

INFERENCE QUESTIONS IN CR

1. In an experiment, two-year-old boys and their fathers made pie dough together using rolling pins and other utensils. Each father-son pair used a rolling pin that was distinctively different from those used by the other father-son pairs, and each father repeated the phrase "rolling pin" each time his son used it. But when the children were asked to identify all of the rolling pins among a group of kitchen utensils that included several rolling pins, each child picked only the one that he had used. **Which one of the following inferences is most supported by the information above?**
 - a) The children did not grasp the function of a rolling pin.
 - b) No two children understood the name "rolling pin" to apply to the same object.
 - c) The children understood that all rolling pins have the same general shape.
 - d) Each child was able to identify correctly only the utensils that he had used.
 - e) The children were not able to distinguish the rolling pins they used from other rolling pins.
2. Mystery stories often feature a brilliant detective and the detective's dull companion. Clues are presented in the story, and the companion wrongly infers an inaccurate solution to the mystery using the same clues that the detective uses to deduce the correct solution. Thus, the author's strategy of including the dull companion gives readers a chance to solve the mystery while also diverting them from the correct solution. **Which one of the following is most strongly supported by the information above?**
 - a) Most mystery stories feature a brilliant detective who solves the mystery presented in the story.
 - b) Mystery readers often solve the mystery in a story simply by spotting the mistakes in the reasoning of the detective's dull companion in that story.
 - c) Some mystery stories give readers enough clues to infer the correct solution to the mystery.
 - d) The actions of the brilliant detective in a mystery story rarely divert readers from the actions of the detective's dull companion.
 - e) The detective's dull companion in a mystery story generally uncovers the misleading clues that divert readers from the mystery's correct solution.
3. A recent research study of undergraduate students analyzed the effects of music on human emotions. Each of the 200 participants attended at least 1 two-hour concert of classical music per week over the course of 12 weeks of their spring semester. At the end of the experiment, all of the students filled out a questionnaire assessing their emotional state. Based on the results of the questionnaires, all of the 10 students who attended the greatest number of concerts reported lower stress levels and higher satisfaction with their lives. Also, most of the 20 students who attended the fewest number of concerts reported below-average levels of emotional comfort. **Which of the following must be true based on the evidence presented above?**
 - a) Most of the 200 participants improved their emotional state and lowered their stress levels.
 - b) During each week of the experiment, the participants spent at least 2 hours less on their academic work as a result of concert attendance.
 - c) Listening to classical music for at least 2 hours per week improves the emotional well-being of the majority of young adults.
 - d) More than 6 participants attended at least 14 concerts during the course of the experiment.
 - e) At least some of the students participated in the study in order to gain free access to classical concerts.
4. Everyone who has graduated from TopNotch High School has an intelligence quotient (IQ) of over 120. Most students with an IQ of over 120 and all students with an IQ of over 150 who apply to one or more Ivy League universities are accepted to at least one of them. **The statements above, if true, best support which of the following conclusions?**
 - a) Every graduate of TopNotch High School with an IQ of 150 has been accepted to at least one Ivy-League school.
 - b) If a person is a high-school graduate and has an IQ of less than 100, he or she could not have been a student at TopNotch High School.
 - c) If a person has an IQ of 130 and is attending an Ivy-League school, it is possible for him or her to have graduated from TopNotch High School.
 - d) At least one graduate from TopNotch high school who has applied to at least one Ivy-League university has been accepted to one of them.
 - e) If a high-school graduate has an IQ of 150 and is not attending an Ivy-League school, then he or she did not apply to one of them.

5. The number of North American children who are obese—that is, who have more body fat than do 85 percent of North American children their age—is steadily increasing, according to four major studies conducted over the past 15 years. **If the finding reported above is correct, it can be properly concluded that:**
- when four major studies all produce similar results, those studies must be accurate
 - North American children have been progressively less physically active over the past 15 years
 - the number of North American children who are not obese increased over the past 15 years
 - over the past 15 years, the number of North American children who are underweight has declined
 - the incidence of obesity in North American children tends to increase as the children grow older
6. From 1973 to 1989 total energy use in this country increased less than 10 percent. However, the use of electrical energy in this country during this same period grew by more than 50 percent, as did the gross national product—the total value of all goods and services produced in the nation. **If the statements above are true, then which one of the following must also be true?**
- Most of the energy used in this country in 1989 was electrical energy.
 - From 1973 to 1989 there was a decline in the use of energy other than electrical energy in this country.
 - From 1973 to 1989 there was an increase in the proportion of energy use in this country that consisted of electrical energy use.
 - In 1989 electrical energy constituted a larger proportion of the energy used to produce the gross national product than did any other form of energy.
 - In 1973 the electrical energy that was produced constituted a smaller proportion of the gross national product than did all other forms of energy combined.
7. Ditrana is a federation made up of three autonomous regions: Korva, Mitro, and Guadar. Under the federal revenue-sharing plan, each region receives a share of federal revenues equal to the share of the total population of Ditrana residing in that region, as shown by a yearly population survey. Last year, the percentage of federal revenues Korva received for its share decreased somewhat even though the population survey on which the revenue-sharing was based showed that Korva's population had increased. **If the statements above are true, which one of the following must also have been shown by the population survey on which last year's revenue-sharing in Ditrana was based?**
- Of the three regions, Korva had the smallest number of residents.
 - The population of Korva grew by a smaller percentage than it did in previous years.
 - The populations of Mitro and Guadar each increased by a percentage that exceeded the percentage by which the population of Korva increased.
 - Of the three regions, Korva's numerical increase in population was the smallest.
 - Korva's population grew by a smaller percentage than did the population of at least one of the other two autonomous regions.
8. Students from outside the province of Markland, who in any given academic year pay twice as much tuition each as do students from Markland, had traditionally accounted for at least two-thirds of the enrollment at Central Markland College. Over the past 10 years academic standards at the college have risen, and the proportion of students who are not Marklanders has dropped to around 40 percent. **Which one of the following can be properly inferred from the statements above?**
- If it had not been for the high tuition paid by students from outside Markland, the college could not have improved its academic standards over the past 10 years.
 - If academic standards had not risen over the past 10 years, students who are not Marklanders would still account for at least two-thirds of the college's enrollment.
 - Over the past 10 years, the number of students from Markland increased and the number of students from outside Markland decreased.
 - Over the past 10 years, academic standards at Central Markland College have risen by more than academic standards at any other college in Markland.
 - If the college's per capita revenue from tuition has remained the same, tuition fees have increased over the past 10 years.
9. Shipping Clerk: The five specially ordered shipments sent out last week were sent out on Thursday. Last week, all of the shipments that were sent out on Friday consisted entirely of building supplies, and the shipping department then closed for the weekend. Four shipments were sent to Truax Construction last week, only three of which consisted of building supplies. **If the shipping clerk's statements are true, which of the following must also be true?**
- At least one of the shipments sent to Truax Construction last week was specially ordered.
 - At least one of last week's specially ordered shipments did not consist of building supplies.
 - At least one of the shipments sent to Truax Construction was not sent out on Thursday of last week.
 - At least one of the shipments that were sent out on Friday of last week was sent to Truax Construction.
 - At least one of the shipments sent to Truax Construction last week was sent out before Friday.

10. Calorie restriction, a diet high in nutrients but low in calories, is known to prolong the life of rats and mice by preventing heart disease, cancer, diabetes, and other diseases. A six-month study of 48 moderately overweight people, who each reduced their calorie intake by at least 25 percent, demonstrated decreases in insulin levels and body temperature, with the greatest decrease observed in individuals with the greatest percentage change in their calorie intake. Low insulin level and body temperature are both considered signs of longevity, partly because an earlier study by other researchers found both traits in long-lived people. **If the above statements are true, they support which of the following inferences?**
- Calorie restriction produces similar results in humans as it does in rats and mice.
 - Humans who reduce their calorie intake by at least 25 percent on a long-term basis will live longer than they would have had they not done so.
 - Calorie intake is directly correlated to insulin level in moderately overweight individuals.
 - Individuals with low insulin levels are healthier than individuals with high insulin levels.
 - Some individuals in the study reduced their calorie intake by more than 25 percent.
11. **Finding of a survey of Systems magazine subscribers:** Thirty percent of all merchandise orders placed by subscribers in response to advertisements in the magazine last year were placed by subscribers under age thirty-five.
- Finding of a survey of advertisers in Systems magazine:** Most of the merchandise orders placed in response to advertisements in Systems last year were placed by people under age thirty-five.
- For both of the findings to be accurate, which of the following must be true?**
- More subscribers to Systems who have never ordered merchandise in response to advertisements in the magazine are age thirty-five or over than are under age thirty-five.
 - Among subscribers to Systems, the proportion who are under age thirty-five was considerably lower last year than it is now.
 - Most merchandise orders placed in response to advertisements in Systems last year were placed by Systems subscribers over age thirty-five.
 - Last year, the average dollar amount of merchandise orders placed was less for subscribers under age thirty-five than for those age thirty-five or over.
 - Last year many people who placed orders for merchandise in response to advertisements in Systems were not subscribers to the magazine.
12. Parasitic wasps lay their eggs directly into the eggs of various host insects in exactly the right numbers for any suitable size of host egg. If they laid too many eggs in a host egg, the developing wasp larvae would compete with each other to the death for nutrients and space. If too few eggs were laid, portions of the host egg would decay, killing the wasp larvae. **Which of the following conclusions can properly be drawn from the information above?**
- The size of the smallest host egg that a wasp could theoretically parasitize can be determined from the wasp's egg-laying behavior.
 - Host insects lack any effective defenses against the form of predation practiced by parasitic wasps.
 - Parasitic wasps learn from experience how many eggs to lay into the eggs of different host species.
 - Failure to lay enough eggs would lead to the death of the developing wasp larvae more quickly than would laying too many eggs.
 - Parasitic wasps use visual clues to calculate the size of a host egg.
13. Federal efforts to aid minority businesses began in the 1960's when the Small Business Administration (SBA) began making federally guaranteed loans and government-sponsored management and technical assistance available to minority business enterprises. While this program enabled many minority entrepreneurs to form new businesses, the results were disappointing, since managerial inexperience, unfavorable locations, and capital shortages led to high failure rates. Even 15 years after the program was implemented, minority business receipts were not quite two percent of the national economy's total receipts. **Which of the following statements about the SBA program can be inferred from the passage?**
- The maximum term for loans made to recipient businesses was 15 years.
 - Business loans were considered to be more useful to recipient businesses than was management and technical assistance.
 - The anticipated failure rate for recipient businesses was significantly lower than the rate that actually resulted.
 - Recipient businesses were encouraged to relocate to areas more favorable for business development.
 - The capitalization needs of recipient businesses were assessed and then provided for adequately.

INFERENCE QUESTIONS IN RC

Since the early 1970's, historians have begun to devote serious attention to the working class in the United States. Yet while we now have studies of working-class communities and culture, we know remarkably little of worklessness. When historians have paid any attention at all to unemployment, they have focused on the Great Depression of the 1930's. The narrowness of this perspective ignores the pervasive recessions and joblessness of the previous decades, as Alexander Keyssar shows in his recent book. Examining the period 1870-1920, Keyssar concentrates on Massachusetts, where the historical materials are particularly rich, and the findings applicable to other industrial areas.

The unemployment rates that Keyssar calculates appear to be relatively modest, at least by Great Depression standards: during the worst years, in the 1870's and 1890's, unemployment was around 15 percent. Yet Keyssar rightly understands that a better way to measure the impact of unemployment is to calculate unemployment frequencies—measuring the percentage of workers who experience any unemployment in the course of a year. Given this perspective, joblessness looms much larger.

Keyssar also scrutinizes unemployment patterns according to skill level, ethnicity, race, age, class, and gender. He finds that rates of joblessness differed primarily according to class: those in middle-class and white-collar occupations were far less likely to be unemployed. Yet the impact of unemployment on a specific class was not always the same. Even when dependent on the same trade, adjoining communities could have dramatically different unemployment rates. Keyssar uses these differential rates to help explain a phenomenon that has puzzled historians—the startlingly high rate of geographical mobility in the nineteenth-century United States. But mobility was not the dominant working-class strategy for coping with unemployment, nor was assistance from private charities or state agencies. Self-help and the help of kin got most workers through jobless spells.

While Keyssar might have spent more time developing the implications of his findings on joblessness for contemporary public policy, his study, in its thorough research and creative use of quantitative and qualitative evidence, is a model of historical analysis.

1. The passage suggests that before the early 1970's, which of the following was true of the study by historians of the working class in the United States?

- A. The study was infrequent or superficial, or both.
- B. The study was repeatedly criticized for its allegedly narrow focus.
- C. The study relied more on qualitative than quantitative evidence.
- D. The study focused more on the working-class community than on working-class culture.
- E. The study ignored working-class joblessness during the Great Depression.

2. Which of the following statements about the unemployment rate during the Great Depression can be inferred from the passage?

- A. It was sometimes higher than 15 percent.
- B. It has been analyzed seriously only since the early 1970's.
- C. It can be calculated more easily than can unemployment frequency.
- D. It was never as high as the rate during the 1870's.
- E. It has been shown by Keyssar to be lower than previously thought.

Measuring more than five feet tall and ten feet long, the Javan rhinoceros is often called the rarest large mammal on earth. None exist in zoos. Like the Indian rhino, the Javan has only one horn; African and Sumatran rhinos have two. While the Javan rhino habitat once extended across southern Asia, now there are fewer than one hundred of the animals in Indonesia and under a dozen in Vietnam. Very little is known about Javan rhinos because they lead secretive and solitary lives in remote jungles. Until recently, scientists debated whether females even have horns, and most scientific work has had to rely on DNA garnered from dung.

The near extinction of the Javan rhino is the direct result of human actions. For centuries, farmers, who favored the same habitat, viewed them as crop eating pests and shot them on sight. During the colonial period, hunters slaughtered thousands. Now, human efforts to save them may well prove futile. The Vietnamese herd is probably doomed, as too few remain to maintain the necessary genetic variation. Rhinos from Java cannot supplement the Vietnamese numbers because in the millions of years since Indonesia separated from the mainland, the two groups have evolved into separate sub-species. In Indonesia, the rhinos are protected on the Ujung Kulon peninsula, which is unsettled by humans, and still have sufficient genetic diversity to have a chance at survival. Ironically, however, the lack of human disturbance allows mature forests to replace the shrubby vegetation the animals prefer. Thus, human benevolence may prove little better for these rhinos than past human maltreatment.

1. Which of the following can be inferred from the passage?

- a) Javan rhinos are one of the most endangered animals on the planet.
- b) More is known about the genetics of the Javan rhino than is known about its mating patterns.
- c) Hunters killed more Javan rhinos in Vietnam than in Indonesia.
- d) Most animal extinctions are the result of human actions.
- e) Genetic diversity is the most important factor for the survival of a species.

For years, U.S. employers have counted on a steady flow of labor from Mexico willing to accept low-skilled, low paying jobs. These workers, many of whom leave economically depressed villages in the Mexican interior, are often more than willing to work for wages well below both the U.S. minimum wage and the poverty line. However, thanks to a dramatic demographic shift currently taking place in Mexico, the seemingly inexhaustible supply of workers migrating from Mexico to the United States might one day greatly diminish if not cease.

Predictions of such a drastic decrease in the number of Mexican immigrants, both legal and illegal, are driven by Mexico's rapidly diminishing population growth. As a result of a decades-long family planning campaign, most Mexicans are having far fewer children than was the norm a generation ago. The campaign, organized around the slogan that "the small family lives better," saw the Mexican government establish family-planning clinics and offer free contraception. For nearly three decades, the government's message concerning population hasn't wavered. In fact, the Mexican Senate recently voted to extend public school sex education programs to kindergarten.

The result of Mexico's efforts to stem population growth is nothing short of stunning. In 1968, the average Mexican woman had just fewer than seven children; today, the figure is slightly more than two. For two primary reasons, Mexico's new demographics could greatly impact the number of Mexicans seeking work in the U.S. First, smaller families by their nature limit the pool of potential migrants. Second, the slowing of Mexico's population growth has fostered hope that Mexico will develop a healthy middle class of people content to make their livelihoods in their home country.

Though the former of these factors is all but assured, the growth of a healthy middle class is far from a foregone conclusion. The critical challenge for Mexico is what it does with the next 20 years. Mexico must invest in education, job training, and infrastructure, as well as a social-security system to protect its aging population. If Mexico is willing to step forward and meet this challenge, America may one day wake up to find that, like cheap gasoline, cheap Mexican labor has become a thing of the past.

1. Which of the following statements can NOT be inferred from the passage?

- a) Due to the government's family planning campaign, Mexico's population is currently diminishing.
- b) On average, Mexican women are having approximately one-third the number of children that they had in 1968.
- c) Many Mexicans still migrate to the United States in search of work.
- d) As a result of declining birth rates, Mexico's population is aging.
- e) A healthy middle class in Mexico has not yet fully developed.

2. Which of the following can be inferred about U.S. employers of Mexican immigrants?

- a) Most of these employers pay Mexican immigrants less money than they pay American citizens.
- b) Some of these employers violate wage laws.
- c) Many of these employers work in the agricultural industry.

- d) Without Mexican immigrants, some of these employers would be forced to close their businesses.
- e) The majority of these employers show no concern for the welfare of their workers.

The single-celled parasite known as *Toxoplasma gondii* infects more than half of the world's human population without creating any noticeable symptoms. Once inside the human body, *Toxoplasma* rapidly spreads to the heart and other organs. It can even penetrate the tight barrier that normally protects the brain from most pathogens. Yet, the blood of infected persons carries very few free-floating *Toxoplasma* cells. Scientists have long been puzzled by this ability of *Toxoplasma* to parasitize the human body without triggering an immune response and without an appreciable presence in the bloodstream. Recent research, however, has shed light on the ways in which *Toxoplasma* achieves its remarkable infiltration of the human body.

Though there are few individual *Toxoplasma* cells coursing freely in the blood of an infected person, scientists have discovered that the parasite is quite common in certain cells, known as dendritic cells, involved in the human immune system. Dendritic cells are found in the digestive tract and frequently come into contact with the various pathogens that enter the human body through food and water. When the dendritic cells encounter pathogens, they travel to lymph nodes and relay this information to other immune cells that then take action against the reported pathogen. Scientists have found, however, that *Toxoplasma* is capable of hijacking dendritic cells, forcing them from their usual activity and using them as a form of transportation to infect the human body quickly. Without this transport mechanism, *Toxoplasma* could not reach the better-protected areas of the body.

Toxoplasma invades the human body through consumption of the undercooked meat of infected animals, primarily pigs and chickens. Other animals, such as cats, can become infected as well. In fact, cats are a necessary component in the reproductive cycle of *Toxoplasma*, since the animal's intestines are the parasite's sole breeding ground. *Toxoplasma* creates egg-like cysts, known as oocysts, in the cats' intestines. These oocysts are shed in the cats' droppings and contaminate ground water and soil, eventually finding their way into the food chain. Because *Toxoplasma* must somehow find its way into a new host cat in order to reproduce, it cannot kill its current host. Instead, it waits for the host, usually a small rodent, to be eaten by a cat, thus providing *Toxoplasma* the opportunity to reproduce.

1. It can be inferred from the passage that which of the following statements is true of dendritic cells in the human body?

- A. They are produced by the lymphatic system.
- B. They are more numerous in the digestive tract than in any other part of the human body.
- C. Most dendritic cells of persons infected with *Toxoplasma* carry the parasite.
- D. They are the only cells capable of being infected by *Toxoplasma*.
- E. They are able to penetrate the membranes surrounding the brain.

A major tenet of the neurosciences has been that all neurons (nerve cells) in the brains of vertebrate animals are formed early in development. An adult vertebrate, it was believed, must make do with a fixed number of neurons: those lost through disease or injury are not replaced, and adult learning takes place not through generation of new cells but through modification of connections among existing ones.

However, new evidence for neurogenesis (the birth of new neurons) has come from the study of canary song. Young canaries and other songbirds learn to sing much as humans learn to speak, by imitating models provided by their elders. Several weeks after birth, a young bird produces its first rudimentary attempts at singing; over the next few months the song becomes more structured and stable, reaching a fully developed state by the time the bird approaches its first breeding season. But this repertoire of song is not permanently learned. After each breeding season, during late summer and fall, the bird loses mastery of its developed “vocabulary,” and its song becomes as unstable as that of a juvenile bird. During the following winter and spring, however, the canary acquires new songs, and by the next breeding season it has developed an entirely new repertoire.

Recent neurological research into this learning and relearning process has shown that the two most important regions of the canary’s brain related to the learning of songs actually vary in size at different times of the year. In the spring, when the bird’s song is highly developed and uniform, the regions are roughly twice as large as they are in the fall. Further experiments tracing individual nerve cells within these regions have shown that the number of neurons drops by about 38 percent after the breeding season, but by the following breeding season, new ones have been generated to replace them. A possible explanation for this continual replacement of nerve cells may have to do with the canary’s relatively long life span and the requirements of flight. Its brain would have to be substantially larger and heavier than might be feasible for flying if it had to carry all the brain cells needed to process and retain all the information gathered over a lifetime.

Although the idea of neurogenesis in the adult mammalian brain is still not generally accepted, these findings might help uncover a mechanism that would enable the human brain to repair itself through neurogenesis. Whether such replacement of neurons would disrupt complex learning processes or long-term memory is not known, but songbird research challenges scientists to identify the genes or hormones that orchestrate neurogenesis in the young human brain and to learn how to activate them in the adult brain.

1. It can be inferred from the passage that the author would most likely describe the current understanding of neurogenesis as

- (A) Exhaustive (B) progressive (C) incomplete
(D) Antiquated (E) incorrect

2. Information in the passage suggests that the author would most likely regard which one of the following as LEAST important in future research on neurogenesis in humans?

- (A) research on possible similarities between the neurological structures of humans and canaries
(B) studies that compare the ratio of brain weight to body weight in canaries to that in humans
(C) neurological research on the genes or hormones that activate neurogenesis in the brain of human infants
(D) studies about the ways in which long-term memory functions in the human brain

(E) research concerning the processes by which humans learn complicated tasks

The Pan-American land bridge, or isthmus, connecting North and South America was formed volcanically long after dinosaurs became extinct. The isthmus cleaved populations of marine organisms, creating sister species. These twin species, called “gemimates,” then evolved independently. Scientists observe, for example, that Pacific pistol shrimp no longer mate with those from the Atlantic Ocean. Yet the two oceans had already begun to form their distinctive personalities long before the isthmus was fully formed. As the seabed rose, Pacific waters grew cooler, their up-swelling currents carrying rich nutrients, while the Atlantic side grew shallower, warmer, and nutrient poor. In fact, it was these new conditions, and not so much the fully-formed isthmus, that spawned changes in the shrimp population.

For terrestrial life, the impact of the isthmus was more immediate. Animals traversed the newly formed bridge in both directions, although North American creatures proved better colonizers—more than half of South America’s mammals trace direct lineage to this so-called Great American Biotic Exchange. Only three animals—the armadillo, opossum, and hedgehog—survive as transplants in the north today.

1. Which of the following statements finds the LEAST support in the passage?

- A. Population divergences resulting from the formation of the Pan-American isthmus were more a process than an event.
B. The divergence in ocean temperature during the formation of the Pan-American isthmus resulted in a divergence in the ocean’s nutrient value.
C. Genetic differences among pistol shrimp have grown to the point that there are now at least two distinct species of these shrimp.
D. The part of ocean which is now the Pacific grew deeper due to the geologic forces that created the Pan-American isthmus.
E. Not until the Pan-American isthmus was fully formed did geminate marine organisms begin to develop in that area of the ocean.

2. Which of the following statements is most readily inferable from the information in the passage?

- A. Species of marine organisms in the Atlantic Ocean number fewer today than before the formation of the Pan-American isthmus.
B. The number of terrestrial animal species in South America today exceeds the number prior to the formation of the Pan-American isthmus.
C. Of the indigenous North American species that migrated south across the Pan-American isthmus, more than three survive to this day.
D. Since the formation of the Pan-American isthmus, fewer terrestrial animals have traveled north across the isthmus than south.
E. As the Pan-American isthmus began to form, most pistol shrimp migrated west to what is now the Pacific Ocean.

Nearly a century ago, biologists found that if they separated an invertebrate animal embryo into two parts at an early stage of its life, it would survive and develop as two normal embryos. This led them to believe that the cells in the early embryo are undetermined in the sense that each cell has the potential to develop in a variety of different ways. Later biologists found that the situation was not so simple. It matters in which plane the embryo is cut. If it is cut in a plane different from the one used by the early investigators, it will not form two whole embryos.

A debate arose over what exactly was happening. Which embryo cells are determined, just when do they become irreversibly committed to their fates, and what are the “morphogenetic determinants” that tell a cell what to become? But the debate could not be resolved because no one was able to ask the crucial questions in a form in which they could be pursued productively. Recent discoveries in molecular biology, however, have opened up prospects for a resolution of the debate. Now investigators think they know at least some of the molecules that act as morphogenetic determinants in early development. They have been able to show that, in a sense, cell determination begins even before an egg is fertilized.

Studying sea urchins, biologist Paul Gross found that an unfertilized egg contains substances that function as morphogenetic determinants. They are located in the cytoplasm of the egg cell; i.e., in that part of the cell's protoplasm that lies outside of the nucleus. In the unfertilized egg, the substances are inactive and are not distributed homogeneously. When the egg is fertilized, the substances become active and, presumably, govern the behavior of the genes they interact with. Since the substances are unevenly distributed in the egg, when the fertilized egg divides, the resulting cells are different from the start and so can be qualitatively different in their own gene activity.

The substances that Gross studied are maternal messenger RNA's—products of certain of the maternal genes. He and other biologists studying a wide variety of organisms have found that these particular RNA's direct, in large part, the synthesis of histones, a class of proteins that bind to DNA. Once synthesized, the histones move into the cell nucleus, where sections of DNA wrap around them to form a structure that resembles beads, or knots, on a string. The beads are DNA segments wrapped around the histones; the string is the intervening DNA. And it is the structure of these beaded DNA strings that guides the fate of the cells in which they are located.

1. **It can be inferred from the passage that the morphogenetic determinants present in the early embryo are**
 - A. located in the nucleus of the embryo cells
 - B. evenly distributed unless the embryo is not developing normally
 - C. inactive until the embryo cells become irreversibly committed to their final function
 - D. identical to those that were already present in the unfertilized egg
 - E. present in larger quantities than is necessary for the development of a single individual

2. **It can be inferred from the passage that the initial production of histones after an egg is fertilized takes place**
 - A. in the cytoplasm
 - B. in the maternal genes
 - C. throughout the protoplasm
 - D. in the beaded portions of the DNA strings
 - E. in certain sections of the cell nucleus

3. **It can be inferred from the passage that which of the following is dependent on the fertilization of an egg?**
 - A. Copying of maternal genes to produce maternal messenger RNA's
 - B. Synthesis of proteins called histones
 - C. Division of a cell into its nucleus and the cytoplasm
 - D. Determination of the egg cell's potential for division
 - E. Generation of all of a cell's morphogenetic determinants

In a 1984 book, Claire C. Robertson argued that, before colonialism, age was a more important indicator of status and authority than gender in Ghana and in Africa generally. British colonialism imposed European-style male-dominant notions upon more egalitarian local situations to the detriment of women generally, and gender became a defining characteristic that weakened women's power and authority.

Subsequent **research** in Kenya convinced Robertson that she had overgeneralized about Africa. Before colonialism, gender was more salient in central Kenya than it was in Ghana, although age was still crucial in determining authority. In contrast with Ghana, where women had traded for hundreds of years and achieved legal majority (not unrelated phenomena), the evidence regarding central Kenya indicated that women were legal minors and were sometimes treated as male property, as were European women at that time. Factors like strong patrilinearity and patrilocality, as well as women's inferior land rights and lesser involvement in trade, made women more dependent on men than was generally the case in Ghana. However, since **age apparently remained the overriding principle of social organization in central Kenya**, some senior women had much authority. Thus, Robertson revised her hypothesis somewhat, arguing that in determining authority in precolonial Africa age was a primary principle that superseded gender to varying degrees depending on the situation.

1. **The passage indicates that Robertson's research in Kenya caused her to change her mind regarding which of the following?**
 - A. Whether age was the prevailing principle of social organization in Kenya before colonialism
 - B. Whether gender was the primary determinant of social authority in Africa generally before colonialism
 - C. Whether it was only after colonialism that gender became a significant determinant of authority in Kenyan society
 - D. Whether age was a crucial factor determining authority in Africa after colonialism
 - E. Whether British colonialism imposed European-style male-dominant notions upon local situations in Ghana
2. **The passage suggests that after conducting the research mentioned in the highlighted text, but not before, Robertson would have agreed with which of the following about women's status and authority in Ghana?**
 - A. Greater land rights and greater involvement in trade made women in precolonial Ghana less dependent on men than were European women at that time.
 - B. Colonialism had a greater impact on the status and authority of Ghanaian women than on Kenyan women.
 - C. Colonialism had less of an impact on the status and authority of Ghanaian women than it had on the status and authority of other African women.
 - D. The relative independence of Ghanaian women prior to colonialism was unique in Africa.
 - E. Before colonialism, the status and authority of Ghanaian women was similar to that of Kenyan women.
3. **The author of the passage mentions the status of age as a principle of social organization in precolonial central Kenya in the highlighted text most likely in order to**
 - A. indicate that women's dependence on men in precolonial Kenya was not absolute
 - B. contrast the situation of senior women to that of less senior women in precolonial Kenyan society
 - C. differentiate between the status and authority of precolonial Kenyan women and that of precolonial Ghanaian women
 - D. explain why age superseded gender to a greater extent in precolonial Kenya than it did elsewhere in Africa
 - E. identify a factor that led Robertson to revise her hypothesis about precolonial Africa

Symptoms of Parkinson's Disease, such as tremors, are thought to be caused by low dopamine levels in the brain. Current treatments of Parkinson's disease are primarily reactionary, aiming to replenish dopamine levels after dopamine-producing neurons in the brain have died. Without a more detailed understanding of the behavior of dopamine-producing neurons, it has been impossible to develop treatments that would prevent the destruction of these neurons in Parkinson's patients.

Recent research provides insight into the inner workings of dopamine-producing neurons, and may lead to a new drug treatment that would proactively protect the neurons from decay. By examining the alpha-synuclein protein in yeast cells, scientists have determined that toxic levels of the protein have a detrimental effect on protein transfer within the cell. More specifically, high levels of alpha-synuclein disrupt the flow of proteins from the endoplasmic reticulum, the site of protein production in the cell, to the Golgi apparatus, the component of the cell that modifies and sorts the proteins before sending them to their final destinations within the cell. When the smooth transfer of proteins from the endoplasmic reticulum to the Golgi apparatus is interrupted, the cell dies.

With this in mind, researchers conducted a genetic screen in yeast cells in order to identify any gene that works to reverse the toxic levels of alpha-synuclein in the cell. Researchers discovered that such a gene does in fact exist, and have located the genetic counterpart in mammalian nerve cells, or neurons. This discovery has led to new hopes that drug therapy could potentially activate this gene, thereby suppressing the toxicity of alpha-synuclein in dopamine-producing neurons.

While drug therapy to suppress alpha-synuclein has been examined in yeast, fruitflies, roundworms, and cultures of rat neurons, researchers are hesitant to conclude that such therapies will prove successful on human patients. Alpha-synuclein toxicity seems to be one cause for the death of dopamine-producing neurons in Parkinson's patients, but other causes may exist. Most scientists involved with Parkinson's research do agree, however, that such promising early results provide a basis for further testing.

1. **It can be inferred from the passage that a yeast cell with toxic levels of alpha-synuclein will die because**
 - A. low levels of dopamine will disrupt the flow of proteins from the endoplasmic reticulum to the Golgi apparatus
 - B. the gene that suppresses alpha-synuclein is missing or is not functioning properly in such yeast cells
 - C. drug therapy has proven to be ineffective in yeast cells
 - D. the normal distribution of proteins to the different cell components outside the Golgi apparatus will be affected
 - E. alpha-synuclein is by nature a toxic protein
2. **It can be inferred from the passage that current treatments of Parkinson's Disease**
 - A. repair damaged cells by replenishing dopamine levels in the brain
 - B. are ineffective in their treatment of Parkinson's symptoms, such as tremors
 - C. were developed without a complete understanding of dopamine-producing neurons
 - D. will inevitably be replaced by new drug therapy to suppress alpha-synuclein toxicity
 - E. were not developed through research on yeast cells