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

A teratogen is an infectious agent, drug, chemical or radiation that alters fetal morphology or function if the fetus is exposed during a critical stage of development.

From reports seen, it’s been stated that it is too early to determine if the Corona virus is a teratogen but from instances of birth seen by Corona virus positive patients, it cannot be transferred from mother to child neither does it affect the development of the fetus in any way. From the cases seen, No, Corona virus is not a teratogen.

**2. What are the impact of ageing and environment in the outbreak of this novel Covid 19.**

1. **The impact on Ageing**

Older people don't have as strong an immune system so they are more vulnerable to infectious disease. They’re also more likely to have conditions such as heart disease, lung disease, diabetes or kidney disease, which weaken their body’s ability to fight infectious disease.

In many countries, they are more likely to be in institutionalized settings like a nursing or retirement home, or living with family in a more crowded situation where there's a greater risk of infection.

The elderly might also have isolation or mobility challenges. So because they're isolated, they can't get information about what to do, or they're not able to get food they need if stores are out of stock and things become more difficult. In many societies, elders are more likely to live in poverty, which makes it more difficult for them to get the things they need and to take care of themselves. Poverty presents a whole range of challenges pertaining to health.

**Why is the mortality rate higher for older people?**

There's a direct correlation between mortality and age. For someone between the ages 60 to 69, the mortality rate is at 3.6%. At 70 to 79, it’s 8%. And for the ages 80 or above, it’s 15%. In some of the data shown recently, it’s even higher, at 18%. The elderly are more likely to get acute respiratory distress syndrome, the acute lung injury that is causing many of the deaths. But it seems the virus is also more likely to affect the heart than any similar viruses, so they're actually seeing people dying from heart attacks who have COVID-19. A dialysis centre in Wuhan had a number of patients die from coronavirus without any pneumonia, so it just stresses the body in general. It doesn’t have to be the pneumonia that kills them.

A side-effect of the impact of coronavirus on the health system is we'll see the elderly will be more likely to die of other causes. In Nigeria right now, you're 70, and you have a heart attack, you're going to get substandard care because the system is overwhelmed. The elderly are hospitalized on a daily basis at much higher rates than younger people and they are not going to get the quality care they deserve during the outbreak.

Normally, Elderly people go for timely check ups but now they may consider just staying home and treating it there, which is a risk as well. So it's a real dilemma. Luckily, in some countries, physicians’ offices are starting to do telemedicine visits, but these may be difficult for the elderly to access.

1. **The impact on the environment**

First of all, the pandemic has led to the abandonment of many environmental sustainability programs in developed countries. An example is in the United States, smaller municipalities have halted recycling programs due to the risks associated with the spread of the virus. Likewise, italy has banned infected residents from sorting their waste at all. Additionally, many corporations have overturned disposable bag bans and begun relying once again on single-use plastics, and many restaurants are no longer accepting reusable containers. An example is in the United States- in early March, Starbucks announced a temporary ban on using reusable cups.

Furthermore, with more and more consumers isolated at home, there has been an increasing number of online purchases and meal deliveries made. This has not only caused the disposal of more single-use plastic packaging, but has further required more fossil fuels to be burned for the individual transportation and distribution of goods.

There has also been an increase in medical waste - much of the personal protective equipment that healthcare professionals are using can only be worn once before being disposed of. Hospitals in Wuhan, for example, produced over 200 tons of water per day during the peak of their outbreak, compared to an average of less than 50 tons prior.

Even if mass isolation were aiding in the reduction of climate change, it would not be a sustainable way of cleaning up the environment.

**3.** **Summarize the importance of Oogenesis and spermatogenesis.**

Gametogenesis is the process by which male and female sex cells or gametes, i.e., sperms and ova are formed respectively in the male and female gonads (testes and ovaries). The gametes differ from all other cells (= somatic cells) of the body in that their nuclei contain only half the number of chromosomes found in the nuclei of somatic cells.

Meiosis forms the most significant part of process of gametogenesis. Gametogenesis for the formation of sperms is termed spermatogenesis, while that of ova is called oogenesis. Both spermatogenesis and oogenesis comprise similar phases of sequential changes viz.,

1. multiplication phase,
2. growth phase and
3. maturation phase.

#### **Spermatogenesis**

The process of formation of sperms is called spermatogenesis. It occurs in the semi­niferous tubules of the testes. The seminiferous tubules are lined by germinal epithelium. The germinal epithelium consists largely of cuboidal primary or primordial germ cells (PGCs) and contains certain tall somatic cells called Sertoli cells (= nurse cells). Spermato­genesis includes formation of spermatids and formation of spermatozoa.

#### **(i) Formation of Spermatids**

It includes the following phases.

**(a) Multiplication Phase**

At sexual maturity, the undifferentiated primordial germ cells divide several times by mitosis to produce a large number of spermatogonia (Gr. sperma = seeds, gonos- generation). Spermatogonia (2N) are of two types: type A spermatogonia and type В spermatogonia. Type A spermatogonia serve as the stem cells which divide to form additional spermatogonia. Type В spermatogonia are the precursors of sperms.

**(b) Growth Phase**

Each type В spermatogonium actively grows to a larger primary spermatocyte by obtaining nourishment from the nursing cells.

**(c) Maturation Phase**

Each primary spermatocyte undergoes two successive divi­sions, called maturation divisions. The first maturation division is reductional or meiotic. Hence, the primary spermatocyte divides into two haploid daughter cells called secondary spermatocytes. Both secondary spermatocytes now undergo second maturation division which is an ordinary mitotic division to form, four haploid spermatids, by each primary spermatocyte.

#### **(ii) Formation of Spermatozoa from Spermatids (Spermatogenesis)**

The transfor­mation of spermatids into spermatozoa is called spermiogenesis or spermateliosis. The spermatozoa are later on known as sperms. Thus four sperms are formed from one sper­matogonium. After spermiogenesis sperm heads become embedded in the Sertoli cells and are finally released from the seminiferous tubules by the process called spermiation.

#### **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 I crossing over takes place which brings about variation,
4. Spermatogenesis occurs in various organisms. Thus it supports the evidence of the basic relationship of the organisms

### **Oogenesis**

The process of formation of a mature female gamete (ovum) is called oogenesis. It occurs in the ovaries (female gonads). It consists of three phases: multiplication, growth and maturation

1. **Multiplicationphase**

In the foetal development, certain cells in the germinal epithelium of the ovary of the foetus are larger than others. These cells divide by mitosis, producing a couple of million egg mother cells or oogonia in each ovary of the foetus. No more oogonia are formed or added after birth. The oogonia multiply by mitotic divisions forming the primary oocytes.

#### **Growth phase**

This phase of the primary oocyte is very long. It may extend over many years. The oogonium grows into a large primary oocytes. Each primary oocyte then gets surrounded by a layer of granulosa cells to form primary follicle. A large number of these follicles degenerate during the period from birth to puberty. So at puberty only 60,000- 80,000 primary follicles are left in each ovary. The fluid filled cavity of the follicle is called antrum.

#### **Maturation phase**

Like a primary spermatocyte, each primary oocyte undergoes two maturation divisions, first meiotic and the second meiotic. The results of maturation divisions in oogenesis are, however, very different from those in spermatogenesis. In the first, meiotic division, the primary oocyte divides into two very unequal haploid daughter cells— a large secondary oocyte and a very small first polar body or polocyte.

In the second maturation division, the first polar body may divide to form two second polar bodies. The secondary oocyte again divides into unequal daughter cells, a large ootid and a very small second polar body. The ootid grows into a functional haploid ovum. Thus from one oogo­nium, one ovum and three polar bodies are formed. The ovum, is the actual female gamete. The polar bodies take no part in reproduction and, hence, soon degenerate.

In human beings, ovum is released from the ovary in the secondary oocyte stage. The maturation of secondary oocyte is completed in the mother’s oviduct (Fallopian tube) usually after the sperm has entered the secondary oocyte for fertilization.

In humans (and most vertebrates), the first polar body does not undergo meiosis II, whereas the secondary oocyte proceeds as far as the metaphase stage of meiosis II. How­ever, it then stops advancing any further; it awaits the arrival of sperm for completion of meiosis II.

Entry of the sperm restarts the cell cycle breaking down MPF (M-phase promoting factor) and turning on APC (Anaphase promoting complex). Completion of meiosis II converts the secondary oocyte into a fertilized ovum (egg) or zygote (and also a second polar body).

#### **Importance of Oogenesis**

1. One oogonium produces one ovum and three polar bodies.
2. Polar bodies have small amount of cytoplasm. It helps to retain 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.
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 the organisms.
5. Describe what you understand by personal hygiene and disaster; hence state their correlation if there any.

**Personal hygiene**

According to the World Health Organization (WHO), "Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases”.  Personalhygiene refers to maintaining the body's cleanliness. In simple terms, personal hygiene is how you care for your body. This practice includes bathing, washing your hands, brushing your teeth, and more. Every day, you come into contact with millions of outside germs and viruses. They can linger on your body, and in some cases, they may make you sick. Personal hygiene practices can help you and the people around you prevent illnesses. There are different types of personal hygiene, they are

1. Toilet hygiene

Wash your hands after you use the restroom. Scrub with soap for 20 to 30 seconds, and be sure to clean between your fingers, on the back of your hands, and under your nails. Rinse with warm water, and dry with a clean towel. If you don’t have running water or soap, an alcohol-based hand sanitizer will also work. Use one that’s at least 60 percent alcohol.

### Shower hygiene

### Personal preference may dictate how often you wish to shower, but most people will benefit from a rinse at least every other day. Showering with soap helps rinse away dead skin cells, bacteria, and oils. You should also wash your hair at least twice a week. Shampooing your hair and scalp helps remove skin buildup and protects against oily residues that can irritate your skin.

### Nail hygiene

Trim your nails regularly to keep them short and clean. Brush under them with a nail brush or washcloth to rinse away buildup, dirt, and germs. Tidying your nails helps you prevent spreading germs into your mouth and other body openings. You should also avoid biting your nails

Iv. Teeth hygiene

Good dental hygiene  is about more than just pearly white teeth. Caring for your teeth and gums is a smart way to prevent prevent gum diseases and cavities. Brush at least twice a day for 2 minutes. Aim to brush after you wake up and before bed. If you can, brush after every meal, too. Floss between your teeth daily, and ask your dentist about using an antibacterial mouthwash. These two steps can help prevent tooth decay and eliminate pockets where bacteria and germs can build up.

### Sickness hygiene

If you’re not feeling well, you should take steps to keep from spreading germs to others. This includes covering your mouth and nose when sneezing, wiping down shared surfaces with an antibacterial wipe, and not sharing any utensils or electronics. Also, immediately throw away any soiled tissues.

### Hands hygiene

Germs on your hands can easily enter your body through your mouth, nose, eyes, or ears. Wash your hands:

* 1. when you handle food
  2. before you eat
  3. if you handle garbage
  4. when you sneeze
  5. any time you touch an animal

Likewise, wash your hands after changing a baby’s diaper, helping someone clean themselves, or when cleaning a cut or wound.

**Disaster**

A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources.

**The relationship between personal hygiene and disaster**

A disaster can be a pandemic. A recent example is the Covid-19 pandemic the world is facing today. Due to its mode of transmission, personal hygiene is the best mode of prevention and as the saying goes ‘Prevention is better than cure'.

According to the World Health Organization (WHO), "Hygiene refers to conditions and **practices that help to maintain health and prevent the spread of diseases.**". Having good personal hygiene habits protects you on as daily basis from germs and harmful microorganisms that come across during our daily activities and in turn preventing certain disasters from spreading or even occurring.