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# Latest Version: 6.0

## Question: 1

Which of the following would NOT occur during sympathetic stimulation?  
Biological Processes

- A. secretion of glucagon
- B. dilation of bronchioles
- C. dilation of intestinal blood vessels
- D. dilation of pupils

**Answer: C**

Explanation:

The blood flow to visceral organs decreases during sympathetic stimulation, but increases under parasympathetic stimulation. One function of the sympathetic nervous system is to increase blood flow to organs in demand of air or nutrients. During the fight-or-flight response, vasodilation works to move blood away from the digestive system and towards the muscles.

## Question: 2

Which hormone is released after a meal high in carbohydrates?  
Biological Processes

- A. insulin
- B. glucagon
- C. EPO
- D. ghrelin

**Answer: A**

Explanation:

When the blood stream is over saturated with glucose (as a result of a meal high in carbohydrates), the pancreas releases insulin in order to regulate the glucose levels in the blood.

## Question: 3

Coughs that linger after a cold or sinus problem cause constant disruption in the home, school, and workplace.

Often, these dry, nonproductive coughs become increasingly troublesome although other symptoms – fever,

congestion, and fatigue – resolved days or weeks ago. This stubborn cough persists for weeks, and plagues its victim and the victim’s family night and day. The diagnosis might be a common, but overlooked cause of lingering cough: atypical pneumonia caused by mycoplasma. Mycoplasma – pleomorphic bacteria that lack a cell wall – are the smallest and simplest self-replicating organisms known to humans. They probably evolved from gram-positive, walled eubacteria by degenerative evolution. Smaller than amoebas, these 0.1- micrometer organisms grow and reproduce slowly and require no oxygen or host cell. They also change shapes asymmetrically, appearing as long, thin filaments, tiny spheres, or branches. Scientists have identified more than 100 mycoplasma species. Fifteen species are known to live in humans, most as normal symbiotic flora. Mycoplasma pneumoniae, previously called “walking pneumonia,” is pathogenic in humans. Mycoplasma pneumoniae glides freely and uses its specialized filamentous tips to burrow between cilia within the respiratory epithelium, causing the respiratory epithelial cells to slough. It also produces hydrogen peroxide, which causes initial cell disruption in the respiratory tract and damages erythrocyte membranes. Researchers have determined that more than 40% of infants younger than 1 year old have had a mycoplasma infection. By age 5, approximately 65% of children have been infected. Nearly all adults have been infected at least once, often repeatedly. Mycoplasma pneumonia usually affects people younger than 40 years of age. The highest incidence is found in the 5- to 9-year age group. The risk of contracting mycoplasma pneumonia is greatest for people who live or work in crowded areas, such as daycare facilities, schools, homeless shelters, longterm care units, and military and prison environments. However, many people who develop mycoplasma infections have no identifiable risk factor. Most mycoplasma infections cause mild to moderate clinical symptoms, but the infection incubates over 3 weeks and can last weeks without treatment. This infection cannot be diagnosed based on symptoms alone; laboratory testing is essential. Infection can also cause ear infections, sinus infections, bronchitis, croup, severe sore throats, infectious asthma, and 1 type of the common cold. When mycoplasma infects children, about 25% of them develop nausea, vomiting, or diarrhea.

In paragraph 2, “symbiotic” most nearly means

Critical Reading

- A. independent
- B. cooperative
- C. divided
- D. shared

**Answer: B**

Explanation:

The full context of this word is a description of the “normal symbiotic flora” that lives inside the human gut. This “normal” flora is contrasted with mycoplasma pneumonia, which is described as pathogenic in humans. Given that some of the species take up residence in the human gut, without causing issue, it is likely that this symbiotic relationship is one of cooperation.

### Question: 4

If  $f(x) = 2x^2 - x^3$ , what is  $f'(3)$ ?

Quantitative Reasoning

- A. 15
- B. -9
- C. -15
- D. 18

**Answer: C**

Explanation:

Recall the power rule:

If  $f(x) = x^n$ ,  $f'(x) =$

$nx^{n-1}$  Here,  $f'(x) =$

$2 \times 2x^1 - 3x^2$

Evaluating the derivative at  $f'(3) = (4 \times 3) - (3 \times 3^2) = 12 - 27 = -15$

### Question: 5

Human predation has caused the population of cheetahs to decline dramatically. Changes in allele frequencies in the remaining population of cheetahs would most likely be due to:

Chemical Processes

- A. Natural selection
- B. Gene flow
- C. The founder effect
- D. The bottleneck effect
- E. Mutation

**Answer: D**

Explanation:

The bottleneck effect occurs when populations undergo a dramatic decrease in size. It could be due to natural or artificial causes.



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