Systems in the human body

Muscular System

There are numerous similarities and differences between the mink's muscular system and that of a human's. For example, the superficial musculatures of the back of the mink's and humans have many distinctions. First of all, humans do not have the longissimus dorsi on the superficial layer which covers the majority of the back for the mink. It covers from the end of the latissimus dorsi all the way until the bottom of the vertebrae. Humans only have the latissimus dorsi which spans almost the entire back and which helps in the adduction and extension of the shoulder. The longissimus dorsi for humans ranges in the deep muscles of the vertebral column and aids in the lateral flexion to the sides. There are also many other muscles of the superficial layer in the mink which are not present in the human body such as the serratus dorsalis, serratus ventralis, and the iliocostalis.

Circulatory System

The circulatory system of both, the humans and the mink, begin at the heart. The heart is virtually in the middle of the chest with all of the arteries and veins attached at the base. A unique characteristic of the heart is that it is an involuntary muscle. It is a muscle that we cannot control based upon our choosing, unlike skeletal muscles. The heart beats astoundingly 100, 000 times a day, pumping 8000 liters of blood. An average adult human heart is approximately 12. 5 cm long measured from the base to the apex. The heart of the mink is obviously smaller to that of a human's. The heart is surrounded by the pericardial cavity which is outlined with the pericardium. This lining is a serous membrane than can be further divided into subdivisions known as the visceral pericardium, or epicardium (which shields

the outer membrane of the heart), and the parietal pericardium which lines the surface of the pericardial sac.

Blood in the circulatory system travels through an arrangement of blood vessels throughout the body. The pulmonary circuit transports blood to and from the gas exchange linings of the lungs, while the systemic circuit carries blood to and from the rest of the body. Both of these circuits initiate and complete at the heart and the blood must travel through both circuits to return to the circuit it originally began from. The heart consists of four chambers: the right atrium, right ventricle, left atrium, and the left ventricle. The right atrium takes in blood from the systemic circuit and empties it to the right ventricle which pumps the blood into the pulmonary circuit. The left atrium gathers the blood dispersed from the pulmonary circuit and passes it to the left ventricle which then pumps the blood into the systemic circuit.

For the right atrium, it receives the blood from the systemic circuit through the superior vena cava and inferior vena cava. The superior vena cava delivers the blood to the right atrium from the head, neck, upper limbs, and chest. The inferior vena cava carries the blood to the right atrium from the trunk and the legs. The right ventricle receives the blood emptied by the right atrium which occurs through the passing of the right atrioventicular valve, or also known as the tricuspid valve. This valve has three fibrous flaps, or cusps, that prevent the backflow of blood into the right atrium when the right ventricle contracts. The chordate tendinae, the free edge of each cusp attached to tendinous connective-tissue fibers, make sure that the cusps close and open at the appropriate times. Inside the ventricle are numerous ridges that coordinate the contraction of the cardiac muscle cells. The top of

the right ventricle also consists of the pulmonary semilunar valve, which has three semilunar cusps, where the blood has to flow through to begin the pulmonary circuit. These cusps, in contrast to the cusps of the tricuspid valve, prevent the backflow of blood as the right ventricle relaxes. The blood then travels into the left and right pulmonary arteries where they will then supply blood to the lungs and capillaries where gas exchange transpires.

The left atrium collects the blood from the pulmonary circuit after it is completed from the two left and right pulmonary veins. The left ventricle also has valves that control the flow during contraction. The left atrioventicular valve, or biscuspid valve, is only two valves (hence the name *bi* cuspid) and carries out the same function as the tricuspid valve for the left atrium and left ventricle. Blood passing through the left ventricle goes through the aortic valve, or aortic semilunar valve, into the largest artery in the body, the aorta. The cusps in the aortic valve are similar to those of the pulmonary valve and it also prevents the backflow into the left ventricle when entering the systemic circuit. The blood then goes through the ascending aorta, up the aortic arch, and then down the descending aorta for the blood to be supplied to the body. The heart of the mink also consists of all the chambers, veins, arteries, etc found in the human heart, but the pressure needed for the heart of the mink is less than that of a human’s because of its relative body size.

The left ventricular consists of a thicker muscular wall than the right ventricle even though they can contain the same amount of blood. This is because the right ventricle only needs enough pressure to pump the blood to and from the lungs (15 cm), which is proximal to the heart. The left ventricle,

however, needs to develop enough pressure for the blood to flow up the aorta and throughout the entire body from the systemic circuit. Because of this, the left ventricle contains more cardiac muscle cells and thicker muscular ridges inside to create the pressure that would suffice the blood flow throughout the entire body.

Respiratory System

There are several similarities, as well as differences, that exist between the respiratory system of the human and of the mink. Besides the fact that the lungs serve the same function in both species. Both species relatively have the same set up when it comes to the lungs. A pair of lungs, where the right consists of three lobes (right cranial lobe, right medial lobe, and right caudal lobe) and the left consists of two (left cranial and left caudal) and each lobe is separated by fissures. However, differences between the lungs exist in the structure of them. Initially, the human lungs are protected by the rib cage, whereas there is no apparent protection of the lungs of the mink. Meanwhile, the human lungs are attached to the diaphragm. In contrast, there is no muscle attachment of the lungs of the mink. Two other features of the comparison of the respiratory system between the mink and the human are the trachea and the larynx. Compared to the human trachea, the mink has a much longer trachea when compared to its body size. Both however, have the same C-shaped cartilage and have a rugged texture to it. As for the larynx, it is made up of many cartilages just like a human but the major difference is that the human voice box, which knows as our larynx, has a laryngeal prominence where voice production takes action. Other than that, it serves the same purpose as an airway to the lungs.

The diaphragm is a dome-shaped septum which separates the thoracic cavity from the abdominal cavity. The convex of the diaphragm forms the floor of the thoracic cavity, while the concave structure under the surface of the roof forms the abdominal cavity. The diaphragm plays a very critical role during breathing and respiration. During inhalation, the diaphragm contractions, causing the thoracic cavity to enlarge. The enlarging of the thoracic cavity creates suction which draws air into the lungs. As the diaphragm relaxes, the air is exhaled by the elastic recoil of the lung and the tissues which line the thoracic cavity. Therefore, this reduces intra-thoracic pressure. Meanwhile, by altering the intra-thoracic pressure, the diaphragm is also involved in functions such as helping to expel vomit, feces and urine from the body.

The two phrases of breathing are inspiration and expiration. During inspiration, the diaphragm plays an important role. The diaphragm and intercostals muscles contract during inspiration. The diaphragm moves downwards thus increasing the volume of the thoracic cavity, and the intercostals muscles pull the ribs up, thus expanding the rib cage and increasing their volume. The increase of volume then lowers the air pressure within the alveoli.

Urogenital System

There are numerous similarities and differences between the anatomies of the mink from that of a human. First of all, for the female mink and female human, the most obvious is the size; the ovaries, vagina, fallopian tubes, urinary bladder, and the urethra are physically larger in the female human than those in the mink’s. Another similarity is the same basic reproductive

organs such as the ones mentioned before. Contrasts between the anatomies are that, proportionally, the fallopian tubes are smaller, which cause the horns of the uterus to be bigger allowing the mink to be able to give birth to approximately 10 offspring. Another difference is that the mink’s gestation period only lasts for 52 days while the pregnancy of humans lasts roughly nine months.

In the anatomy of the male mink’s reproductive system, the os penis, or baccum, is an advantage in terms of fertilization of the egg in the fact that it gives the male the ability to completely insert the penis into the vagina of the female for fertilization of the egg. Because some mammals have a short span of ejaculation, this allows the animals to ensure the fact that the semen of the male will reach the female. Differences to the male human reproductive system are that humans do not have an os penis which results in a proportionally smaller penis. Because of this, it is more difficult for humans to become pregnant for the fact that the semen cannot be sure to have reached the eggs to carry out fertilization.

The kidneys are part of the excretory system and are the organs in the body that are responsible for cleaning out the useless wastes that are not needed for the body. The internal structure of the kidney could be compared to that of a bean. The kidneys of both, the mink and the human, contain the basic anatomical structures such as the renal cortex, renal medulla, renal arteries and veins, renal papilla, and the renal pelvis. The texture of the kidney is rather smooth with numerous vessels and veins on top with all of the features easily noticeable.