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ANA 308 Embryological Mechanism, Teratology and Reproductive Techniques

1. From our understanding of teratology, can we say corona virus is a teratogen and if No/Yes, justify your answer

**Answer**

Teratology is a science that studies the causes, mechanisms and pattern of abnormal development in embryos. Examples of teratogens are metals, chemicals, drugs, diseases, heat etc. Although there appears to be some risk of premature rupture of membranes, preterm delivery, fetal tachycardia, and fetal distress when the infection occurs in the third trimester of pregnancy, there is no evidence suggesting trans placental transmission based on very limited data, as the analysis of the amniotic fluid, cord blood, neonatal throat swab, and breast milk samples available from six of nine patients were tested and found negative for SARS-COV-2. Whether virus shedding occurs vaginally is also not known. Whether COVID-19 increases the risk of miscarriage and still birth is unknown. Also information on the effect of COVID-19 on the course and outcome of pregnancy in the first and second trimesters is not available yet. Therefore, it is safe to say that it has not been discovered, due to the short time span of the outbreak of the disease, whether corona virus is a teratogen or not.

1. What are the impact of ageing and environment in the outbreak of this novel covid 19?

**Answer**

**Impact of Ageing in The Outbreak of Covid 19**

Even before the covid-19 reached more than 100 countries around the world, early data from china- where the outbreak started- suggested that older adults were the most vulnerable to the worst effects of the disease. That data along with emerging research from Italy- the second most affected country in the world- is showing just how dangerous covid-19 is for older people and others with heart, lung and immunological conditions. Immune functions declines with age. That makes them more susceptible to more severe illnesses. In older adults the number of white blood cells that find and help eliminate infections can decline. The cells also become less adept at identifying new pathogens to fight. In the case of covid-19, the virus can also damage the immune cells that may otherwise overcome the virus. If there are fewer of these cells to begins with, and they are also weaker than they once were, an illness can do more damage.

When a response to infection kicks in, an older person’s immune system faces a higher chance of a dangerous overreaction known as a **cytokine storm.** Cytokines are proteins that serve as signals to the body to ramp up its infection-fighting machinery. But during a storm these cytokines are overproduced which causes severe inflammation high fever and organ failure. In other words, it is not just a sluggish response that can harm older adults, the immune system’s overreaction to an invader can also kill.

Sean Leng, a geriatrician and a professor of medicine at John Hopkins University School of Medicine said, ‘the cause of death of this virus is no. 1, respiratory failure, and the no. 2 probably the cytokine storm.’ It is also important to know that it’s not just age alone that endangers people; its being older with one or more preexisting chronic diseases. these chronic diseases such as ischemic heart disease and diabetes mellitus can leave organs degraded and more vulnerable to infection. Additionally, the treatments for these conditions can suppress the immune system, leaving the body susceptible to pathogens. Older people may be less efficient at coughing and sneezing, making it harder for them to clear the covid 19 virus, which infects the airways. Accumulated lung damage in older adults from habits like smoking or breathing polluted air can further increase vulnerability, so when covid-19 strikes, it can lead to problems like severe pneumonia. On the other hand, it is still only a minority of the older adults who are facing the most severe consequences of covid-19. Many have recovered and older people in good health will likely survive the infection.

**Impact of The Environment On the Outbreak of Corona Virus**

The first lesson to be drawn from the covid-19 pandemic and how it relates to the environment is that well-resourced, equitable health systems with a strong supported health work force are essential to protect us from health security threats. the ongoing pandemic also illustrates how inequality is a major barrier in ensuring the health and wellbeing of people, and how social and economic inequality materializes in unequal access to healthcare systems.

For example, the health threat of the novel corona virus is on average greater for cities and people exposed to higher levels of pollution, which most often are people living in poorer areas. The WHO estimates that by reducing the environmental and social risk factors people are exposed to, nearly a quarter of the global health burden could be prevented. This global crisis has also forced us to dramatically change our behavior in order to protect ourselves and those around us, to a degree most people have never experienced before. This temporary shift of gears could lead to a long term shit in old behaviors and assumptions, which could lead to a public drive for collective action and effective risk management.

1. Summarize the importance of oogenesis and spermatogenesis

**Answer**

Gametogenesis is the process of formation and development of specialized generative cells, gametes (oocytes/sperms) from bipotential precursor cells. This development, involving the chromosomes and cytoplasm of the gametes, prepares these sex cells for fertilization. Gametogenesis is divided into oogenesis and spermatogenesis.

Oogenesis is the sequence of events by which oogonia (primordial germ cells) are transformed into mature oocytes. All oogonia develop into primary oocytes before birth. Oogenesis continues till menopause. It occurs in the ovaries. Oogenesis helps to retain a sufficient amount of cytoplasm in the ovum which is essential for the development of early embryo. Formation of polar bodies maintains half number of chromosomes in the ovum

Spermatogenesis is the sequence of events by which spermatogonia (primordial germ cells) are transformed into mature cells. This maturation process begins at puberty and occurs in the seminiferous tubules of the testes.

**Importance of spermatogenesis**

1. During spermatogenesis, one spermatogonium produces four sperms
2. Sperms have half the number of chromosomes, after fertilization, the diploid chromosome number is restored in the zygote. It maintains the chromosome number of the species.
3. During meiosis 1 crossing over takes place which brings about variation
4. Spermatogenesis occurs in various organisms; thus it supports the evidence of the basic relationship of organisms

**Importance of oogenesis**

1. One oogonium produces one ovum and three polar bodies
2. Polar bodies have small amount of cytoplasm in the ovum which is essential for the development of early embryo. Formation of polar bodies maintains half number of chromosomes in the ovum.
3. During meiosis first crossing over takes place which brings about variation
4. Oogenesis occurs in various organisms. Therefore, it supports the evidence of basic relationship of organisms.
5. Describe what you understand by personal hygiene and disaster; hence state their correlation if any

**Answer**

A disaster is a natural catastrophe having unfortunate consequences. Biological disasters are the devastating effects cause by an enormous spread of a certain kind of living organism that may spread diseases, viruses or infestation of plant, animal or insect life on an epidemic or pandemic level. It includes exposure to pathogenic microorganisms, toxins and bioactive substances that may cause loss of life, injury, illness or other health impacts, property damage, loss of livelihood, or environmental damage. Examples of biological disasters include outbreaks of epidemic disease, plant or animal contagion. Biological disasters may be in the form of an epidemic or a pandemic

An epidemic affects a large number of individuals within a population, community or region at the same time e.g. cholera, plague etc.

A pandemic is a disaster that spreads across a large region, that is, a continent or even worldwide e.g. swine flu.

Personal hygiene refers to maintaining cleanliness of one’s body and clothing to preserve overall health and wellbeing. Different biological disasters have various activities that maybe carried out to either prevent or curb the spread of the diseases. Biological disasters can be the diarrheal group of diseases e.g. cholera, respiratory group of diseases e.g. influenza or mosquito borne diseases e.g. dengue.

**For respiratory group of diseases such as tuberculosis, influenza, meningitis or covid-19,**

The spread of viruses and respiratory infections is facilitated by large gatherings of people, stale air, travelling and commerce. Hygienic measures help reduce the risk. Flu viruses are transmitted via the following main routes:

* Through the air: the virus spreads through the air in infectious droplets when people cough, sneeze or spit
* Through close contact: with a person with a respiratory virus
* Via the hands which are contaminated with infectious droplet of saliva or fluid from the nose or mouth
* Through contact with objects which have been touched by sick people.

Therefore, it is seen that by observing personal hygiene measures such as

* Handwashing or use of alcohol based hand sanitizers,
* Cleaning objects and surfaces with disinfectants,
* Use of surgical masks by suspected or confirmed cases of the disease and by the care provider,
* Covering the mouth with a handkerchief or tissue paper when coughing or sneezing which should be disposed of in dustbins,
* Sick persons at home should keep distance from others,
* Get plenty of sleep, be physically active and eat nutritious foods,
* Avoid smoking,
* Avoiding crowds and contact with people who are having respiratory illnesses etc.

the larger effects of biological disasters such as the covid-19 pandemic can be somewhat avoided.