Fall 2021 **- Week 10**

Fall 2021 - EE BIOL184-1 - SEARS

Started on	Friday, 3 December 2021, 4:35 PM PST
State	Finished
Completed on	Friday, 3 December 2021, 5:05 PM PST
Time taken	30 mins 22 secs
Grade	**35.00** out of 35.00 (**100**%)

Question 1

Correct

1.75 points out of 1.75

What percentage of human infants are born with a congenital variant (i.e., anomaly)?

a. About 10%

b. About 1%

c. About 5% ✔

d. About 8%

The correct answer is:
About 5%

Question 2

Correct

1.75 points out of 1.75

Retinoic acid is the main component of Tretinoin, an anti-cancer chemotherapy drug. Retinoic acid is also a known teratogen which can cause congenital anomalies in eyes, ears, hearts, lungs, limbs, and many other organ systems. Based on the organ systems that are impacted by exposure to retinoic acid, during which of the following trimesters of pregnancy are developing humans most susceptible to the teratogenic effects of retinoic acid?

a. Second trimester

b. Third trimester

c. First trimester ✔

The correct answer is:
First trimester

Question 3

Correct

1.75 points out of 1.75

In class we discussed how Fetal Alcohol Sydrome (FAS) impacts the development of a certain type of cells via disruption of a certain pathway. What is this cell type and pathway?

a. Germ cells, *Bmp* pathway

b. Mesenchymal cells, *Fgf* pathway

c. Neural crest cells, *Shh* pathway ✔

d. Myotomal cells, *Hox* pathway

The correct answer is:
Neural crest cells, *Shh* pathway

Question 4

Correct

1.75 points out of 1.75

Continuing on with Fetal Alcohol Syndrome (FAS)... The last question asked you to identify the cell type and pathway that are disrupted by exposure to alcohol during development. Which of the three basic cellular mechanisms are disrupted in this cell type to generate the FAS phenotype?

a. proliferation, adhesion, migration

b. differentiation, adhesion, death

c. migration, death, and differentiation ✔

d. adhesion, proliferation, differentiation

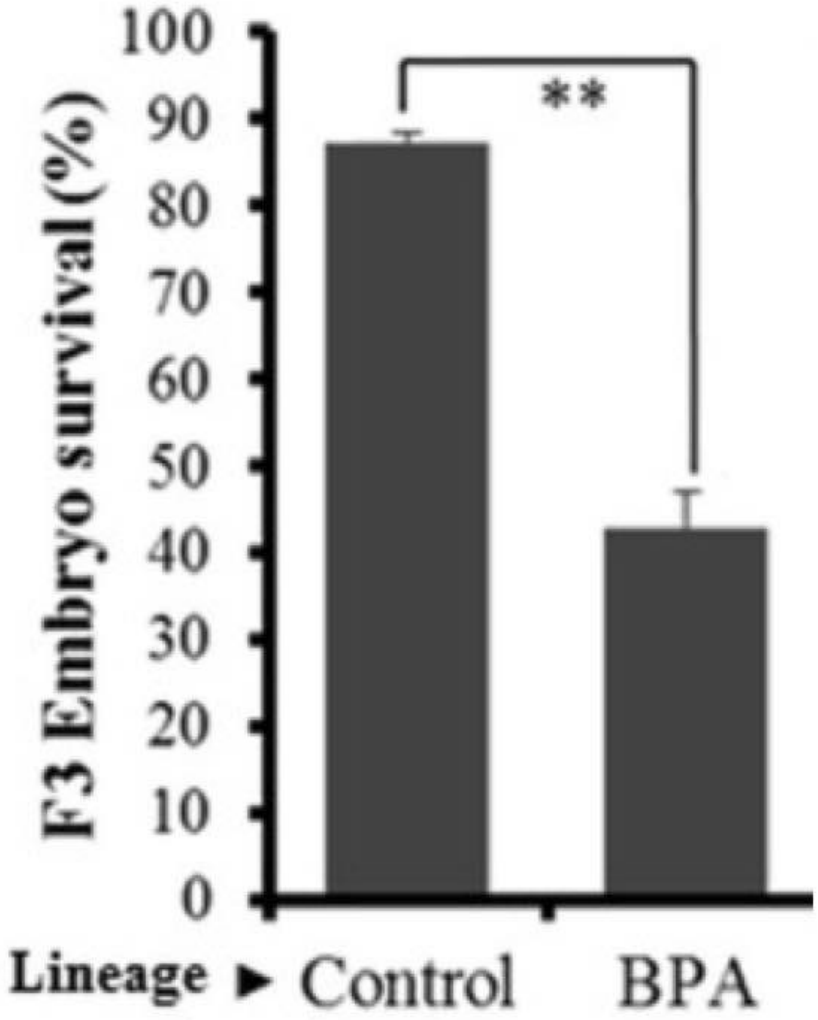
The correct answer is:
migration, death, and differentiation

Question 5

Correct

1.75 points out of 1.75

Bisphenol A (BPA) is a common chemical used to make plastics. The impact of exposure to BPA on development has been studied in many animals, including medaka fish. When F1 fish are exposed to BPA, F2 embryo survival rates are significantly lower than in non-exposed fish. The impact of this single BPA treatment on embryo survival rate carries through to the next generation, the F3 generation. This is shown in the figure on the right. Based on what we discussed in class, what is the most likely mechanism for the transgenerational effect of BPA on embryo survival?



- a. Epigenetic changes ✔
- b. Protein inhibition
- c. Horizontal transmission

d. Point-mutations in DNA sequence

The correct answer is:
Epigenetic changes

Question 6

Correct

1.75 points out of 1.75

Which of the following is a correct statement about endocrine disruptors?

a. Endocrine disruptors disrupt development in females, but not in males

b. By definition, endogenous estrogen can be an endocrine disruptor

c. The ability of endocrine disrupts to disrupt human fetal development has been generally accepted by the medical community for more than 100 years.

d. Endocrine disruptors can increase hormone synthesis ✔

The correct answer is:
Endocrine disruptors can increase hormone synthesis

Question 7

Correct

1.75 points out of 1.75

You are working as an environmental scientist. In your studies, you find evidence that a newly discovered chemical, Chemical X, is an endocrine disruptor. You hypothesize that Chemical X is impacting estrogen function as an agonist. Which of the following findings would support your hypothesis?

a. Chemical X decreases the elimination of estrogen by the body

b. Chemical X "primes" the organism to be more sensitive to estrogen later in life

c. Chemical X prevents the binding of estrogen to its receptor

d. Chemical X directly binds to the estrogen receptor ✔

The correct answer is:
Chemical X directly binds to the estrogen receptor

Question 8

Correct

1.75 points out of 1.75

Women exposed to DES during development display a suite of phenotypes including T-shaped uteri. How is DES thought to generate these phenotypes?

a. DES disrupts Wnt5a expression, which in turn disrupts HoxA expression, which in turn disrupts the migration and differentiation of uterine cells

b. DES disrupts Wnt7a expression, which in turn disrupts Wnt5a expression, which in turn disrupts the migration and adhesion of uterine cells

c. DES disrupts HoxA expression, which in turn disrupts Wnt5a expression, which in turn disrupts the apoptosis and proliferation of uterine cells

d. DES disrupts Wnt7a expression, which in turn disrupts HoxA expression, which in turn disrupts the proliferation and differentiation of uterine cells ✔

The correct answer is:
DES disrupts Wnt7a expression, which in turn disrupts HoxA expression, which in turn disrupts the proliferation and differentiation of uterine cells

Question 9

Correct

1.75 points out of 1.75

As discussed in class and in the online videos, proper development of the Asbora wasps and of the nematode *Brugia malayi* is dependent upon the presence of a single endosymbiont. What is this endosymbiont?

a. *Rhizobia*

b. *Symbiodinium*

c. *Buchnera*

d. *Wolbachia* ✔

The correct answer is:
Wolbachia

Question 10

Correct

1.75 points out of 1.75

Voles that are born in the Spring have thin coats as adults, while voles that are born in the Fall have thick coats as adults. Most voles live only a few months; voles born in the Spring are alive during the warm summer season, while voles born in the Fall are alive during the cold winter season. The environment experienced by the mother during pregnancy determines coat thickness in the offspring. Now consider a situation in which the environment the vole mothers during pregnancy changes, such that voles born in the Fall now have thin coats. Assume in this case that the Winters are still cold. This scenario provides an example of which of the following hypotheses?

- a. Environment mismatch hypothesis ✔
- b. Plasticity first hypothesis
- c. Endocrine disruptor hypothesis
- d. Thrifty genotype hypothesis

The correct answer is:
Environment mismatch hypothesis

Question 11

Correct

1.75 points out of 1.75

Which of the following is an accurate statement about the relationship between the insulin signaling cascade and aging?

- a. The insulin signaling cascade likely contributes to aging in vertebrate, but not invertebrate, animals
- b. The insulin signaling cascade is not responsive to environmental factors
- c. In many animals, upregulation of the insulin signaling cascade results in the upregulation of *Foxo* transcription
- d. Lower levels of insulin signaling are generally correlated with increased life spans ✔

The correct answer is:
Lower levels of insulin signaling are generally correlated with increased life spans

Question 12

Correct

1.75 points out of 1.75

Dr. Sears' lab studies the biology of bats, among other things. On a recent trip to Cameroon, the lab collected tissues from many bats. After returning home, lab members quantified the level of DNA methylation present across many genes in each bat. Based on what we discussed in class, what conclusion could lab members make about the bats from these methylation data?

a. Bats with less methylation likely have more symbionts

b. Bats with more methylation likely have more symbionts

c. Bats with more methylation are likely older ✔

d. Bats with less methylation are likely older

The correct answer is:
Bats with more methylation are likely older

Question 13

Correct

1.75 points out of 1.75

Which of the following is a characteristic of a cell undergoing cellular senescence?

a. Doubling in physical size

b. Atypically low *NGF1-A* levels

c. Abnormally high rate of proliferation

d. Production of SASPs ✔

The correct answer is:
Production of SASPs

Question 14

Correct

1.75 points out of 1.75

Every day, humans and other animals are exposed to drugs in their environments that have the capacity to disrupt development. According to the online video you watched for class, what is the greatest source of drugs in the environment (please select the best answer)?

a. burning of fossil fuels

b. improper drug disposal

c. drug excretion ✔

d. antibiotic misuse

The correct answer is:
drug excretion

Question 15

Correct

1.75 points out of 1.75

Adult *Daphnia cucullata* are aquatic and have two morphs. One has a large "helmet" which makes it harder for their main predator, a type of insect, to eat them. The other lacks the helmet. Female *Daphnia* keep their eggs within their bodies before hatching. Typically, when mothers are in ponds with their insect predators, their offspring develop helmets, and vice versa. The above scenario best represents an example of a:

a. immediate adaptive response

b. continuous adaptive response

c. non-adaptive response

d. predictive adaptive response ✔

The correct answer is:
predictive adaptive response

Question 16

Correct

1.75 points out of 1.75

The human microbiome is sensitive to mode of birth (e.g., Caesarean-born vs vaginal birth) and source of infant nutrition (e.g., breast- vs bottle- fed). Which of the following is a way in which the microbiomes of Caesarean-born and bottle-fed babies are similar (relative to vaginal birth and breast-fed, respectively)?

a. The microbiomes of Caesarean-born and bottle-fed babies have a faster colonization rate than those of vaginally-born and breast-fed babies, respectively

b. The microbiomes of Caesarean-born and bottle-fed babies have higher levels of gene expression than those of vaginally-born and breast-fed babies, respectively

c. The microbiomes of Caesarean-born and bottle-fed babies are less susceptible to environmental perturbations than those of vaginally-born and breast-fed babies, respectively

d. The microbiomes of Caesarean-born and bottle-fed babies are less diverse (e.g., fewer species present) than those of vaginally-born and breast-fed babies, respectively ✔

The correct answer is:
The microbiomes of Caesarean-born and bottle-fed babies are less diverse (e.g., fewer species present) than those of vaginally-born and breast-fed babies, respectively

Question 17

Correct

1.75 points out of 1.75

Kwashiorkor is a nutritional disorder most often seen in regions experiencing famine cause by lack of protein in the diet. To investigate the impact of the gut microbiome on kwashiorkor, researchers gathered gut microbiomes from sets of twins in which one twin has kwashiorkor and the other does not. They then transferred these microbiomes to previously germ-free mice and fed the mice a low-protein diet. According to the online video you watched for class, which of the following was an outcome of this study?

a. Mice infected with the kwashiorkor microbiome did not develop kwashiorkor-like symptoms, which mice infected with the non-kwashiorkor microbiome did

b. Mice infected with the kwashiorkor microbiome or non-kwashiorkor microbiome developed kwashiorkor-like symptoms

c. Mice infected with the kwashiorkor microbiome developed kwashiorkor-like symptoms, while mice with the non-kwashiorkor microbiome did not ✔

d. Neither mice infected with the kwashiorkor microbiome nor the non-kwashiorkor microbiome developed kwashiorkor-like symptoms

The correct answer is:
Mice infected with the kwashiorkor microbiome developed kwashiorkor-like symptoms, while mice with the non-kwashiorkor microbiome did not

Question 18

Correct

1.75 points out of 1.75

You are a scientist raising two colonies of mice that are identical except for their exposure to germs. Specifically, the first colony contains mice that have been exposed to germs and the second contains mice that are germ-free. Which of the following is a difference you should expect to observe between these colonies of mice?

a. Germ-free mice have reduced food intake

b. Germ-free mice have more motor activity ✔

c. Germ-free mice have more active immune systems

d. Germ-free mice display less anxiety

The correct answer is:
Germ-free mice have more motor activity

Question 19

Correct

1.75 points out of 1.75

Arthropods and humans, along with most other organisms, have symbionts. However, the mode of symbiont acquisition differs in arthropods and humans. According to the online video you watched for class, how does the mode differ?

a. In most arthropods, symbionts are acquired through transfer from other arthropods; in humans most symbionts are acquired through environmental encounters

b. In most arthropods, symbionts are acquired through vertical transfer; in humans most symbionts are acquired through horizontal transfer ✔

c. In most arthropods, symbionts are acquired through transfer from mother to offspring; in humans most symbionts are acquired through nosocomial infections

d. In most arthropods, symbionts are acquired through interactions with the environment; in humans most symbionts are acquired through direct transfer during mitosis

The correct answers are:
In most arthropods, symbionts are acquired through transfer from other arthropods; in humans most symbionts are acquired through environmental encounters,

In most arthropods, symbionts are acquired through vertical transfer; in humans most symbionts are acquired through horizontal transfer ,

In most arthropods, symbionts are acquired through transfer from mother to offspring; in humans most symbionts are acquired through nosocomial infections,

In most arthropods, symbionts are acquired through interactions with the environment; in humans most symbionts are acquired through direct transfer during mitosis

Question 20

Correct

1.75 points out of 1.75

Researchers have developed mouse models for autism. In an experiment, they introduced Bacteroides fragilis into these mice. Which of the following was a result of this experiment?

a. Epithelial barrier integrity was weakened

b. Some autism-related behaviors were minimized ✔

c. Gut microbiota remained unchanged

d. Serum metabolites were reduced

The correct answer is:
Some autism-related behaviors were minimized

◄ Online quiz for Online ...

Jump to...

Exam 6, Part 2 - Essay ... ►