1) The following lipoproteins are synthesized by the liver:

* A. VLDL, LDL
  B. chylomicron, HDL
  C. chylomicron, VLDL
  D. a and c

2) Cytokine release from macrophages/monocytes initiate the acute phase protein response?

* A. True
  B. False

3) Leptin is a hormone whose concentration in the bloodstream is proportional to the amount of adipose tissue

* A. True
  B. False

4) Postprandial Hyperlipidemia refers to

  A. The presence of lipids in the blood 12 hours after the last meal
  B. The spike in blood lipids after birth in the neonate
  C. The transient rise in blood lipids that follows exercise
* D. The transient rise in blood lipids that follows a meal

5) Specificity is a measure of how well a test detects the specific 'illness' being tested for

  A. True
* B. False

6) Muscle tissue cannot release free glucose in order to increase blood glucose levels.

  A. False
* B. True

7) Fructosamine and glycosylated hemoglobin reflect blood glucose levels in the past and are useful for diagnosing diabetes. Fructosamine reflects average blood glucose over last 2-3 weeks while glycosylated hemoglobin reflects average blood glucose over last 2-3 months.

  A. False
* B. True

8) A kinase is a type of enzyme that removes phosphate groups from targets

* A. False
  B. True

9) A battery of 10 tests was done on a healthy animal. Approximately what is the probability (in %) that at least one test returns a result outside its reference range?

  A. 60%
  B. 95%
* C. 40%
  D. 10%

10) Carnitine is synthesized in all tissues of the body to some extent, excluding brain tissue and cardiac tissue

  A. True
* B. False

11) Insulin is the classic example of a hormone that works using a G protein-linked receptor

  A. True
* B. False

12) A serum enzyme that is considered a useful clinical marker will be

  A. fairly tissue specific
  B. concentrated enough
  C. easily measured
  D. have a definitive half-life
* E. all of the above
  F. A and B only

13) A clinician hands you a chart indicating a patient has hypoproteinemia. Before letting you examine the patient, he asks you what the most likely cause is. You respond:

* A. Burns
  B. Dehydration
  C. decreased A/G ratio from an infection
  D. By asking why you can’t see the patient before you answer the question
  E. Inflammation from a vaccine reaction

14) Ketones are a normal source of energy

  A. False
* B. True

15) Blood plasma contains clotting factors and proteins, but does not contain red and white blood cells

* A. True
  B. False

16) Gluconeogenesis is the creation of glucose from glycogen

* A. False
  B. True

17) Test results can be affected by a number of external factors including :

  A. Anticoagulants
  B. Hemolysis
  C. Recent meal
* D. All of the above

18) The hexose monophosphate pathway (one of the paths of glucose metabolism) is important for producing precursor molecules for nucleic acid synthesis.

* A. True
  B. False

19) G proteins are the largest family of cell surface receptors

  A. True
* B. False

20) LCFA stands for Light Combat Fighter Aircraft.

  A. True
* B. False

21) The following are enzymatic reactions involved in the formation of LCFAs from glucose in non-ruminants:

  A. the conversion of citrate to acetyl-CoA and oxaloacetate via citrate lyase in the mitochondria
  B. the conversion of citrate to acetyl-CoA and oxaloacetate via citrate lyase in the cytosol
  C. the conversion of acetyl-CoA to malonyl CoA via acetyl CoA carboxylase in the cytosol
  D. a and c
* E. b and c

22) What kind of tests would you use to diagnose pancreatic insufficiency?

  A. Serum trypsin-like immunoreactivity (TLI)
  B. Chymotrypsin activity test
  C. Feed a high fat meal and check for fat in the circulation
  D. Look for fat in the feces
* E. All of the above

23) The nitroprusside test is used to qualitatively identify ketones present in blood serum.

* A. True
  B. False

24) All G protein-linked receptors have a largely similar structure.

* A. True
  B. False

25) In an animal with type I diabetes, how does the liver respond to changes in the adipocytes

* A. LCFAs released by adipocytes will be taken up by the liver, repackaged in to VLDLs and sent out into recirculation
  B. No reaction, as adipocytes are unaffected.
  C. VLDLs released by adipocytes will be taken up by the liver, repackaged in to Chylomicrons and sent out into recirculation
  D. LCFAs released by adipocytes will be taken up by the liver, repackaged in to Chylomicrons and sent out into recirculation
  E. None of the above

26) Ketosis is metabolic acidosis that results from excess production of ketones

* A. False
  B. True

27) Glycogenolysis primarily occurs in tissue cells of the body

* A. False
  B. True

28) During an extended fasting period, which of the following occur?

  A. The Liver secrete HDLs and IDLs into the blood-stream
* B. Glucagon stimulates glycogenolysis, lipogenesis and protein metabolism
* C. Insulin down, Glucagon up
* D. Triacylglycerol in adipose tissue is mobilized by hormone-sensitive lipase into glycerol and free fatty acids
  E. Insulin stimulates glycogenolysis, lipogenesis and protein metabolism

29) Gs, Gi and G-olf are G protein units that work through adenylate cyclase

* A. True
  B. False

30) The full form of ALP is alanine phosphatase

* A. False
  B. True

31) How does amplification occur within the G protein-linked receptor signalling cascade?

* A. A G-protein amplifies the signal by creating multiple molecules of the secondary messenger (e.g. CAMP)
* B. Each molecule of enzyme can produce many molecules of product
* C. Each molecule of PKA can activate many molecules of enzyme
* D. A single activated receptor can recruit multiple G-proteins, in turn
  E. Each molecule of cAMP activates multiple molecules of protein kinase A (PKA)

32) Normally insulin and glucagon are secreted in reciprocal fashion such that when insulin is high, glucagon is low. Under what condition is this reciprocal regulation NOT applicable?

  A. Type 2 diabetes
  B. Type 1 diabetes
* C. Starvation
  D. Insulinoma

33) Sample enzyme activity should always be compared to the normal amount of enzyme activity within a population in order to give a definite prognosis of the disease.

  A. True
* B. False

34) What is true about albumin

* A. There is a positive correlation between body size and the half-life of albumin (turnover)
  B. Albumin can contribute to a successful immune response
  C. There is a negative correlation between body size and the half-life of albumin (turnover)
  D. Albumin is synthesized by the liver and some cells of the immune system
  E. None of the above

35) Which of the following points regarding oncotic pressure is INCORRECT?

  A. In the arterial system, net interstitial pressure opposes blood pressure, and the net flow is into the interstitial space
  B. In the arterial system, oncotic pressure is not sufficient to overcome blood pressure
  C. In the venous system, net interstitial pressure opposes blood pressure, and the net flow is into the vascular system
  D. Altogether, the overall net outflow (arterial - venous) of vascular fluid is small, being taken up by the lympatic system
* E. All of these statements regarding oncotic pressure are correct

36) Why does blood not continually clot?

* A. The liver produces inactive forms of the clotting factors
  B. Immunosuppressant cells prevent thrombin from clotting
  C. Thrombin and fibrin are sequestered until the clotting cascade occurs
  D. All of the above

37) Primary Hyperlipidemia is

  A. Rare
  B. Often seen in animals such as horses and cows
  C. May be the result of a deficiency in lipoprotein lipase and apolipoprotein CII
  D. May be the result of a deficiency in the liver to produce VLDLs
  E. Both b and c
* F. Both a and c

38) What are the functions of plasma proteins

  A. Vascular pressure maintenance
  B. Biochemical reaction catalysts
  C. Clotting factors
  D. Immunoglobulins
* E. All of the above

39) What would you expect to see with inflammation?

  A. Hyperfibrinogenemia
  B. Hyperglobulinemia
  C. Hyperalbuminemia
* D. A and B
  E. None of the above

40) Which one of these statements about pancreatic secretions is FALSE?

* A. Gamma cells produce amylase
  B. Alpha cells produce glucagon
  C. Beta cells produce insulin
  D. Acinar cells produce proteases
  E. None of the above

41) Insulin…

  A. Stimulates glucose uptake in tissues
  B. Secretion is stimulated by hyperglycemia
  C. Promotes storage of glucose as glycogen in liver and muscle
  D. Promotes storage of triglycerides (fat) in adipose tissue
* E. All of the above.

42) The major fate of amino acids reaching the liver is:

  A. re-use for structural and functional proteins elsewhere in the body
  B. re-use for hepatic proteins
* C. Urea
  D. Transport to systemic circulation for cellular protein synthesis
  E. Immune system functional proteins

43) Lipids are less dense than proteins. Chylomicrons have a much lower density than other lipoproteins - VLDLs, LDLs, IDLs and HDLs. This means that Chylomicrons contain a higher proportion of lipids in comparison to other lipoproteins.

  A. False
* B. True

44) Lipemia is a term used only for the milky layer on the top of a serum sample after the serum refrigeration test has been administered

  A. True
* B. False

45) During a catabolic phase of metabolism endogenous distribution of LCFAs follow this sequence:

  A. high blood glucagon levels stimulate hormone sensitive lipase to convert triglyceride to LCFAs and glycerol; LCFAs and glycerol are both transported in the blood by albumin to the liver; the liver reforms triglycerides from its basic components and packages them into IDLs
  B. high blood glucagon levels stimulate hormone sensitive lipase to convert triglyceride to LCFAs and glyceride; LCFAs and glycerol are both transported in the blood by albumin to the liver; the liver reforms triglycerides from its basic components and packages them into VLDLs
  C. high blood glucagon levels stimulate hormone sensitive lipase to convert triglyceride to LCFAs and glycerol; LCFAs and glycerol are both transported in the blood by albumin to the liver; the liver reforms triglycerides from its basic components and packages them into VLDLs
* D. high blood glucagon levels stimulate hormone sensitive lipase to convert triglyceride to LCFAs and glycerol; glycerol and albumin-bound LCFAs are transported in the blood to the liver; the liver reforms triglycerides from its basic components and packages them into VLDLs

46) Acetyl-CoA is produced by the beta-oxidation of LCFAs. To make use of the energy available from the excess acetyl-CoA, ketone bodies are produced which can then circulate in the blood. This ketone production from Acetyl-CoA occurs in the cytosol.

* A. False
  B. True

47) A signalling pathway initiated by a specific hormone (e.g. Insulin) is usually not affected by activity triggered by a different ligand.

* A. False
  B. True

48) Serum enzymes used as clinical markers are the same for all species

* A. False
  B. True

49) What effect does dehydration have on the A/G ratio

* A. No effect
  B. Decreases albumin and globulin concentration equally
  C. Hyperglobulinemia
  D. Hypoalbuminemia
  E. None of the above

50) Which of the following statements about diabetes is true?

  A. Type I diabetics cannot produce enough insulin
  B. Type II diabetics are said to be insulin resistant
  C. Type I diabetics have a high glucagon:insulin ratio
  D. Type II diabetics have a normal glucagon:insulin ratio
* E. All of the above

51) Some species can use glucose to produce vitamin C.

* A. True
  B. False

52) Which of the following rarely occurs?

  A. hypoglobulinemia
  B. hyperfibrinogenemia
* C. hyperalbuminemia
  D. hyperproteinemia
  E. hypofibrogenemia

53) The two main types of membrane-bound glucose transporters studied in this course, GLUT2 (liver) and GLUT4 (muscle and adipose tissue), increase transport of glucose when insulin is present.

* A. False
  B. True

54) Lipemia affects biochemical tests in the following ways…

  A. Enhances hemolysis
  B. Interferes with refractory measurements of sugars
  C. May interfere with hemoglobin determination
  D. Enhances spectrophotometric determination of analytes
  E. Both a and d
* F. Both a and c

55) A cell that is mildly injured could release ALT, which is located where in the cell

  A. membrane
  B. mitochondria
* C. cytoplasm
  D. rough endoplasmic reticulum

56) Measurement of phospholipids is used as a common indication of Serum Lipid Content

  A. True
* B. False

57) Sources of Long Chain Fatty Acids (LCFAs) include

  A. Dietary Triglycerides
  B. Produced from glucagon
  C. Produced from acetate
  D. Lipolysis
  E. All of the above
* F. Answers a, c, and d only

58) What function(s) can the albumin/globulin ratio represent?

  A. immune activity
  B. renal function
  C. protein metabolism
  D. inflammation
* E. All of the above

59) Pancreatic lipase acts in the small intestine to convert triglyceride substrates found in oils from food to monoglycerides and free fatty acids. These diffuse across the apical membrane of enterocytes and are converted into chylomicrons. Chylomicrons diffuse across the enterocyte basal membrane to enter circulation.

  A. True
* B. False

60) What is the functional difference between amino acid absorption of ruminants and non-ruminants?

  A. amino acids, once broken down in the rumen by intestinal flora, proceed to the intestine, then the blood in ruminants
  B. dietary proteins can be transported into the blood in non-ruminants
  C. the intestine serves as the only site for breakdown of dietary proteins in non-ruminants
  D. non-ruminants use chymotrypsin and trypsin to break down dietary proteins, while ruminants use rumen flora
* E. ruminants have an extra pathway using rumen flora for amino acid absorption through bacterial protein synthesis

61) A signaling molecule, unlike an antibody, can have a variety of functions, depending on the receptor it activates as well as the tissue where the receptor resides.

* A. True
  B. False

62) Which factor(s) are important to consider when assaying a serum protein sample?

  A. Sex of the animal
  B. Stress
  C. Age
  D. Pregnancy status
* E. All of the above
  F. A and C

63) An example of a signaling molecule that uses intracellular receptors is testosterone.

* A. True
  B. False

64) Cholera is characterized by a malfunction in G-protein deactivation.

  A. False
* B. True

65) When taking a measurement of serum lipids using the Lipemia Refrigeration Test, the following statement is false

  A. A turbid sample after refrigeration implies a serum sample rich in VLDL
  B. A layer on top of the sample which is milky in color is an indication of a high concentration of chylomicrons in the sample
* C. A Sample which shows both turbidity as well as a milky top layer has a mixture of chylomicrons, LDLs, and VLDLs
  D. All the above statements are true

66) Amino acids are small biomolecules that contain at least 2 amino groups bound to a carbon molecule.

* A. False
  B. True

67) Where are acute phase proteins produced

* A. Liver
  B. Blood stream, by Macrophages
  C. Blood stream, by Monocytes
  D. Kidney
  E. Spleen

68) Paracrine signalling is a form of cell signalling in which the target cell is same as the signal releasing cell

* A. False
  B. True

69) Which of the following statements about production of LCFAs for energy is true?

  A. CAT I and CAT II are used to allow LCFAs into the cell to be used as energy
  B. CAT I and CAT II are used by the mitochondria for energy
* C. CAT I and CAT II are used to allow LCFAs into the mitochondria to be used for energy
  D. CAT I and CAT III are used to allow LCFAs into the mitochondria to be used for energy

70) If you had performed a biochemical profile on an animal and had found elevated insulin levels, normal serum amylase and lipase levels, and hypoglycemia, what would be the most likely diagnosis?

  A. Pancreatic insufficiency
  B. Diabetes type II
  C. Diabetes type I
  D. Pancreatitis
* E. Insulinoma

71) The pancreas secretes bicarbonate to decrease the pH of digesta so that its digestive enzymes will be activated.

  A. True
* B. False

72) What is the best laboratory diagnostic test for diagnosing pancreatitis?

* A. Serum trypsin-like immunoreactivity (TLI)
  B. Serum lipase
  C. Serum amylase
  D. Trypsinogen activation peptide (TAP)
  E. All methods are equal for diagnosing pancreatitis.

73) Hormones that influence lipid metabolism with their corresponding effect include
:

  A. insulin - promotes formation of triglycerides for lipid storage
  B. thyroid hormone - promotes formation of triglycerides for lipid storage
  C. growth hormone - promotes formation of VLDLs in the liver required to deliver triglycerides
to peripheral tissues
  D. a, b, and c
* E. a and c

74) Movement of molecules through an ion channel-linked receptor requires ATP

  A. True
* B. False

75) Neonate pigs are often hypoglycemic, but this is common in all baby mammals.

  A. True
* B. False

76) Which of the following is NOT a gamma globulin?

  A. IgM
  B. IgE
  C. IgA
  D. IgG
* E. IgC

77) How would you measure globulin concentration in serum?

  A. Biuret method
  B. Thin line chromatography
  C. Bromcrescol green assay
* D. A and C
  E. B and C

78) To maintain blood glucose during fasting, liver cells carry out gluconeogenesis.
Gluconeogenesis uses which of the following molecule(s) as precursors:

* A. Lactate
  B. Fructose
  C. Acetate
  D. Butyrate
  E. All of the above

79) Insulin and glucagon are normally released in a coordinated fashion so that when insulin levels rise, glucagon levels fall, and vice versa

  A. False
* B. True

80) Ketones are normally present in urine

* A. False
  B. True

81) Type 2 diabetes is caused by the inability of the pancreas to produce enough insulin

  A. True
* B. False

82) Ketone formation depends on the amount of energy already in the cell as indicated by oxaloacetate and TCA cycle intermediates.

  A. False
* B. True

83) Proteins are all EXCEPT:

* A. Able to be stored in a specific storage molecule
  B. A majority of a cell's dry weight
  C. A combination of NH2, COOH, a carbon backbone, and an R side chain
  D. Able to combine with lipids to form specific structural molecules
  E. All of the above are true

84) Carnitine needs to be bound to LCFAs so that they can be utilized to produce energy within the cell

  A. True
* B. False

85) Tyrokinase receptors are 'turned off' when the ligand disassociates from the receptor or when the receptor is dephosphorylated

* A. True
  B. False

86) Blood plasma is used for the measurement of enzyme activity

* A. False
  B. True

87) A high glucagon:insulin ratio results in an increase of the following in the blood

  A. LCFA
  B. Ketones
  C. VLDL
* D. All of the above
  E. A and B

88) When acetate is absorbed by the ruminant, it gets used for

* A. creation of LCFAs
  B. glycolysis
  C. creation of ketones
  D. gluconeogenesis
  E. glycogenolysis

89) Epinephrine and norepinephrine inhibit insulin secretion and stimulate glucagon secretion.

* A. True
  B. False

90) Buddy, a dog, suffers from insulinoma. This means that his pancreas is damaged and cannot produce enough insulin.

  A. True
* B. False

91) Chylomicron constituents include:

  A. bile acids, free cholesterol, phospholipids
  B. triglycerides, bile acids, phospholipids
  C. apolipoprotein, free cholesterol, non-esterified fatty acids
* D. apolipoprotein, free cholesterol, phospholipids

92) The breakdown of triglycerides stored in adipocytes is known as lipolysis. During this process, LCFAs, packaged into VLDLs by adipocytes, are released into the bloodstream and circulate to cells in need of energy.

* A. False
  B. True

93) A G protein consists of two units : G-alpha-GTP and G-beta/gamma. The alpha subunit, primarily, determines the intracellular proteins affected.

  A. False
* B. True

94) Myasthenia Gravis can be put into transient remission by administration of acetylcholine inhibitors, which reduces the over-stimulation of acetylcholine receptors in neuromuscular junctions.

* A. False
  B. True

95) In an animal with type I diabetes, how do pancreatic hormones in the blood stream impact adipocytes

  A. No impact. Insulin is low, so glucagon will also be low.
* B. The elevated glucagon:insulin ratio would activate hormone-sensitive lipase to break down triglycerides into LCFA and glycerol
  C. The elevated glucagon:insulin ratio would activate hormone-sensitive lipase inhibiting the creation of ketone bodies
  D. The elevated glucagon:insulin ratio would de-activate hormone-sensitive lipase inhibiting break down of triglycerides into LCFA and glycerol

96) The brain, skeletal, cardiac muscles and liver are able to use acetoacetate and Beta-hydroxy as an energy source.

  A. True
* B. False

97) Large scale production of LCFAs takes place in mammary, liver, and adipose tissue in ruminants; and in mammary and adipose tissue in non-ruminants.

  A. True
* B. False

98) This enzyme is responsible for breakdown of Triglyceride into glycerol and LCFA (long chain fatty acids) and is activated by this substrate.

* A. hormone sensitive lipase, activated by glucagon
  B. hormone sensitive lipase, activated by insulin
  C. CAT II, activated by glucagon
  D. CAT I, activated by insulin

99) Pregnancy/lactation, type II diabetes, and fasting could result in a high glucagon:insulin ratio

* A. False
  B. True

100) In the presence of oxygen, glucose is converted to pyruvate, which is then converted to lactate.

* A. False
  B. True

101) Consequences of high levels of ketones in the bloodstream

  A. appetite suppression
  B. anorexia/weight loss
  C. weakness
  D. fatty liver
* E. all of the above

102) Some methods used to measure serum protein include Biuret method, Refractometry, Bromcresol green assay and Serum Protein Electrophoresis

* A. True
  B. False

103) What is the pattern of albumin concentration over an animal’s lifetime?

  A. Constant throughout life
  B. High when colostrum received, decrease throughout life
* C. Low at birth, rise throughout life, decreasing with old age
  D. low at birth, increasing throughout life

104) The generic term for an enzyme that removes phosphate groups from proteins is?

  A. Phosphorylase
  B. Phosphate
  C. Kinase
* D. Phosphatase

105) What is the general name for the class of compounds absorbed by ruminants following digestion of dietary carbohydrates?

* A. Volatile fatty acids
  B. LCFA
  C. VLDL
  D. Glucose, Fructose and Sucrose
  E. None of the above
  F. All of the above

106) The cell membrane contains receptor proteins. These are particularly important because they are the only way that communication signals can reach a cell.

* A. False
  B. True

107) Muscles and the Liver can store glycogen. Muscles cannot contribute to blood glucose but the liver can. Why?

* A. Muscles do not possess glucose-6-phosphatase
  B. Muscles do not have GLUT4 glucose transporters
  C. Muscles do not contain hexokinase
  D. None of the above

108) Examining urine glucose levels is a good early indicator of diabetes.

  A. True
* B. False

109) When butyrate is absorbed by the ruminant, it gets used for

  A. creation of LCFAs
  B. glycogenolysis
  C. gluconeogenesis
* D. creation of ketones
  E. glycolysis

110) Plotting the response of insulin to an intravenous glucose tolerance test can distinguish type I diabetes from type II diabetes.

  A. False
* B. True

111) Ketosis is particularly likely to develop in ruminants during pregnancy or lactation

* A. True
  B. False

112) In neuromuscular junctions, acetylcholine receptors control ion channels

* A. True
  B. False

113) Muscle glycogen cannot, directly or indirectly, contribute to blood glucose levels

* A. False
  B. True

114) HDL's main function is to transport LCFAs from the liver to other parts of the body (endogenous pathway)

  A. True
* B. False

115) In an animal with type I diabetes describe the levels of pancreatic hormones in circulation

  A. Insulin high, glucagon low (low glucagon:insulin ratio)
  B. Insulin low, glucagon low
  C. Insulin high, glucagon high
* D. Insulin low, glucagon high (high glucagon:insulin ratio)

116) In an animal with type I diabetes, how do pancreatic hormones in the blood stream impact adipocytes

  A. The elevated glucagon:insulin ratio would de-activate hormone-sensitive lipase inhibiting break down of triglycerides into LCFA and glycerol
  B. The elevated glucagon:insulin ratio would activate hormone-sensitive lipase inhibiting the creation of ketone bodies
* C. The elevated glucagon:insulin ratio would activate hormone-sensitive lipase to break down triglycerides into LCFA and glycerol
  D. No impact. Insulin is low, so glucagon will also be low.

117) The following are some of the molecules absorbed by ruminants following carbohydrate digestion (multiple answers)

* A. Butyrate
  B. LCFA
* C. Propionate
  D. Glucose
* E. Acetate

118) When propionate is absorbed by the ruminant, it gets used for

* A. gluconeogenesis
  B. glycolysis
  C. creation of ketones
  D. creation of LCFAs
  E. glycogenolysis

119) When butyrate is absorbed by the ruminant, it gets used for

* A. creation of ketones
  B. glycogenolysis
  C. glycolysis
  D. creation of LCFAs
  E. gluconeogenesis

120) When acetate is absorbed by the ruminant, it gets used for

  A. glycolysis
* B. creation of LCFAs
  C. creation of ketones
  D. gluconeogenesis
  E. glycogenolysis

121) Cytokine release from macrophages/monocytes initiate the acute phase protein response?

* A. True
  B. False

122) Where are acute phase proteins produced?

  A. Blood stream, by Macrophages
  B. Spleen
* C. Liver
  D. Blood stream, by Monocytes
  E. Kidney

123) Glycogenolysis primarily occurs in tissue cells of the body

* A. False
  B. True

124) What function(s) can albumin/globulin ratio represent (single answer)?

  A. Immune activity
  B. Renal function
  C. Protein metabolism
  D. Inflammation
* E. All of the above

125) What effect does dehydration have on the A/G ratio

  A. Hypoalbuminemia
  B. Hyperglobulinemia
* C. No effect
  D. Decreases concentration of albumin and globulin equally

126) Transamination is a process in which

  A. An amine group is removed from a molecule and sent to the urea cycle
  B. An amine group is transferred from an alpha-keto acid to an amino-acid
  C. Alpha-ketoglutarate donates its amine group to an amino acid, like glutamate
  D. A protein is broken down into its amino-acids
* E. An amine group is transferred from an amino-acid to an alpha-keto acid

127) Deamination is a process in which

  A. A protein is broken down into its amino-acids
  B. Alpha-ketoglutarate donates its amine group to an amino acid, like glutamate
* C. An amine group is removed from a molecule and sent to the urea cycle
  D. An amine group is transferred from an alpha-keto acid to an amino-acid
  E. An amine group is transferred from an amino-acid to an alpha-keto acid

128) Aspartate aminotransferase is an enzyme that catalyzes

* A. Transamination
  B. Transamination or Deamination, depending on the amino acid
  C. The Urea cycle
  D. Deamination

129) Ammonia can be recycled into protein

  A. through transamination
  B. through deamination
  C. in the urea cycle
* D. by microorganisms
  E. by oxidative phosphorylation

130) Transamination and deamination of proteins in the liver is

  A. To conjugate Bilirubin
  B. The first step in the creation of plasma proteins
* C. To catabolize excess amino acids
  D. To get rid of toxins (like ammonia) through the urea cycle

131) When protein is catabolized in muscle, toxic ammonia is removed as follows

  A. Deamination of ammonia
  B. Transamination or Deamination, depending on the amino acid
* C. Ammonia reacts with glutamate to produce glutamine. This is broken down in the kidney, where ammonia is excreted in urine.
  D. Ammonia diffuses into the blood and is taken to the liver where it is converted into urea

132) A high BUN (Blood Urea Nitrogen) points to a malfunction in :

  A. TCA cycle
* B. Kidney
  C. Gall bladder (obstruction)
  D. Spleen
  E. Liver

133) Birds excrete ammonia using uric acid while animals always excrete ammonia as urea or ammonia dissolved in urea.

  A. True
* B. False

134) The liver is believed to have over 500 functions. In most healthy animals the liver is operating at approximately what percentage of its maximum potential?

  A. 75
  B. 50
* C. 30
  D. 120 (like most crocodiles)
  E. 10

135) The parenchymal cell of the liver is the hepatocyte. Along with endothelial cells that line sinusoids, they constitute approximately what % of cells belonging to the liver?

  A. less than 50%
  B. 80%
* C. 95-98%
  D. 60%

136) Periportal hepatocytes

* A. Tend to have aerobic functions as they reside close to the hepatic arteriole and portal venule
  B. Tend to have anaerobic functions as they contain a biliary pole
  C. Tend to have aerobic functions as they contain a vascular pole
  D. Tend to have anaerobic functions because they reside close to the central venule

137) Cholestrol is present in every animal cell. It also is required for the production of bile salts, steroid hormone synthesis, cell membranes, myelin and lipoproteins. Its production is regulated by which enzyme

* A. HMG-COA reductase
  B. Cholestrol aminotransferase
  C. HMG-COA dehydrogenase
  D. Cholestro-transferase

138) Regulation of cholestrol synthesis is carried out by

  A. Synthesis isn't regulated. Instead, excess is excreted by the kidney
* B. By controlling both the activity and levels of HMG CoA Reductase
  C. By controlling the levels of HMG Coa Reductase
  D. By controlling the activity of HMG Coa Reductase

139) Most of the cholestrol used to create bile

  A. Facilitates the digestion of protein
  B. Is lost in the feces
  C. Is used to facilitate the excretion of bilirubin
* D. Is reabsorbed in the ileum

140) A portosystemic shunt

* A. Occurs when part of the portal system bypasses the liver
  B. Results in reduced bile secretion into the intestine
  C. Is a bile duct blockage
  D. Is usually the result of severe trauma to the abdomen

141) Cholestasis is

  A. Reduced production of bile due to liver failure
* B. Blockage of the flow of bile from the liver to the intestine
  C. Reduced synthesis of cholestrol
  D. Excessive production of cholestrol

142) Bilirubin is formed by the breakdown of senescent RBCs in the

* A. Reticuloendothelial system
  B. Spleen only
  C. Spleen, Liver and Kidney
  D. Liver only

143) Diazo dye detects

* A. Conjugated bilirubin because it is soluble
  B. Conjugated bilirubin because it is insoluble
  C. Unconjugated bilirubin because it is soluble
  D. Unconjugated bilirubin because it is insoluble

144) Bilirubin, in a healthy animal

  A. If conjugated, will not pass through the glomerulus
  B. Is normally present in small quantities in urine
* C. Is not normally present in urine
  D. If unconjugated, being a smaller molecule, will pass through the glomerulus
  E. Is never present in blood serum

145) The brownish color of feces is due to

* A. Stercobilin
  B. Urobilinogen
  C. Conjugated bilirubin
  D. Unconjugated bilirubin

146) Under conditions of hepatic lipidosis, a blood test could show the following

  A. AST, ALT, Albumin and bile acids higher than normal; Bilirubin lower than normal
  B. AST, ALT normal; Bile acids, Bilirubin higher than normal; Albumin lower than normal
* C. AST, ALT, Bilirubin and bile acids higher than normal; Albumin lower than normal
  D. AST, ALT, Albumin normal; Bile acids higher than normal; Bilirubin lower than normal

147) Peptides are broken down into free amino acids and di/tripeptides at the level of the

  A. membrane of the stomach
  B. lumen of the small intestine
* C. membrane of the small intestine
  D. lumen of the stomach

148) Proteins can only be taken up by enterocytes in the form of amino acids

  A. True
* B. False

149) Which of the following statements is true”

* A. The small intestine is the main site of protein digestion, pancreatic proteolytic enzymes work at neutral pH
  B. The stomach is the main site of protein digestion, gastric enzymes work in neutral pH
  C. The small intestine is the main site of protein digestion, pancreatic proteolytic enzymes work at low pH
  D. The stomach is the main site of protein digestion, gastric enzymes work at high pH

150) Which of the following enzymes are found only in the small intestine?

  A. chymosin (rennin)
  B. pepsin
  C. intestinogen
* D. trypsin

151) Which of the following is true concerning di/tripeptides and amino acids in the adult gut lumen-enterocyte interface

  A. they are actively transported by chloride transporters
  B. they are absorbed by pinocytosis
  C. they are cotransported with bicarbonate
* D. they are cotransported with sodium

152) Which of the following is true regarding carbohydrate and protein digestion in the intestine?

  A. Proteins must be absorbed only as amino acids whereas carbohydrates can be taken up as disaccharides or glucose
* B. Carbohydrates must be absorbed only as simple sugars whereas proteins can be taken up as di/tripeptides and amino acids
  C. Carbohydrates can be taken up as di/trisaccharides and broken down into glucose within the enterocyte
  D. Both carbohydrates and proteins must be broken down to their basic building blocks (glucose and amino acid respectively) before they can be absorbed

153) Mammals can never absorb large peptides through the gut

* A. False
  B. True

154) The acute phase responder protein in horse and cows during an inflammation is:

  A. Enterokinase
  B. Globulin
  C. Albumin
* D. Fibrinogen

155) Relative hyperproteinemia refers to

  A. increase in albumin only
  B. increase in fibrinogen only
  C. increase in globulin only
  D. increase in the A/G ratio
* E. none of the above