other than within the limits of the pancreas.

45. Chronic pancreatitis is a cause of secondary diabetes mellitus

46. Pancreatic Divisum is the result of abnormal development in which there are dorsal and ventral pancreatic primordia instead of the single normal primordium in the dorsal position

47. “Ground glass hepatocytes” are due to tubules and spheres of HCV in cytoplasm producing a finely granular eosinophilic appearance on H&E stain

48. Mallory hyaline and macrovesicular steatosis are likely to be present in alcoholic liver disease but are not diagnostic

49. Hirschsprung disease is characterized primarily by aganglionosis in the cecum and the ascending colon
Questions 50 - 52:
Match the following clinical situations with their corresponding tests/serologies:

50. Hepatitis B immunization

51. Chronic passive carriage state (likely vertical transmission)

52. Active Hepatitis B infection
   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

53. Lamivudine therapy for hepatitis B:
   A. Has not been associated with any viral mutations causing resistance to therapy
   B. Works through incorporation of the drug into viral DNA resulting in chain termination
   C. Is poorly tolerated by most patients
   D. Results in the inhibition of viral RNA'se
   E. Has low bioavailability due to poor GI tract absorption

54. Which of the following statements about pancreatic secretion is true:
   A. Stimulation of the vagus nerve decreases 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 acinar cell is to secrete bicarbonate and water in the formation of pancreatic juice.
   D. Cholecystokinin decreases the effect of secretin on pancreatic secretion.
   E. Pancreatic secretions activate pepsin in the bowel lumen.

55. Enzymes secreted as proenzymes by the pancreas include all of the following EXCEPT:
   A. Colipase
   B. Elastase
   C. Amylase
   D. Carboxypeptidase
   E. Trypsin
56. A primary mechanism by which senna induces laxation is:

A. It inhibits sodium absorption, promotes chloride excretion by the colonic mucosa, and increases colonic motility.
B. It acts as an osmotic agent to increase luminal retention of water, as does magnesium sulfate.
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.
E. It decreases the synthesis of PGE2 in the intestinal mucosa.

Questions 57 – 58 refer to the following case scenario:
A chronic alcoholic patient presents to the hospital jaundiced and complaining of abdominal distension. On exam he has a large amount of ascites, and a paracentesis is performed. The findings of the paracentesis and his labwork are as follows:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Albumin</td>
<td>3.4 mg/dl</td>
</tr>
<tr>
<td>Ascites Albumin</td>
<td>2.5 mg/dl</td>
</tr>
<tr>
<td>Ascites WBC</td>
<td>210 (10% PMN's)</td>
</tr>
<tr>
<td>Ascites RBC</td>
<td>10</td>
</tr>
<tr>
<td>Cytology</td>
<td>Negative</td>
</tr>
</tbody>
</table>

57. Which of the following statements is true?

A. The labwork suggests that he is at risk for Spontaneous Bacterial Peritonitis
B. The labwork suggests a non-portal hypertensive etiology for his ascites
C. The labwork suggests that he has at least bridging fibrosis on liver biopsy
D. The labwork suggests that his poor nutritional status is the cause of his ascites

58. A diagnosis compatible with this labwork would be:

A. Nephrotic syndrome
B. Tuberculous peritonitis
C. Massive hepatic metastasis
D. Right heart failure
Questions 59 - 63 are based on the case narrative and photo below.
The H&E stained liver tissue illustrated below is from a 52 year old man with a peculiar bronze skin color, hepatosplenomegaly, cardiomegaly, and diabetes mellitus.

Answer true (A) or false (B) for each of the following: (1 point each)

59. The brown granules probably represent lipofuscin since they are quite large

60. In this disorder, the brown deposits within the liver are confined to hepatocytes

61. This disease is transmitted in an autosomal recessive pattern of inheritance

62. Similar deposition of this pigment can be seen secondary to hemolysis in patients with pernicious anemia

63. This patient's pancreas would likely show significant fibrosis
64. All of the following statements about alcohol as a cause of chronic pancreatitis are true EXCEPT:

A. Alcohol has a direct toxic effect on acinar cells
B. Alcohol increases the pressure in the pancreatic ducts and may lead to alteration of flow of pancreatic secretions
C. The exocrine insufficiency of chronic alcoholic pancreatitis is treated in the same manner as that seen with cystic fibrosis
D. Alcohol causes the direct activation of enterokinase in the acinar cells, inappropriately activating the digestive enzyme cascade.
E. Alcohol facilitates collagen deposition leading to pancreatic fibrosis

Questions 65 – 69 refer to the following case scenario:
A 60-year old male with a history of COPD, and a family history of peptic ulcer disease complains to his family doctor of 9 months diffuse mild intermittent abdominal pain and some heartburn. He has lost 20lbs over this time on the Atkins diet. Physical examination reveals an obese man (weight 264 lbs, height 5'8") with normal vital signs. He has decreased breath sounds at the bases, minimal epigastric tenderness, no hepatosplenomegaly, is guaiac negative on rectal examination, and has 2+-lower extremity edema.

His PCP orders some investigations and arranges to see the patient in 2 weeks. The patient returns with the following results from his investigations:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBC</td>
<td>Hgb 13.4 (nl 14-18 m/dl)</td>
</tr>
<tr>
<td>MCV</td>
<td>96 (nl 82-96)</td>
</tr>
<tr>
<td>WBC</td>
<td>6.1 (nl 4.5-11/mm³)</td>
</tr>
<tr>
<td>PLT</td>
<td>267 (nl 130-400 x 10³/mm³)</td>
</tr>
<tr>
<td>Chem 7: Normal</td>
<td></td>
</tr>
<tr>
<td>LFT's</td>
<td>AST 44 (nl 7-40 U/L)</td>
</tr>
<tr>
<td>ALT</td>
<td>47 (nl 7-40 U/L)</td>
</tr>
<tr>
<td>Alb</td>
<td>3.8 (nl 3.5-5.2 mg/dl)</td>
</tr>
<tr>
<td>Bili</td>
<td>1.5 (nl 0.2-1.2 mg/dl)</td>
</tr>
<tr>
<td>INR</td>
<td>1.2 (nl &lt; 1.3)</td>
</tr>
</tbody>
</table>

Abdominal ultrasound: Mildly enlarged liver with increased echogenicity. Spleen size is normal. No free fluid. The gallbladder shows small floating stones but no wall thickening; there is no tenderness directly over the gallbladder when pressure is applied with the transducer. The common bile duct is normal. The pancreas is obscured by gas. An upper GI series reveals a sliding hiatal hernia and a 1 cm. ulcer in the duodenal bulb.

65. Of the following, the most appropriate test for the PCP to order next is:

A. Abdominal CT scan
B. H. pylori breath test
C. Hepatitis A, B and C serologies, transferrin, and ceruloplasmin
D. Upper GI endoscopy
E. Esophageal manometry with Bernstein test
66. All of the following are complications of peptic ulcers **EXCEPT:**

   A. Bleeding  
   B. Perforation  
   C. Stenosis  
   D. Barrett's esophagus  

67. His liver function test abnormalities may be due to each of the following, **EXCEPT:**

   A. Passive hepatic congestion  
   B. Chronic hepatitis B  
   C. Non-alcoholic fatty liver disease  
   D. Hemochromatosis  
   E. Chronic hepatitis E  

68. The following plan of care should be taken with respect to his gallstones:

   A. Clinical monitoring for symptoms  
   B. Oral dissolution therapy with ursodeoxycholic acid  
   C. Referral for laparoscopic cholecystectomy  
   D. Referral for open cholecystectomy  
   E. Diagnostic ERCP  

69. Factors which are likely contributors to gallstone formation in this patient include all of the following **EXCEPT:**

   A. Obesity  
   B. High caloric intake  
   C. Excess cholesterol secretion into bile  
   D. Gilbert's syndrome  

70. The pathogenesis of IBD is thought to involve all of the following **EXCEPT:**

   A. Bacterial antigens  
   B. Toxigenic bacteria  
   C. Genetic susceptibility  
   D. Dysregulated mucosal immunity
Question 71 relates to the following scenario and photomicrograph:
During the past several months, a 43-year old man has noted dysphagia and burning lower substernal pain after eating. Endoscopy reveals an area of erythematous mucosa in the lower esophagus. An H&E stained section from a biopsy is shown below.

71. All of the following are true EXCEPT: (5 points)
   A. The biopsy shows inflammatory cells, basal zone hyperplasia and elongated lamina propria papillae
   B. Complications include Barrett esophagus, bleeding and stricture
   C. The inflammatory cells include eosinophils
   D. Abnormalities of contraction of the lower esophageal sphincter are involved in causation and gastric emptying plays no role
   E. A sliding hiatus hernia is a possible cause
Questions 72 – 75 refer to the following case scenario:

A 27-year old woman is seen in the Emergency Room with a 12-hour history of severe abdominal pain. She does not drink alcohol and denies any prior health problems and takes no medication except oral contraceptives. Her abdomen is diffusely tender with guarding. She has a temperature of 101°F. Serum amylase is markedly elevated =1100 and her WBC is elevated to 15,000.

72. The differential diagnosis in the emergency room includes all of the following EXCEPT:
   A. Infected pancreatic necrosis
   B. Tuboovarian abscess
   C. Necrotizing pancreatitis
   D. Perforated ulcer

A more thorough evaluation is performed, and the patient is confidently diagnosed with pancreatitis.

73. Clinical features that would portend a poor prognosis would include any or all of the following EXCEPT:
   A. Fluid requirement > 4-6 L/day
   B. Hypoxemia
   C. Hypocalcemia
   D. Serum lipase level > 1000

74. The pancreas is protected from the harmful effects of its own enzymes by which of the following:
   A. Enzymes which attack membranes are synthesized as lysosomal hydrolases.
   B. Acinar cells produce an amylase inhibitor which prevents premature amylase activation within pancreatic tissue.
   C. A protective membrane fuses zymogens with the acinar cell cytoplasm.
   D. Enzyme activation normally occurs only in the duodenum, where trypsinogen, the activating enzyme, is released.
   E. The lysosomal hydrolase catalyse B deactivates proenzymes when local injury occurs.

She is treated aggressively with hydration and pain medications. She spends 4 days in the ICU. She improves and starts a clear liquid diet by mouth. A follow-up CT scan shows mild pancreatic edema and a fluid collection around the pancreas without evidence of gas. Her abdominal exam improves. She remains afebrile and is eager to advance her diet.

75. Your plan of action should include all of the following EXCEPT:
   A. Further evaluation to determine the etiology of her pancreatitis
   B. CT-guided needle aspiration of the fluid collection
   C. Advancing her to a low fat diet by mouth
   D. Monitoring for complications
76. Which of the following statements about fat and fat digestion/absorption is true?

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

Questions 77 – 82 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. 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.

77. Clinical findings likely to be present in this patient include all of the following EXCEPT:

A. A wedged hepatic venous pressure gradient > 12 mm Hg
B. Renal sodium wasting
C. Retropitoneal collaterals
D. Decreased systemic vascular resistance

He is seen in the office two weeks later. His ascites has markedly improved, and his edema is gone. He is, however, now somewhat confused, and demonstrates asterixis on examination. Labs are as follows:

<table>
<thead>
<tr>
<th></th>
<th>(Hosp day 1)</th>
<th>(Hosp day 2)</th>
<th>(Current visit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Creat</td>
<td>0.4</td>
<td>0.5</td>
<td>2.7</td>
</tr>
<tr>
<td>(normal 0.7 – 1.4 mg/dl)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine Sodium</td>
<td>&lt; 10 mEq/ml</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

78. Factors that may be contributing to this process include all of the following EXCEPT:

A. Volume depletion with resultant pre-renal azotemia
B. Splanchnic vasoconstriction
C. Elevations in renin and aldosterone levels
D. Portosystemic shunting
E. Endotoxemia

79. The most appropriate initial treatment consideration at this time is:

A. Trial of plasma volume expansion with IV saline
B. Liberalize his salt restricted diet
C. Immediate referral for TIPS placement
D. Discontinue his beta-blockers
80. The probable underlying biochemical cause of his confusion is:

A. Elevated ammonium (NH₃⁺) in the colon lumen
B. Elevated central gamma-aminobutyric acid levels
C. Increased levels of excitatory neurotransmitters
D. Elevated levels of branched chain amino acids

81. Pharmacological agents used to treat hepatic encephalopathy:

A. Detoxify the gut from Ammonia producing bacteria eg: Neomycin
B. Enhance nitrogenous product absorption from the gut eg: Lactulose
C. Elevate gut lumen pH thus decreasing ammonia absorption from the lumen eg: Lactulose
D. Work primarily through eradication of parasites from the gut eg: Metronidazole
E. Are usually systemically absorbed eg: Lactulose

82. Interferon alpha, when used for the treatment of chronic HCV infection:

A. Specifically targets the HCV virus
B. Can be attached to a polyethylene glycol (PEG) molecule to decrease its half-life
C. Can be attached to a polyethylene glycol (PEG) molecule to increase its potency
D. Is well-tolerated with minimal side-effects
E. Initiates a sequence of immunological and virus-specific events in response to viral infection

83. A newborn infant is found to be jaundiced. Total bilirubin is 4 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. Abnormal excretion of bilirubin diglucuronide
C. Increased bilirubin load associated with premature red cell breakdown or hemolysis
D. Decreased enterohepatic circulation secondary to a bile salt transport defect
84. A 44-year old male with a > 15 year history of ulcerative colitis presents to your office for follow-up. His colitis has been under fairly good control on sulfasalazine, and he has been on this drug for > 10 years. His LFT’s are as follows:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilirubin</td>
<td>2.1 mg/dl</td>
<td>(nl 0.2-1.2 mg/dl)</td>
</tr>
<tr>
<td>Alk Phos</td>
<td>473 U/L</td>
<td>(nl 30-115 U/L)</td>
</tr>
<tr>
<td>AST</td>
<td>67 U/L</td>
<td>(nl 7-40 U/L)</td>
</tr>
<tr>
<td>ALT</td>
<td>58 U/L</td>
<td>(nl 7-40 U/L)</td>
</tr>
</tbody>
</table>

True statements about this disorder include all of the following EXCEPT:

A. Portal bacteremia and toxic bile metabolites may be contributors to the disease
B. Females are more commonly affected compared with males
C. No therapies have been proven to alter the course of this disease
D. ERCP is the gold standard diagnostic test

85. Mechanisms of action of Ursodeoxycholic acid (UDCA) in Primary Biliary Cirrhosis (PBC) include:

A. Prevention of hydrophilic bile acid re-uptake from the terminal ileum
B. Promotion of cholangiocytic apoptosis
C. Stimulation of cholangiolar bile secretion
D. Dissolution of gallstones
E. Making bile more hydrophobic

86. A 45-year old woman is evaluated for anemia. 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, and a 7-pound weight loss. Physical exam was notable for mild tympany on percussion of the abdomen; otherwise, her exam was completely benign; stool was guaiac negative. Evaluation of the anemia reveals:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folate</td>
<td>2.1 ng/ml</td>
<td>(nl 2 – 9 ng/ml)</td>
</tr>
<tr>
<td>Vit B12</td>
<td>165 pg/ml</td>
<td>(nl 230 - 900 pg/ml)</td>
</tr>
<tr>
<td>Iron</td>
<td>35 µg/ml</td>
<td>(nl 35-160 µg/ml)</td>
</tr>
<tr>
<td>TIBC</td>
<td>450 µg/ml</td>
<td>(nl 245-400 µg/ml)</td>
</tr>
<tr>
<td>Ferritin</td>
<td>20 ng/ml</td>
<td>(nl 30-284 ng/ml)</td>
</tr>
</tbody>
</table>

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

Fecal Fat 11 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)
D-Xylose Test 10 mg/ml in blood sample at 2 hours  (nl > 40 mg/ml at 2 hours)
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. Jejunal diverticulosis on an small bowel follow-through
D. Blunting of the small intestinal villi, with elongation of the crypts and increased intra-epithelial lymphocytes

87. All of the following statements regarding laboratory parameters in liver disease are correct EXCEPT:

A. The AST/ALT ratio seen in alcoholic hepatitis reflects a deficiency in pyridoxal 5’-phosphate (Vitamin B₆)
B. Wedged hepatic venous pressure gradients greater than 12 mm Hg are associated with bleeding esophageal varices
C. Ascitic fluid PMN > 250 is always consistent with spontaneous bacterial peritonitis
D. Low urine sodium levels typically occur in cirrhosis in spite of salt restriction
E. Ascitic fluid analysis in cirrhosis is most likely to show a high serum-ascites albumin gradient

88. One of a pair of monozygotic twins is diagnosed with Crohn’s disease at age 16. His brother’s risk of developing Crohn’s is:

A. As high as 50%
B. Lower than would be his risk of developing colitis if his brother had ulcerative colitis
C. Less than 5%
D. The same as if they were fraternal twins
E. Related to whether they have the same or different diets

89. Which of the following statements about Barrett’s Esophagus is true:

A. Most patient with erosive esophagitis will develop Barrett’s esophagus
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 is always associated with the presence of reflux symptoms
D. Barrett’s esophagus with high-grade dysplasia requires aggressive surveillance and/or possible ablation or resection

90. Which of the following statements about omeprazole and esomeprazole is true.

A. Both are metabolized extensively by cytochrome P450.
B. Both induce many drug-drug interactions.
C. Omeprazole but not esomeprazole is extensively protein bound.
D. Esomeprazole provides greater inhibition of stimulated gastric acid secretion than omeprazole.
91. Which of the following statements regarding the treatment of gastroesophageal reflux disease is true:

A. Metoclopramide is used to inhibit the number of transient lower esophageal relaxations
B. Loxiglumide is a prokinetic agent that increases LES pressure and esophageal peristalsis
C. Famotidine and omeprazole suppress gastric acid production and prevent further damage to gastric mucosa.
D. Baclofen increases GI motility by enhancing the release of ACh at cholinergic motor neurons innervating the smooth muscle of the esophagus and LES

92. You are working as a clinician in an underdeveloped country, and a mother brings her small child to your walk-in clinic for evaluation of scleral icterus and jaundice. The patient has provided you with a urine sample which appears clear yellow. You correctly conclude that the patient could have any of the following diagnoses EXCEPT:

A. Acute Hepatitis A
B. Hemolytic anemia
C. Gilbert’s syndrome
D. Crigler-Najjar Type II
E. Breast-milk jaundice

93. A 54-year old woman presents with dysphagia and joint pain. She has difficulty swallowing liquids and solids, and notes heartburn and occasional regurgitation. Esophageal manometry reveals normal upper esophageal sphincter tone, and decreased amplitude of contractions in the mid and distal esophagus with poor peristalsis. LES tone is diminished. The most compatible diagnosis is:

A. Amyotrophic lateral sclerosis
B. Scleroderma-like esophagus
C. Polymyositis
D. Myasthenia gravis

94. 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 on swallowing. The most likely diagnosis is:

A. Amyotrophic lateral sclerosis
B. Scleroderma
C. Diffuse esophageal spasm
D. Hypertensive peristalsis
95. The experiment which best demonstrates the mechanism by which the esophagus produces peristaltic contractions is?

A. The nitric oxide blocker L-NAME abolishes the latency of contraction in stimulated esophageal smooth muscle strips.
B. Tetrodotoxin lowers LES resting tone.
C. Removing calcium from the muscle bath reduces LES resting tone.
D. Atropine increases the amplitude of esophageal smooth muscle contraction.

96. Reduction or elimination of the normal bacterial flora from the gut lumen can produce all of the following EXCEPT:

A) Diarrhea  
B) Coagulopathy  
C) Ulcerative colitis  
D) C. Difficile overgrowth and toxin production

97. A 52-year old male with Laennec’s cirrhosis who had been stable for the past 6 months, presents to your office complaining of dyspnea, primarily when upright, not associated with exertion or when supine. On exam he has moderate ascites and numerous spider nevi (telangiectasias) on the upper chest. All of the following statements are true EXCEPT:

A. Ascites may play a role in this process  
B. His A-a (alveolar-arterial) gradient is increased  
C. He has developed intrapulmonary vascular dilations/shunts at the bases of his lungs  
D. He has significant pulmonary vasodilation  
E. A formal diagnosis requires invasive methods, such as pulmonary angiography

98. A 48-year old woman presents for evaluation of peptic ulcer disease. She has had recurrent bouts of symptoms over the past 18-24 months. Endoscopic evaluation during one of these episodes revealed multiple duodenal ulcers. Symptoms transiently respond to PPI therapy, but always return when the therapy is stopped. Serologic testing is negative for H. Pylori. Which of the following is most consistent with a diagnosis of gastrinoma:

A. High serum gastrin level with low gastric acid production  
B. High serum gastrin level with high gastric acid production  
C. Normal gastric acid production with a marked increase after pentagastrin stimulation  
D. High gastric acid production with a marked increase after pentagastrin stimulation  
E. High serum gastrin level with normal gastric acid production

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

A. Dexamethasone  
B. Diphenhydramine  
C. Odansetron  
D. Haloperidol  
E. Nabilone
100. Which of the following agents has both prokinetic and antiemetic properties:
   A. Metronidazole
   B. Ranitidine
   C. Magnesium hydroxide
   D. Sucralfate
   E. Metoclopramide

101. All of the following statements are true about the migrating motor complex EXCEPT:
   A. the migrating motor complex follows the fed pattern of contraction
   B. the migrating motor complex is unable to clear particles > 3 mm from the stomach
   C. the migrating motor complex is associated with an increase in serum motilin levels
   D. the migrating motor complex is characterized by three phases of activity ranging from quiescence forceful propagating contractions

102. Significant contributors to the pathogenesis of hepatocellular carcinoma in chronic hepatitis B infection include all of the following EXCEPT:
   A. Production of the HBx protein, a transcriptional transactivator
   B. Increased level of mutations that result from viral replication
   C. Increased cell injury, regeneration, and turnover, leading to genomic instability
   D. Integration of viral DNA into host mitochondrial DNA

103. Hepatitis A and B vaccines:
   A. Contain live and inactivated virus
   B. Result in lifelong immunity is a small subset of persons
   C. Are administered subcutaneously
   D. Are highly immunogenic
   E. Both require routine booster shots every 20 years
Questions 104 – 108 are related to the narrative and photo below (True/False)
A 55 year old woman presents with weight loss and nausea of 2 months duration. There was no diarrhea. On upper GI endoscopy, a 5 cm area of pale gastric mucosa with loss of rugal folds is seen in the fundus. A section from a biopsy is shown below. A rapid urease test of the biopsy tissue was positive.

Answer true (A) or false (B) for each of the following: (1 point each)

104. The causative organism is a curvilinear gram-negative rod

105. The causative organism is related to peptic ulcer formation but has no association with causation of linitis plastica

106. This biopsy is consistent with MALT lymphoma

107. MALT lymphoma is a T-cell lymphoma
108. This lesion can be eliminated in many cases by treatment of the patient with antibiotics.

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

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

110. The rate of gastric emptying will be slowest with:

   A. A high calorie hyperosmotic liquid
   B. A high calorie isosmotic liquid
   C. A low calorie isosmotic liquid
   D. A low calorie isoosmotic emulsion

111. All of the following statements about intestinal M-cells are true EXCEPT:

   A. They are responsible for sampling and uptake of luminal antigens
   B. They contribute to the development of common mucosal immunity
   C. They are found in association with Peyer’s patches
   D. They are responsible for directly activating CD4+ T-cells
   E. They are part of the epithelial component of the gut-associated lymphoid tissue

112. Which of the following statements regarding the treatment of Irritable Bowel Syndrome is true:

   A. Loperamide is useful in treatment of constipation-predominant patients.
   B. Antimuscarinic agents such as hyoscine are useful to treat pain, gas, and bloating.
   C. Alosetron is a 5-HT3 antagonist that enhances colonic transit and sensation.
   D. Tegaserod is a 5-HT4 partial agonist that inhibits small and large intestinal and colonic motility and slows colonic transit.

113. Which of the following statements best describes treatment of chemotherapy-induced vomiting:

   A. Haloperidol is a 5-HT3 antagonist that blocks serotonin receptors in the chemo-receptor trigger zone, solitary tract nucleus stomach and intestine.
   B. Metoclopramide is useful for patients treated with highly emetogenic anti neoplastic therapy because it antagonizes both D2 and 5-HT3 receptors.
   C. Meclizine is useful for patients treated with mild to moderate emetogenic chemotherapeutic agents like fluorouracil or methotrexate.
   D. Granisetron is a D2 receptor antagonist that also acts at muscarinic and histaminergic receptors to inhibit emesis.
Questions 114 – 115 pertain to the following case scenario:
A 47-year old businessman presents to the emergency department for evaluation of lethargy and nausea which have progressed over the past 24 hours. His company is undergoing a merger, and he has been under a lot of stress at work. He has been required to attend many business luncheons and dinners. He has had frequent headaches. He denies illicit drug use, and has not been sexually active in six months. Review of systems prior to the onset of illness was negative. Physical examination is notable for right upper quadrant tenderness and mild lethargy. Sclerae are not icteric. He has no peripheral edema.

Labwork is notable for the following:

- Hemoglobin 14.2 (nl 14-18 gm/dl)
- Hematocrit 44.5% (nl 42-52%)
- Platelet count 120,000 (nl 130,000-400,000)
- PT 50 sec (control 12 sec)
- INR 3.4
- AST 6453 (nl 7-40 U/L)
- ALT 7123 (nl 7-40 U/L)
- Alk Phos 164 (nl 30-115 U/L)
- Bilirubin 2.4 (nl 0.2-1.2 mg/dl)
- ANA (+) 1:20 (nl ≤ 1:20)
- HbcAb Positive
- HBsAb Positive
- HBsAg Negative
- HCV Elisa Positive
- HCV RNA Negative

114. Acutely, which of the following is likely to be the most appropriate treatment for this patient?

A. Peg-interferon/Ribavirin
B. Hepatitis B immune globulin
C. N-acetyl cysteine
D. Prednisone
E. Pooled gamma-globulin

115. All of the following are true about his elevated PT/INR EXCEPT:

A. His PT will not correct with parenteral Vitamin K supplementation
B. His elevated PT is a poor prognostic marker
C. His elevated PT reflects an alteration of bacterial flora and reduced endogenous Vitamin K synthesis
D. A consumptive coagulopathy cannot be confidently excluded with this data
116. As part of an evaluation of heartburn, a patient undergoes an upper endoscopy, which unexpectedly demonstrates non-bleeding esophageal and gastric varices. In order to better understand the mechanism of portal hypertension, the patient undergoes hepatic vein catheterization. The hepatic venous pressure gradient is calculated, and is found to be 4 mm Hg. This finding would be consistent with which of the following diagnoses?

A. Constrictive pericarditis
B. Isolated splenic vein thrombosis
C. Cirrhosis secondary to Chronic Hepatitis C
D. The patient cannot have varices with this hepatic venous pressure gradient

117. The mainstay of therapy in persons with esophageal varices secondary to cirrhosis is:

A. Octreotide as chronic therapy to prevent bleeding episodes
B. A cardioselective beta blocker to prevent bleeding episodes
C. A non-selective beta blocker to prevent bleeding episodes
D. Vitamins K and E to prevent bleeding episodes
E. Lactulose to prevent bleeding episodes

118. A 57-year old woman is found to have iron deficiency anemia. Colonoscopy is negative for tumors, polyps, or other potential colonic sources of chronic blood loss. Compatible diagnoses would include all of the following EXCEPT:

A. Presence of an anti-parietal cell antibody
B. Bacterial overgrowth
C. Celiac Disease
D. Small intestinal telangiectasias

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

A. Blocking uptake by organic anion transporting proteins (OATP’s)
B. Interfering with uridine diphosphate glucuronide glucuronosyltransferase 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

120. Which of the following sphincters does not relax in response to gastrointestinal hormones or neuropeptides?:

A. Upper esophageal sphincter
B. Lower esophageal sphincter
C. Sphincter of Oddi
D. Internal Anal Sphincter
Question 121 relates to the following case scenario and photograph:
A 55 year old man has noted increasing fatigue for the past several months. Laboratory studies reveal stool positive for blood, hemoglobin 9.5 g/dL, MCV 76.
A mass in the gut was detected and the opened, resected portion is shown below.

121. Which of the following statements is most likely to be correct? (5 points)

A. This is the most common location for carcinoma of the colon and is usually associated with obstruction
B. This patient has a hypochromic microcytic anemia as a result of chronic blood loss
C. 50% of patients with this lesion have a familial syndrome such as familial adenomatous polyposis
D. Staging of these tumors is based on size and degree of obstruction
E. This lesion could have arisen from a tubular adenoma but not from a villous adenoma
Questions 122 – 123 refer to the following case scenario:
You are working as the covering physician in the Adult Correctional Institute (ACI). You return Tuesday from a three-day weekend to learn that a prisoner had started a hunger strike on Saturday.

122. You would expect to find which of the following metabolic consequences in this prisoner?:

A. Accelerated glycogen formation and storage  
B. Preservation of muscle tissue  
C. Elevated levels of ketone bodies  
D. Low blood sugar

123. Despite your best efforts, the patient refuses to eat. Legal proceedings are undertaken. By Thursday, you would expect all of the following metabolic consequences EXCEPT:

A. Decreased basal metabolic rate  
B. No thermic effect of food  
C. Preferential utilization of fatty acids as an energy source  
D. Low blood sugar

Questions 124 – 126 refer to the following scenario:
A 60-year-old woman is evaluated by her primary care physician. Her past medical history is rather benign and limited to mild hypertension, currently on no medications. On review of systems she denies any active complaints.

On physical examination she is 5 feet 7 inches tall and weighs 195 lbs. Her blood pressure is measured with a large cuff and found to be 137/94 mm Hg, pulse rate 82, respiratory rate 14.

She does not smoke, drink or use illicit drugs. She does not know her family history. She is not sexually active. She was allowed to donate blood last year.

Bloodwork is obtained, which shows the following results:

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilirubin</td>
<td>1.2 mg/dl</td>
<td>(nl 0.2-1.2 mg/dl)</td>
</tr>
<tr>
<td>AST</td>
<td>84 U/L</td>
<td>(nl 7-40 U/L)</td>
</tr>
<tr>
<td>ALT</td>
<td>92 U/L</td>
<td>(nl 7-40 U/L)</td>
</tr>
<tr>
<td>Alk Phos</td>
<td>125 U/L</td>
<td>(nl 30-115 U/L)</td>
</tr>
<tr>
<td>Iron</td>
<td>80 μg/ml</td>
<td>(nl 35-160 μg/ml)</td>
</tr>
<tr>
<td>TIBC</td>
<td>340 μg/ml</td>
<td>(nl 245-400 μg/ml)</td>
</tr>
<tr>
<td>Ferritin</td>
<td>300 ng/ml</td>
<td>(nl 30-284 ng/ml)</td>
</tr>
<tr>
<td>ANA</td>
<td>1:20</td>
<td>(nl &lt; 1:20)</td>
</tr>
<tr>
<td>T. Cholesterol</td>
<td>233 mg/dL</td>
<td>(Ideal &lt; 200 mg/dL)</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>175 mg/dL</td>
<td></td>
</tr>
<tr>
<td>LDL</td>
<td>160 mg/dL</td>
<td>(Ideal &lt; 130 mg/dl, &lt; 100 mg/dl with risk factors)</td>
</tr>
<tr>
<td>HDL</td>
<td>38 mg/dL</td>
<td>(Ideal &gt; 45 mg/dl)</td>
</tr>
<tr>
<td>Blood sugar</td>
<td>116 mg/dL</td>
<td>(&lt; 100 Fasting)</td>
</tr>
</tbody>
</table>
124. The most likely mechanism for this patient’s LFT abnormalities is:
   A. Homozygous mutation of site 282 (C282Y) on chromosome 6
   B. Genetic mutation resulting in abnormal function of the WND/ATP7B transport protein
   C. Cytokine mediated damage inflicted by cytotoxic T lymphocytes
   D. Insulin resistance with increased free fatty acid production

125. A correct diagnosis will most likely require:
   A. Genetic testing
   B. Serologic testing
   C. Liver biopsy
   D. ERCP

126. Peptides associated with the induction of satiety include all of the following EXCEPT:
   A. CCK
   B. Gherlin
   C. Leptin
   D. Peptide YY

127. Cholesterol solubility in bile is improved by which of the following?:
   A. Enterohepatic recirculation of secondary bile acids
   B. Bile salt wasting processes, such as ileal Crohn’s disease
   C. Increased cholesterol secretion into bile
   D. Gallbladder mucus

128. Absorption of sodium in the small intestine can be associated with all of the following EXCEPT:
   A. The apical chloride channel
   B. Glucose
   C. Na+/H+ carrier proteins
   D. Amino acids

Questions 129 - 130 pertain to the following case scenario:
A 54-year old woman with a history of intermittent GI distress associated with fatty meals presents to the hospital complaining of severe abdominal pain. She has mild scleral icterus, and has right upper quadrant abdominal tenderness with mild localizing rebound. She is febrile to 101.7 F°. Plain films are negative for free air. Labs return showing:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilirubin</td>
<td>3.5 mg/dl</td>
<td>(nl 0.2-1.2 mg/dl)</td>
</tr>
<tr>
<td>AST</td>
<td>147 U/L</td>
<td>(nl 7-40 U/L)</td>
</tr>
<tr>
<td>ALT</td>
<td>159 U/L</td>
<td>(nl 7-40 U/L)</td>
</tr>
<tr>
<td>Alk Phos</td>
<td>295 U/L</td>
<td>(nl 30-115 U/L)</td>
</tr>
<tr>
<td>Amylase</td>
<td>45 U/L</td>
<td>(nl 25-128 U/L)</td>
</tr>
<tr>
<td>Lipase</td>
<td>18 U/L</td>
<td>(nl 4-24 U/L)</td>
</tr>
</tbody>
</table>

Ultrasound shows small gallstones in the gallbladder. The gallbladder wall is mildly thickened, and there is fluid around the gallbladder. The common bile duct is dilated to 13 mm in diameter (normal < 6 mm).
129. Therapies that might be of immediate value to this patient include all of the following except:

A. IV crystalloid
B. IV antibiotics
C. ERCP with endoscopic sphincterotomy
D. Aspiration of the fluid collection

130. Blood cultures might be expected to grow any of the following bacteria except:

A. E. Coli
B. Klebsiella
C. Staph Aureus
D. Enterococcus

131. Pancreatic zymogens can be activated by all of the following except:

A. Trypsin
B. Cathepsin B
C. Secretin
D. Enterokinase

Questions 132 – 135 refer to the following case scenario:
A 27-year old male alcohol abuser is involved in an accident while riding his motorcycle. He sustains a blunt handle-bar injury to the abdomen as well as numerous orthopedic injuries. He is stabilized in the emergency room and aggressively hydrated. He complains of epigastric abdominal pain. His abdominal exam shows mild diffuse tenderness, but no evidence of rebound or guarding. Serum amylase returns at 1200. He receives pain medications, and is kept NPO. His orthopedic injuries are attended to. 24 hours later, he is noted to have diffuse abdominal distension and shifting dullness. Flat and upright films of the abdomen are negative for free air but show a ground-glass appearance and ileus. A bedside paracentesis reveals the following:

- Ascitic Fluid Albumin: 2.2
- Serum Albumin: 2.9 (normal 3.5 – 5.0 mg/dl)
- Ascitic Fluid WBC: 125 (30% PMN’s)
- Ascitic Fluid RBC: 140
- Ascitic Fluid Amylase: 900

132. The most likely cause of his ascites is:

A. Alcoholic liver disease
B. Pancreatic duct disruption
C. Perforated viscus
D. Portal vein thrombosis

He is maintained on an NPO (nothing by mouth) status while further evaluation is performed.
133. The indication for initiating parenteral nutrition in hospitalized patients is:

A. Weight loss of 10%
B. Hypoalbuminemia; serum albumin < 3.0 g/dL
C. To prevent the 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

134. Which of the following best describes the cause of refeeding syndrome and appropriate preventive measures?

A. A shift from glucose as the primary fuel during starvation to fat as the primary fuel during refeeding, resulting in liver dysfunction caused by steatosis; it is prevented by withholding fat in the initial parenteral nutrition formula
B. Excessive volume of parenteral nutrition, leading to severe hypertension and heart failure; it is prevented by minimizing the parenteral nutrition volume initially
C. A shift from fat as the primary fuel during starvation to glucose as the primary fuel during refeeding of a seriously malnourished patient, resulting in glucose-induced hypophosphatemia, hypokalemia, and hypomagnesemia, often accompanied by excessive fluid retention with congestive failure; it is prevented by slowly increasing the infusion rate over several days to a week and relative restriction of total calories, carbohydrate, volume, and sodium
D. A miscalculation of nutrition status in the marasmic patient, resulting in a miscalculation of parenteral nutrition formulas; it is prevented by accurate calculation of nutrition status and parenteral nutrition formula.

135. The use of a PICC (peripherally inserted central catheter) to provide parenteral nutrition in patients with adequate antecubital venous access offers an advantage over an infracavicular subclavian vein because it:

A. Has a lower risk of infection
B. Offers better patient comfort and mobility
C. Allows a sterile dressing to be better maintained
D. Eliminates the risk of pneumothorax

Questions 136 – 137 refer to the following scenario:
A 10-year-old child presents complaining of progressively worsening diarrhea over the past 1-2 months. Stools are watery and non-bloody. Stool osmolality is 285 mOsm/L. Stool Na⁺ is 32 mEq/L and Stool K⁺ is 53 mEq/L. Stool fecal leukocytes are negative. Stool Ova and Parasites and routine cultures are negative.

136. Of the following, the most likely diagnosis is:

A. Drinking too much Starbucks® coffee
B. Chewing too much artificially sweetened gum
C. Eating camp food containing pre-formed toxins
D. Irritable bowel syndrome
137. Hydrogen breath testing will demonstrate:

A) An early peak in breath H₂ using lactose if this patient is lactase deficient
B) An early peak in breath H₂ using glucose if this patient is lactase deficient
C) A late peak in breath H₂ using lactulose if this patient has small bowel bacterial overgrowth
D) No significant “bump” in breath H₂ using lactose if this patient has normal absorption

138. The primary effect of Loperamide on gastrointestinal function is:

A. Increased cytoprotection of gastric mucosa.
B. Slowed transit of intestinal contents.
C. More rapid gastric emptying.
D. Inhibition of gastric acid secretion.
E. Increased colonic secretion of chloride ion.

Questions 139 – 141:
Match the patient to the expected type of gallstones:

139. 43-year old obese woman

140. 22-year old patient with hereditary spherocytosis

141. 37-year old male with Crohn’s s/p ileal resection

A. Cholesterol Stones
B. Pigment Stones

142. Which of the following statements are true about the “fed” pattern of small bowel motility?

A. The fed pattern can be induced throughout the small bowel via hormonal signals from gastrin or CCK
B. The fed pattern can be abolished by blocking vagal activity
C. The fed pattern is not dependent on extrinsic neural input
D. Inhibitory neural activity is found concurrently through all segments of the bowel during the mixing phase
143. A centrally obese 55 year old male patient with Type 2 diabetes and the following lipid profile: total cholesterol= 375 mg/dL, HDL cholesterol= 32 mg/dL, and triglycerides= 1762 mg/dL:

A. Likely has a Type III hyperlipoproteinemia, and should be started on atorvastatin (at maximal dose), and have his diabetic control improved.
B. Likely has a Type IV hyperlipoproteinemia, and should be started on atorvastatin (at maximal dose) plus colesveplam, and have his diabetic control improved.
C. Likely has a Type V hyperlipoproteinemia, and should be started on gemfibrozil (600 mg twice daily), and have his diabetic control improved.
D. Likely has a Type V hyperlipoproteinemia, and should be started on simvastatin (at maximal dose), plus ezetimibe, and have his diabetic control improved.
E. Likely has a Type IV hyperlipoproteinemia, and should be started on atorvastatin (at maximal dose), and have his diabetic control improved.

144. 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 pre-treatment risk of developing coronary heart disease (i.e., Framingham Study risk index).
C. The patient’s tolerance of HMG CoA reductase inhibitor (statin) drugs.
D. The patient’s family history of dyslipidemia
E. The patient’s pre-treatment HDL level

145. 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 colesveplam.
D. Niacin has no effect on glucose tolerance.
E. Niacin is the most effective drug for reducing VLDL levels.

Questions 146 – 147 relate to patient FA:

146. Given the following lipid profile for patient FA- total cholesterol= 536 mg/dL, HDL= 25 mg/dL, triglycerides= 823 mg/dL, your best clinical course of action would be:

A. Calculate the LDL level from the data presented and start treatment with atorvastatin 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 fenofibrate.
D. Order a direct VLDL level, and while results are pending, start patient on colesvelem plus pravastatin at maximal dose
E. Order a direct VLDL level, and while results are pending, start treatment with long acting niacin

147. Patient FA’s direct LDL result comes back 75 mg/dL. The previous lipid profile numbers for patient FA still pertain: total cholesterol= 536 mg/dL, HDL= 25 mg/dL, triglycerides= 823 mg/dL. Which of the following statements is most accurate?

A. The patient’s VLDL/triglycerides is over 0.50, consistent with a Type III hyperlipoproteinemia, and treatment with colesvelem, plus pravastatin at the maximal dose, was the best empirical option.
B. The patient’s VLDL/triglycerides is less than 0.25, consistent with a Type IV hyperlipoproteinemia, and treatment with colesvelem, plus pravastatin at the maximal dose was the best empirical option.
C. The patient’s VLDL/triglycerides is over 0.50 consistent with a Type IIB hyperlipoproteinemia, and treatment with simvastatin at the maximal dose, plus ezetimibe was the best empirical option.
D. The patient’s VLDL/triglycerides is over 0.50, consistent with a Type III hyperlipoproteinemia, and treatment with fenofibrate was the best empirical option.
E. The patient’s VLDL cholesterol is 436 mg/dL, consistent with a Type IV hyperlipoproteinemia, and treatment with niacin was the best empirical option.

148. 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.

149. A unique advantage of colesvelem 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%)
150. As a dosage of aspirin increases to high toxic levels:
   A. Circulating protein-bound salicylate increases in proportion to the total circulating concentration.
   B. The apparent volume of distribution decreases.
   C. The half-life increases.
   D. Flux through the pathways that metabolize salicylate increases with first-order kinetics.
   E. Serum levels at a fixed time point (e.g., 8 hr after the ingestion) decline.

151. Chronic salicylate poisoning:
   A. Is much less dangerous than acute intoxication.
   B. Results in tissue salicylate concentrations that are disproportionately high relative to circulating levels.
   C. Results in toxicity only at very high circulating aspirin levels.
   D. Is almost always accompanied by metabolic acidosis.
   E. Is a condition in which acetazolamide (Diamox) is a particularly effective therapy.

152. The most effective means of salicylate removal in a severely intoxicated patient is:
   A. Cathartics.
   B. Oral administration of activated charcoal.
   C. Hemodialysis.
   D. Gastric lavage.
   E. Forced alkaline diuresis.

153. A frequent consequence of aspirin poisoning that is the main contraindication to forced alkaline diuresis is:
   A. Overhydration.
   B. Encephalopathy.
   C. Metabolic acidosis.
   D. Respiratory alkalosis.
   E. Hypoglycemia.

154. The ability of aspirin to uncouple oxidative phosphorylation accounts for the following consequences of aspirin poisoning:
   A. Gastritis.
   B. Fever and lactic acidosis.
   C. Hypoglycemia and respiratory acidosis.
   D. Hyperglycemia and respiratory alkalosis.
   E. Reye’s syndrome.
155. The decline in salicylate levels that occurs between 12 and 24 hr after a single toxic dose:

A. Is expected, but is not necessarily reassuring.
B. Is reassuring because it reflects declining tissue concentrations.
C. Can be attributed to effective renal salicylate metabolism.
D. Is an indication for instituting forced alkaline diuresis.
E. Is almost always following by a rise in salicylate levels.

156. The acid-base status in salicylate intoxication:

A. Is a consequence of the combined effects of accumulation of organic acids and a direct effect on pulmonary function.
B. Is due to renal dysfunction resulting in bicarbonate loss.
C. Results in net systemic acidosis most often in very young patients (under 4 years old).
D. Results in net systemic alkalosis most often in very young patients (under 4 years old).
E. Can be mimicked by exposure to news of the upcoming marriage of the Prince of Wales and his long-time companion, Mrs. Camilla Parker Bowles.

157. The most effective currently available therapeutics for treating Alzheimer’s disease include:

A. Acetylcholine precursors
B. Anticoagulants
C. Psychomotor stimulants
D. Vasodilators
E. Acetylcholinesterase inhibitors

158. Carbidopa is often administered with L-dopa:

A. Because carbidopa is a direct dopamine receptor agonist
B. To increase dopamine levels in the periphery
C. To enhance the amount of L-dopa available to cross the blood-brain barrier
D. To block cholinergic muscarinic receptors in the CNS
E. To react with and destroy harmful free radicals produced by dopamine metabolism in the CNS
159. Although L-dopa is a very effective anti-Parkinsonian drug, it is often not used as the first therapeutic treatment because:

A. High doses are needed for absorption into the CNS  
B. Dopamine receptor antagonists have fewer peripheral side effects  
C. The development of hallucinations, confusion and the on/off syndrome represent significant hazards  
D. It cannot cure Parkinson’s disease  
E. It reduces the effectiveness of MAO inhibitors and muscarinic antagonists

160. In the treatment of Parkinson’s disease, administration of L-dopa along with which other agent can produce a life-threatening hypertensive crisis?:

A. Carbidopa  
B. Selegiline  
C. Non-specific MAO inhibitors  
D. Pramipexole  
E. Entacapone

161. Which of the following compounds can produce mild improvement for patients with Alzheimer’s disease?:

A. Ropinirole  
B. Choline chloride  
C. Benztrapine (Cogentin)  
D. Tetrahydroaminoacridine (Tacrin)  
E. Entacapone

162. Indicate which of the following class of drugs would be contraindicated for treating Parkinson’s disease:

A. Acetylcholinesterase inhibitors  
B. Dopamine receptor agonists  
C. Dopamine precursors  
D. Muscarinic receptor antagonists  
E. MAO inhibitors
163. Dopamine receptor agonists are potentially more effective therapies for Parkinson's disease than L-dopa because they:

A. Act only in the caudate/putamen
B. Have a shorter half-life
C. Can have a longer duration of action, avoiding the on/off syndrome
D. Entirely block the production of free radicals
E. Are MAO inhibitors
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for 2005 GASTROPHARMACOLOGY Test Form: 0

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