

Student name: _____

TRUE/FALSE - Write 'T' if the statement is true and 'F' if the statement is false.

Extant microorganisms are organisms from the fossil record that are no longer present on Earth today.

true

false

Microbiologists study a variety of organisms, but all are considered either *Bacteria* or *Archaea*.

true

false

All eukaryotes have a membrane-delimited nucleus.

true

false

Viruses are not generally studied by microbiologists because they are not classified as living organisms.

true

false

Viruses constitute the fourth domain of life in current biological classification schemes.

true

false

The earliest microbial fossils that have been found are dated from approximately 4.5 million years ago.

true

false

Fanny Hesse first suggested that agar be used to solidify microbiological media.

true

false

M. J. Berkeley demonstrated that the great potato blight of Ireland was caused by a water mold (then thought to be a fungus).

true

false

Invisible living creatures were thought to exist and cause disease long before they were ever observed.

true

false

Koch's postulates were instrumental in establishing that the intracellular parasite *Mycobacterium leprae* is the causative organism of leprosy.

true

false

Edward Jenner's work in preventing rabies led to the use of the term vaccination to describe a type of procedure used in the prevention of disease.

true

false

Although developed over 100 years ago, Koch's postulates continue to be used to find the causative organism for all known human infectious diseases.

true

false

Viruses and bacteria were first cultured in the laboratory at about the same time.

true

false

Charles Chamberland developed porcelain filters that allowed other scientists to demonstrate that viruses are smaller than bacteria.

true

false

The first disease to be identified as being caused by a virus was tobacco mosaic disease.

true

false

John Tyndall demonstrated that microorganisms present in the air are carried on dust particles.

true

false

Agostino Bassi demonstrated that a type of silkworm disease was caused by a fungus and proposed that many diseases are caused by microorganisms.

true

false

The usefulness of agar in solidifying microbiological growth media is limited because it does not remain solid at temperatures above 28°C.

true

false

Robert Koch developed a vaccine that could be used to prevent anthrax.

true

false

The endosymbiotic hypothesis is generally accepted as the origin of eukaryotic organelles.

true

false

The relationship between specific bacteria and specific diseases was first demonstrated by Koch.

true

false

Some microorganisms are useful in bioremediation processes that reduce the effects of pollution.

true

false

MULTIPLE CHOICE - Choose the one alternative that best completes the statement or answers the question.

Protists contain all of the following forms of life EXCEPT _____.

protozoa

fungi

slime molds

algae

Cells with a relatively complex morphology that have a true membrane-delimited nucleus are called _____.

prokaryotes

eukaryotes

urkaryotes

nokaryotes

Cells with a relatively simple cell morphology that do not have a true membrane-delimited nucleus are called _____.

prokaryotes

eukaryotes

urkaryotes

nokaryotes

The ribosomal RNA studies that led to the division of prokaryotic organisms into the Bacteria and the Archaea were begun by_____.

Pasteur

Woese

Needham

Watson

Proteins function in modern cells as _____.

catalysts

hereditary information

structural elements

both catalysts and structural elements

RNA is a key intermediate molecule involved in the process that uses the information stored in DNA to ultimately produce _____.

carbohydrates

proteins

lipids

RNA

Which of the following distinguishes the field of microbiology from other fields of biology?

The size of the organism studied.

The techniques used to study organisms regardless of their size.

Both the size of the organism studied and the techniques employed in the study of organisms.

Neither the size of the organism studied nor the techniques employed in the study of organisms regardless of their size.

In the following list of scientists, who developed a set of criteria that could be used to establish a causative link between a particular microorganism and a particular disease?

Fracastoro

Koch

Pasteur

Lister

In the following list of scientists who was the first to observe and accurately describe microorganisms?

Pasteur

Lister

van Leeuwenhoek

Tyndall

In the following list of scientists who provided the evidence needed to discredit the concept of spontaneous generation?

Pasteur

Koch

Semmelweis

Lister

The concept that living organisms arise from nonliving material is called_____.

biogenesis

cell theory

spontaneous generation

germ theory

The concept that human and animal diseases are caused by microorganisms is called the _____.

cell theory

germ theory

causative theory

disease theory

Whose work on spontaneous generation first demonstrated the existence of a very heat-resistant form of bacteria that are called endospores?

Schwann

Redi

Tyndall

Pasteur

Antiseptic surgery was pioneered by _____.

Pasteur

Lister

Jenner

Kitasato

Studies by Emil von Behring and Shibasaburo KITASATO demonstrated that inactivated toxins can induce the synthesis of antitoxins in the blood of rabbits. These antitoxins (antibodies) are the basis of _____.

humoral immunity

cell-mediated immunity

antibiotic immunity

phagocyte-mediated immunity

The first surgical antiseptic to be used was _____.

iodine

ethanol

phenol

None of the choices are correct.

Old cultures of bacteria that have lost their ability to cause disease are said to be _____.

impotent

virulent

pathogenic

attenuated

Who is credited with developing and documenting the first vaccination procedure against smallpox?

Koch

Pasteur

Jenner

Lister

Who is credited with developing a vaccine against chicken cholera?

Koch

Pasteur

Jenner

Lister

Who of the following first discovered that some blood leukocytes could engulf disease-causing bacteria?

von Behring

Meister

Metchnikoff

Ivanowski

The use of enrichment cultures and selective media was pioneered by_____.

Beijerinck

Jenner

Pasteur

von Behring

Which of the following provides the best explanation for why viruses are not included in the three-domain system?

Viruses are too small.

Viruses have either DNA or RNA, not both.

Viruses are not a cellular life form.

Viruses show no evidence of evolution.

A new microbe has been discovered in the rumen of sheep. Microscopy shows no evidence of a nuclear membrane, and biochemical studies of the cell wall demonstrate the lack of peptidoglycan. Metabolic studies show that this microbe generates methane. This microbe would most likely be classified in _____.

domain Bacteria

domain Archaea

domain Eukarya, Kingdom Fungi

domain Eukarya, Protists

What is the most compelling reason why “protists” are not considered to be a taxonomic group?

They are not cellular life forms.

They are too small to be included among the eukaryotes.

The group includes both prokaryotic and eukaryotic cell types.

The organisms often included in this group are very diverse and don’t form a cohesive taxon.

Scientists study microorganisms on Earth today to search for life forms elsewhere, as well as to explore the origins of life on Earth. These microorganisms that are studied are referred to as _____.

existing

extant

extinct

extirpated

An important aspect of agar that makes it a useful ingredient for solidifying media for bacterial culture is _____.

that it provides an excellent nitrogen source for bacteria

that bacteria are unable to break it down so it stays solidified

that it melts at 100°C and solidifies at temperatures below 40°C

that it provides an excellent carbon and energy source for bacteria

Which molecule is believed to have preceded the other two during the evolution of life?

Proteins

DNA

RNA

What is the most compelling reason why DNA, rather than RNA, evolved to be the storage repository for genetic information in cellular life forms?

DNA has deoxyribose rather than ribose.

DNA molecules are more chemically stable than RNA molecules.

DNA is double-stranded rather than single-stranded.

DNA molecules are larger than RNA molecules.

Each of the following provides evidence in support of the primary role of RNA in the evolution of life EXCEPT _____.

some RNA molecules are catalytic

RNA catalyzes peptide bond formation during protein synthesis

ATP (energy currency of the cell) is a ribonucleotide

RNA is less chemically stable than DNA

RNA can regulate gene expression

The appearance of organisms that carry out aerobic respiration likely evolved as organisms that release oxygen during photosynthesis gradually changed Earth's atmosphere. These photosynthetic organisms were the precursor for _____.

chloroplasts

mitochondria

the last universal common ancestor

eukaryotes

Which term is most inclusive? In other words, which term includes all the others?

Microbial species

Microbial strain

Biovars

Serovars

Which of the processes named here is the least likely to contribute to the evolution of genetic diversity of bacteria and archaea?

Mutation

Sexual reproduction

Binary fission

Horizontal gene transfer

A student is observing microorganisms in a sample of pond water. One organism of interest has an obvious nucleus, small oval structures containing a green pigment, and does not appear to be motile. In which of the following groups would this microbe most likely be classified?

Eukaryotes (Fungi)

Eukaryotes (Algae)

Bacteria

Archaea

Eukaryotes (Protozoa)

A student is observing microorganisms in a sample of pond water. One organism of interest has an obvious nucleus and has been moving rapidly during observation and appears to have rows of cilia along its surface. In which of the following groups would this microbe most likely be classified?

Eukaryotes (Fungi)

Eukaryotes (Algae)

Bacteria

Eukaryotes (Protozoa)

Morphovars, serovars, biovars, and pathovars are examples of terms that refer to microbial _____.

species

strains

types

Archaea

In a search for new antibiotics, a previously unknown organism has been recovered from the soil. It is nonmotile and is composed of long thread-like structures formed from nucleated cells. It is non-photosynthetic and absorbs its nutrients. This organism will most likely be classified among the _____.

bacteria

Archaea

eukaryotes (fungi)

eukaryotes (protozoa)

eukaryotes (algae)

Three of the SSU rRNA sequences of three organisms have been compared. For organisms 1 and 2, two of the twelve nucleotides in the sequence are different. For organisms 1 and 3, six of the twelve nucleotides are different. Which organism has a greater evolutionary distance from organism 1?

Organism 2

Organism 3

The evolutionary distance is the same.

Evolutionary distance cannot be predicted from this data.

Which group of microbes contains organisms necessary for production of wine and bread?

Bacteria

Archaea

Fungi

Algae

You discover a new microbe while working on a citizen scientist project. The microbe is taken to a lab that specializes in placing organisms in their correct phylogenetic niche. In order to determine its evolutionary relatedness to other microbes, the lab carries out_____.

SSU rRNA analysis

microscopic analysis

biochemical tests

DNA fingerprinting

You are a medical microbiologist in Dallas, TX. A small population of individuals spread throughout the city has been experiencing alarming yet similar symptoms affecting the liver that have physicians puzzled as to the etiology, although they all suspect it is microbial in nature. What steps would you take to elucidate the organism?

1. Sample the livers from affected patients to culture and compare organisms; 2. Grow the suspected organisms in culture; 3. Inoculate the cultured organisms into a laboratory animal and monitor for similar symptoms; 4. Culture and analyze the organism from the lab animal and determine relatedness.

1. Inoculate all suspected organisms into a laboratory animal and monitor for similar symptoms; 2. Biopsy the original patient's liver to look for organisms; 3. Grow the suspected organisms from the liver in culture; 4. Culture and analyze the organism from the lab animal and determine relatedness.

Sample the livers of all sick individuals and culture the organisms, comparing symptoms and microscopic characteristics.

1. Biopsy the patient's liver to look for organisms; 2. Culture the organisms obtained from the liver and run biochemical tests to determine similarities to other known liver pathogens; 3. Inoculate liver pathogens into lab animals to compare symptoms.

According to genome analysis, a member of the genus_____ is most closely related to the mitochondrion.

Escherichia

Agrobacterium

Prochloron

Rickettsia

According to the endosymbiosis hypothesis _____.

the first endosymbiotic event involved an anaerobic bacterium

the first endosymbiont was a fermentative organism

the mitochondrion evolved from the same endosymbiont as the hydrogenosome

All of the choices are correct.

The ancestors of modern _____ performed the oxygenic photosynthesis responsible for converting our anoxic planet to an oxygenated one.

Crenarchaeota

Proteobacteria

Firmicutes

cyanobacteria

FILL IN THE BLANK. Write the word or phrase that best completes each statement or answers the question.

All cellular organisms can be placed into one of three _____, which includes the *Bacteria*, *Archaea*, and the *Eukarya*.

Archaea are cellular organisms that have unique cell membrane

_____.

Elie Metchnikoff discovered _____, which is a major feature of the host immune response.

An Italian physician, _____, challenged the concept of spontaneous generation by demonstrating that maggots do not arise from decaying meat but rather from developing fly eggs.

_____ discovered that soil bacteria could oxidize iron, sulfur, and ammonia to obtain energy.

_____ was the first to isolate a root nodule bacterium capable of nitrogen fixation.

The branch of microbiology that deals with diseases of humans and animals is called _____ microbiology.

The branch of microbiology that deals with the mechanisms by which the human body protects itself from disease-causing organisms is called _____.

_____ microbiologists monitor community food establishments and water supplies in order to control the spread of communicable diseases.

The branch of microbiology that studies the relationship between microorganisms and their habitats is called _____.

_____ microbiology involves the use of microorganisms to make products such as antibiotics, vaccines, steroids, alcohols, vitamins, amino acids, and enzymes.

Microbial _____ are scientists who investigate the synthesis of antibiotics and toxins, the production of energy with microorganisms, and the ways in which microorganisms survive harsh environmental conditions.

Microbial _____ focuses on the nature of heredity and how it regulates the development and function of cells and organisms.

A microbial _____ is a collection of strains that share many stable properties and differ significantly from other groups of strains.

Answer Key

Test name: ch1 Prescott's Microbiology e12

FALSE

FALSE

TRUE

FALSE

FALSE

FALSE

TRUE

TRUE

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D

domains

lipids

phagocytosis

Redi

Winogradsky

Beijerinck

medical

immunology

Public health

microbial ecology

Industrial

physiologists

genetics

species