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**DEPT: ANATOMY**

**COURSE: ANA 308(Embryological Mechanism and Teratology and Reproductive Techniques) Assignment**

**Questions**

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

2.What are the impact of ageing and environment in the outbreak of this novel COVID-19

3.Summarize the importance of oogenesis and spermatogenesis.

4.Describe what you understand by personal hygiene and disaster, hence state their correlation if there is any.

**Answer**

1.Corona virus is not a teratogen.

Teratogens are infectious agents, drugs, chemicals or radiation that may produce physical or functional defects in the developing embryo or fetus if the fetus is exposed to them during the critical stage of development.

There is no evidence to suggest that Corona virus is teratogenici.e would induce congenital formalities. The novel Corona virus (SARS-COV-2) is a new strain of Corona virus causing Covid-19. There is no strong evidence of any negative effects of Covid-19 infection on eggs, sperm, embryos or pregnancies( especially those at early stages) as indicated by the latest updates from the Centers for Diseases Control and Prevention(CDC) in the USA and the Royal College of Obstetricians and Gynecologists (RCOG) in the UK.

**Transmission**

Viral infections may reach the fetus via the placenta amniotic fluid , vaginal or through the blood stream.

However, there is no evidence suggesting trans placental transmission of COVID 19 from mother to fetus 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. 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. 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.

Most cases of Covid-19 worldwide have shown evidence of human transmission. The virus can be found in respiratory secretions, feces and fomites. There are currently two ways in which Covid-19 can spread:

Directly from close contact with an infected person (within 2 meters), as respiratory secretions can enter the eyes, mouth, nose or airways. The risk increases the longer someone has close contact with an infected person who has symptoms.

Indirectly, by touching a surface or object (or hand of an infected person) that has been contaminated with respiratory secretions and then touching one’s own mouth, nose or eyes.

Pregnant women, at present, do not appear to be more likely to contract the virus than the general population. But, during pregnancy the body’s immune system is weakened (in both naturally conceived and ART conceived pregnancies) and as such response to viral infections in the pregnancy. This is known as vertical transmission and emerging evidence suggests that although likely, the proportion of pregnancies affected and the consequences to the newborn have yet to be determined. There are a few reported cases of women positive for Covid-19, who have delivered healthy infants free of the disease. On the other hand, there have also been reports of adverse outcomes (premature rupture of membranes and preterm delivery) in infants born to mothers positive for Covid-19 during their pregnancy. Until very recently, there was just one case report published of an infected newborn, but with no strong evidence that this was the result of vertical transmission. However, a new report published on 26th march 2020, describes a newborn birthed to a Covid-19 positive mother, which was found to have SARS-COV-2IgM in serum at birth. This represents a clear indication of a neonatal immune response to an in-utero infection, as IgM does not cross the placenta. Most data refer to pregnancies in their final stages, but there is very little information on the possible effects of Covid-19 infection on pregnancies in their initial stages, hence the concern for those planning pregnancies around this period. There is currently no data to suggest there is an increased risk of miscarriage or early pregnancy loss in relation to Covid-19, it is still unclear whether these cases were spontaneous or a result of the viral infection.

**2.Impact of ageing in the outbreak of this novel COVID-19**: The COVID-19 pandemic is impacting the global population in drastic ways. In many countries, older people are facing the most threats and challenges at this time. Although all age groups are at risk of contracting COVID-19, older people face significant risk of developing severe illness if they contract the disease due to physiological changes that come with ageing and potential underlying health conditions.

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 environment in the outbreak of this novel COVID-19**

For communities, inadequate shelter and overcrowding in our environment are major factors in the transmission of diseases with epidemic potential such as acute respiratory infections, meningitis, typhus, cholera, scabies, etc. Outbreaks of disease are more frequent and more severe when the population( hence our environment ) density is high.

Overcrowding in our environment premote the spread covid 19 as this goes against the rule of social distance in order not to come too close to people.

Also climate contribute to the spread of the virus as low temperature aids the survival of the diease in the air for some period of time but at high temperature the virus dies off quickly.

**3.Importance of spermatogenesis and oogenesis**

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**

* Provide haploid motile sperm which is the male gamete
* During spermatogenesis, one spermatogonium produces four sperms
* 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.
* During meiosis 1 crossing over takes place which brings about variation
* Spermatogenesis occurs in various organisms; thus it supports the evidence of the basic relationship of organisms

**Importance of oogenesis**

* Provide haploid ovum which is the female gamete
* One oogonium produces one ovum and three polar bodies
* 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.
* During meiosis first crossing over takes place which brings about variation
* Oogenesis occurs in various organisms. Therefore, it supports the evidence of basic relationship of organisms.

**4**. Personal hygiene involves those practices performed by an individual to care for one’s bodily health and wellbeing through cleanliness. Motivations for personal hygiene practice include reduction of personal illness, optimal health and sense of wellbeing, social acceptance and prevention of spread of illness to others. Practices that are generally considered proper hygiene include showering or bathing regularly, washing hands regularly and especially before handling food, washing scalp hair, wearing clean clothes, brushing teeth, beside other practices.

A disaster is a serious disruption occurring over a short or long period of time that causes widespread human, material, economic or environmental loss which exceeds the ability of the affected community or society to cope using its own resources. Three types of disasters are:

Natural – hurricanes, tornados, earthquakes, floods, volcanoes e.t.c

Technological – chemical releases, power outages, natural gas explosion, e.t.c

Man-made – terror attacks, race riots, mass shootings, e.t.c

The correlation of personal hygiene and disaster: During or after a major disaster, the risk of becoming ill from disease or infection go way up. The maintenance of personal hygiene and a hygienic environment are the biggest priorities after or during a disaster. Being clean is the best way to prevent yourself from getting ill during this time. Washing hands, brushing teeth, and taking showers are the first line of defense against disease. Clean hands saves lives in emergency situations. Cleaning and sanitizing of hands are the best method to keep illness free at an extremely stressful time.