<Q>Which of the following best describes carnitine?

<S>Y

<C+>It transports fatty acids across the inner mitochondrial membrane for breakdown.

<C>It transports acetyl-CoA to the cytosol for fatty acid synthesis.

<C>It's a precursor of cholesterol.

<C>It carries growing acyl chains during fatty acid synthesis.

<Q>Where in the cell does beta-oxidation occur?

<S>Y

<C>Cytoplasm.

<C>Outer mitochondrial membrane.

<C>Mitochondrial intermembrane space.

<C+>Mitochondrial matrix.

<Q>The metabolically activated form of a fatty acid is

<S>Y

<C>an ester

<C>a Schiff base

<C>a phosphate ester

<C+>a thioester linkage to Coenzyme A

<Q>The following vitamins and cofactors are all used in beta-oxidation, except:

<S>Y

<C+>Biotin

<C>Niacin

<C>Pantothenic acid

<C>Riboflavin

<Q>The processing of one molecule of stearic acid (18 carbons) by beta-oxidation

<S>Y

<C+>requires 8 cycles of beta-oxidation and produces 9 molecules of acetyl-CoA

<C>requires 8 cycles of beta-oxidation and produces 8 molecules of acetyl-CoA

<C>requires 9 cycles of beta-oxidation and produces 8 molecules of acetyl-CoA

<C>requires 9 cycles of beta-oxidation and produces 9 molecules of acetyl-CoA

<Q>A key intermediate in the catabolism of fatty acids with odd numbers of carbon atoms is:

<S>Y

<C>malonyl-CoA

<C+>propionyl-CoA

<C>oxaloacetate

<C>phosphoenolpyruvate

<Q>The conversion of methylmalonyl-CoA to succinyl-CoA involves which of these cofactors?

<S>Y

<C>thiamine pyrophosphate

<C+>Vitamin B12

<C>NAD+

<C>biotin

<Q>A key intermediate in the formation of "ketone bodies" is

<S>Y

<C>succinyl-CoA

<C>methyl malonyl-CoA

<C>propionyl-CoA

<C+>acetoacetyl-CoA

<Q>Where in the cell does fatty acid synthesis occur?

<S>Y

<C+>Cytoplasm.

<C>Mitochondrial matrix.

<C>Mitochondrial intermembrane space.

<C>Inner mitochondrial membrane.

<Q>Reduction reactions during fatty acid synthesis utilize the following Coenzyme:

<S>Y

<C>FADH2.

<C>NADH.

<C+>NADPH.

<C>FADH2 and NADH.

<Q>The ultimate precursor of all the carbon atoms in steroids is

<S>Y

<C+>acetyl-CoA (acetyl group)

<C>oxaloacetate

<C>succinyl-CoA (succinyl group)

<C>alpha-ketoglutarate

<Q>Cholesterol is a precursor of all of the following compounds, except:

<S>Y

<C>cortisone

<C>testosterone

<C>progesterone

<C+>insulin

<Q>All of the following describe Beta-oxidation, except:

<S>Y

<C>Two-carbon units are eliminated during each cycle.

<C+>The process occurs in the mitochondrial intermembrane space.

<C>The process is the primary route to fatty acid degradation.

<C>The two-carbon units are eliminated from the carboxyl end of the fatty acid

<Q>Advantages of fatty acids as primary energy storage molecules include all these points except

<S>Y

<C>they are more reduced than carbohydrates

<C>they are hydrophobic in nature and can pack more efficiently in fat storage cells

<C+>they are more readily available for immediate metabolic needs

<C>they contain more energy per gram than carbohydrates

<Q>The carrier molecule which transports fatty acids through the inner mitochondrial membrane is:

<S>Y

<C>ATP

<C+>Carnitine

<C>Coenzyme A

<C>Lipoic Acid

<Q>Products of the activation of fatty acids includes all of the following, except:

<S>Y

<C>A thioester

<C+>ADP

<C>Pyrophosphate

<C>AMP

<Q>Ketone bodies are formed when

<S>Y

<C>oxaloacetate is converted to acetoacetyl-CoA

<C>there is a deficiency of acetyl-CoA

<C+>there is not enough oxaloacetate to react with available acetyl-CoA

<C>an organism consumes excessive amounts of carbohydrate compared to its lipid intake

<Q>Acetyl-CoA carboxylase uses which of these cofactors?

<S>Y

<C>Thiamine pyrophosphate

<C>Vitamin B12

<C>Lipoic acid

<C+>Biotin

<Q>Which of the following statements about beta-oxidation is incorrect?

<S>Y

<C>It occurs in the mitochondrial matrix

<C+>It starts at the methyl end

<C>It is an oxidative process

<C>It requires carnitine

<Q>Which of the following enzymes catalyzes the rate-limiting step of cholesterol biosynthesis from acetyl-CoA?

<S>Y

<C>acetyl-CoA carboxylase

<C>citrate lyase

<C+>HMG-CoA reductase

<C>mevalonate kinase

<Q>Under starvation conditions acetoacetate is the preferred source of energy in:

<S>Y

<C+>Brain.

<C>Liver.

<C>Heart muscle

<C>Red blood cells.

<Q>Which of the following statments is NOT CORRECT regarding lipid metabolism?

<S>Y

<C>It represents a more efficient way of energy storage than carbohydrates

<C+>Epinephrine decreases lipid catabolism

<C>Fatty acids are the main source of energy in lipid catabolism

<C>Bile acids are derived from cholesterol

<Q>Which of the following statements is NOT CORRECT regarding activation of fatty acids for catabolism?

<S>Y

<C>It occurs in the cytosol

<C>It releases pyrophosphate (PPi)

<C>It is catalyzed by acyl-CoA synthetase enzyme

<C+>It produces acetyl-CoA

<Q>Which of the following statements is CORRECT regarding ketone bodies?

<S>Y

<C>they arise when excessive intake of carbohydrates compared to fats

<C+>they arise when an excess of acetyl-CoA produced from beta-oxidations of fatty acids and shortage of oxaloacetate in cells

<C>they are formed in the cytosol

<C>causes a condition called alkalosis

<Q>During fatty acid synthesis, chain lengthening and formation of double bonds occur in

<S>Y

<C+>endoplasmic reticulum

<C>cytosol

<C>mitochondrial matrix

<C>mitochondrial intermembrane space

<Q>Presence of high cholesterol in cells causes all of the followings EXCEPT:

<S>Y

<C>Activates acyl-CoA:cholesterol acyltransferase

<C>inhibits HMG-CoA reducatse

<C>inhibits synthesis of mevalonate

<C+>Activates the synthesis of LDL receptors

<Q>Which of the following is involved in the transport of dietary lipids?

<S>Y

<C+>Chylomicrons.

<C>VLDL.

<C>HDL.

<C>LDL

<Q>In humans, acetyl CoA can be produced from catabolism of ALL OF THE FOLLOWING EXCEPT

<S>Y

<C+>cholesterol

<C>fatty acids

<C>amino acids

<C>glucose

<Q>Acetyl-CoA is made available in the cytosol by the action of the enzyme:

<S>Y

<C>Citrate synthase

<C+>Citrate lyase

<C>HMG-CoA lyase

<C>Fatty acid synthase

<Q>Which statement best describes the fate of propionyl-CoA in mammalian systems?

<S>Y

<C+>Propionyl-CoA is metabolized finally to succinyl-CoA

<C>Propionyl-CoA is converted to acetyl CoA.

<C>Propionyl-CoA and acetyl CoA condense to form a 5 carbon precursor of a citric acid cycle intermediate.

<C>Propionyl-CoA is oxidized to malonate and CoA.

<Q>An intermediate common to the biosynthesis of cholesterol and the biosynthesis of ketone bodies is:

<S>Y

<C>methylmalonyl-CoA

<C>succinyl-CoA

<C>cholyl-CoA

<C+>HMG-CoA

<Q>Acetyl-CoA carboxylase reQuires all of the following for activity EXCEPT:

<S>Y

<C>Biotin.

<C>Bicarbonate.

<C>ATP.

<C+>Pyridoxal phosphate.

<Q>Fatty acid catabolism produces all of the following EXCEPT:

<S>Y

<C>Acetyl-CoA

<C>NADH

<C+>NADPH

<C>FADH2

<Q>Propionyl-CoA is produced from:

<S>Y

<C>Oxidation of saturated fatty acids with an even number of carbon atoms

<C+>Oxidation of fatty acids with an odd number of carbon atoms

<C>Oxidation of unsaturated fatty acids with an even number of carbon atoms

<C>Oxidation of steroids

<Q>Acetyl-CoA carboxylase complex contains all of the following enzymes EXCEPT:

<S>Y

<C+>carnitine acyltransferase I

<C>biotin carboxylase

<C>biotin carrier protein

<C>carboxyl transferase

<Q>How many NADH are produced from complete oxidation of stearic acid (C18:0)?

<S>Y

<C>8

<C>27

<C+>35

<C>18

<Q>Which of the following has the lowest density?

<S>Y

<C+>Chylomicrons.

<C>VLDL.

<C>HDL.

<C>LDL

<Q>Which of the following pairs of compounds are derived from cholesterol?

<S>Y

<C+>aldosteron and cortisone

<C>cortisone and glycogenin

<C>glycocholate and glycogenin

<C>mevalonate and estradiol

<Q>The enzyme that catalyzes the transfer of fatty acyl group from Acyl-CoA to form O-Acylcarnitine in the mitochondria is

<S>Y

<C>Acyl-CoA synthetase

<C+>carnitine acyltransferase (CPT-I)

<C>carnitine acylcarnitine translocase

<C>acyl CoA synthetase

<Q>Which of the following statements is CORRECT about the beta oxidation of stearic acid (C18:0)?

<S>Y

<C+>its complete oxidation requires 8 molecules of water

<C>its complete oxidation produces 9 CoA molecules

<C>occurs in 9 cycles

<C>occurs in the cell cytosol

<Q>HMG-CoA is an intermediate in the biosynthesis of

<S>Y

<C+>acetoacetate

<C>citrate

<C>glucose

<C>palmitic acid

<Q>Which of the following molecules is not an intermediate in the biosynthesis of cholesterol?

<S>Y

<C+>Βhydroxybutyrate

<C>acetoacetyl-CoA

<C>mevalonate

<C>squalene

<Q>The second step in fatty acid oxidation cycle is:

<S>Y

<C>oxidation

<C+>hydration

<C>dehydration

<C>cleavage by the thiolase

<Q>The first condensation step in the biosynthesis of fatty acids occurs between

<S>Y

<C+>acetyl group bound to the enzyme synthase and malonyl group bound to the acyl carrier protein

<C>acetyl group bound to the acyl carrier protein and malonyl group bound to coenzyme-A

<C>acetyl group bound to coenzyme-A and malonyl group bound to the acyl carrier protein

<C>both acetyl and malonyl groups are bound to the acyl carrier protein

<Q>In human cells acetyl-CoA can be used for the synthesis of the following compounds EXCEPT

<S>Y

<C>malonyl-CoA

<C>acetone

<C+>pyruvate

<C>cholesterol

<Q>Which of the following is the product of the rate limiting step in cholesterol biosynthesis?

<S>Y

<C>Glycocholic acid

<C>beta-hydroxybutyrate

<C>Cholesterol

<C+>Mevalonate

<Q>Which of the following enzyme and coenzyme pairs are required for the first oxidative step in the beta-oxidation of fatty acids

<S>Y

<C>3-ketoacyl CoA dehydrogenase and FAD

<C>trans-delat2-enoyl CoA reductase and NADH

<C>3-hydroxyacyl CoA dehydrogenase and NAD

<C+>acyl CoA dehydrogenase and FAD

<Q>What is the net number of ATP produced from the complete oxidation of butanoic acid (C4:0) into CO2 and H2O?

<S>Y

<C>18

<C>20

<C+>22

<C>24

<Q>Which of the following is necessary for fatty acid biosynthesis?

<S>Y

<C+>NADPH

<C>NADH

<C>NAD+

<C>NADP+

<Q>Free fatty acids required by cells are obtained from all the following sources EXCEPT:

<S>Y

<C>hydrolysis of triacylglycerols

<C>hydrolysis of phospholipids

<C>internal biosynthesis

<C+>hydrolysis of sphingosine

<Q>Which of the following is a glucocorticoid?

<S>Y

<C>Cholic acid

<C>Progesterone

<C+>Cortisone

<C>Aldosterone

<Q>Which of the following is necessary for fatty acid biosynthesis?

<S>Y

<C+>NADPH

<C>NADH

<C>NAD+

<C>NADP+

<Q>The last carrier of the malonyl group during fatty acid biosynthesis is:

<S>Y

<C>CoA-SH

<C>HS-KSase

<C+>ACP-SH

<C>biotin

<Q>Which of the following statements is CORRECT about the beta oxidation of arachidic acid [20:0]?

<S>Y

<C>its complete oxidation requires 10 molecules of water

<C>its complete oxidation produces 9 CoA molecules

<C+>occurs in 9 cycles

<C>occurs in the cell cytosol

<Q>Free fatty acids obtained from hydrolysis of triacylglycerols can undergo all the following processes EXCEPT:

<S>Y

<C>re-use by cells for different purposes

<C+>conversion into acetyl-CoA in the cytosol

<C>conversion into acetyl-CoA in the mitochondria

<C>complete oxidation

<Q>Regarding ketone bodies, which of the following statements is INCORRECT

<S>Y

<C>they are formed mainly in the liver and used by other organs

<C>their presence in blood cuases ketoacidosis

<C+>they are water insoluble

<C>they can be used by heart muscle as a source of energy

<Q>In human cells acetyl-CoA can be used for the synthesis of the following compounds EXCEPT

<S>Y

<C>malonyl-CoA

<C>acetone

<C+>pyruvate

<C>cholesterol

<Q>A key intermediate in the catabolism of fatty acids with uneven numbers of carbon atoms is

<S>Y

<C+>propionyl-CoA

<C> malonyl-CoA

<C> oxaloacetate

<C> phosphoenolpyruvate

<Q> Which of the following best describes carnitine?

<S>Y

<C+>It transports fatty acids across the inner mitochondrial membrane for breakdown.

<C> It transports acetyl-CoA to the cytosol for fatty acid synthesis.

<C> It's a precursor of cholesterol.

<C> It carries growing acyl chains during fatty acid synthesis.

<Q>The metabolically activated form of a fatty acid is

<S>Y

<C> an ester

<C> a Schiff base

<C> a phosphate ester

<C+>a thioester

<Q>The first three reactions of the beta-oxidation cycle of fatty acids produce

<S>Y

<C> two moles of FADH2

<C+>one mole each of NADH and FADH2

<C> two moles of ATP

<C>three moles of ATP

<Q>Carnitine acyltransferase I is located in the mitochondrion within the

<S>Y

<C>intermembrane space

<C>outer membrane

<C+>inner membrane

<C>matrix

<Q>The oxidation of unsaturated fatty acids specifically requires

<S>Y

<C>a cis-trans isomerase and an epimerase

<C+>a cis-trans isomerase and a dehydrogenase

<C> a dehydrogenase and an epimerase

<C> a dehydrogenase and a hydrase

<Q>The addition of two-carbon units to a growing fatty acid chain is directly driven by:

<S>Y

<C> reduction of NADP+

<C> oxidation of NADPH

<C+>decarboxylation of malonyl-CoA

<C> hydrolysis of ATP

<Q>The enzyme that catalyzes the transfer of fatty acyl group from Acyl-CoA to form O-Acylcarnitine in the mitochondria is

<S>Y

<C>Acyl-CoA synthetase

<C+>carnitine acyltransferase (CPT-I)

<C>carnitine acylcarnitine translocase

<C>acyl CoA synthetase

<Q>The source of oxygen for beta-oxidation is:

<S>Y

<C> CO2

<C> O2

<C> Peroxide

<C+>Water

<Q>Which lipid form is transported across the inner mitochondrial membrane before beta-oxidation?

<S>Y

<C+>acylcarnitine

<C> fatty acyl CoA

<C> acetoacetyl CoA

<C> lysophospholipid CoA

<Q>What is the main function of the carnitine shuttle system?

<S>Y

<C+>To transport fatty acids into the mitochondrion.

<C> To transport newly synthesized sphingolipids to the blood.

<C> To carry cholesterol from its site of synthesis in the endoplasmic reticulum to the plasma

membrane.

<C> To aid in the assembly of chylomicrons.