Lab report

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Lab report

**Discussion**

**Response 1: Do you think erythropoietin levels in athletes at low altitudes are lower, higher or the same after training at a high altitude for 2 months? Explain your answer?**

At high altitudes air pressure is lower, the pressure of oxygen is also lower which causes stimulation of more production of erythropoietin. Erythropoietin level increases resulting in increased requirement of oxygen. Kidneys will secrete erythropoietin to make RBC production to increase hemoglobin production and deliver it to the muscles.

**Response 2: Calculate the average ml of oxygen molecules in 100 ml blood in the athletes at lower altitudes and then in athletes at high altitudes while training at high altitudes. Use the following information ml of oxygen per gram of hemoglobin.**

Erythropoietin levels at low altitudes are higher in athletes. At low altitude our body has 14.3g/100 ml of blood. Considering the value per gram 1.39 ml of oxygen. This would be 20.1 of oxygen in every 100 ml of blood. Our body has 17.1g/100 ml at the levels of high altitude. Considering the value 17.1g/100 ml of blood. We will get 1.39 ml of oxygen per gram resulting in 23.81 of oxygen in every woo ml of our blood.

**Response 3: Do athletes training at high altitudes have more or fewer oxygen molecules per ml of blood then athletes training at low altitudes? Explain why this difference gives athletes who train at high altitudes an advantage over athletes who train only at low altitudes.**

Athletes utilize exercise to produce more red blood cells at high altitudes. Because the oxygen molecules per volume of air is less which prepares the body to make more hemoglobin. This extra hemoglobin is required to carry increase amount of oxygen to the muscles.

**Response 4: In family 1, can the mother or father donate blood to their child to explain your answer?**

While donating blood the donor and recipient must be compatible. Mother’s blood will cause clotting and it will end up in death. Father’s blood cannot cause clotting and can be donated to the child.

**Response 5: In family 2, can the mother or father donate blood to their child? Explain your answer**

Blood typing is the blood test that will decide if the blood compatibility. Recipient and the donor blood must be compatible. In this case, parent's blood is matching with the blood of donor that is child and both can recipient their blood to their child.

**Response 6: In family 3, can the mother or father donate blood to their child? Explain**

To donate blood, blood test is performed. Blood typing is the blood test that will decide if the blood compatibility. Recipient and the donor blood must be compatible. Parent’s blood is matching with the blood of recipient that is child and both can donate their blood to their child.

**Response 7: What will happen if someone did not receive a compatible blood type during blood transfusion?**

An ABO reaction that is incompatibility occurs that is when someone receives a blood type that is wrong. It is rare as blood typing is performed before blood transfusion but it is potentially fatal that happens when incompatible blood is recognized by our immune system. A red blood cell protein called an antigen is attached to the cells. People with blood group B have antigen B. people with blood type A carry antigen A. The immune system produces antibodies when recognized wrong blood antigen if the body does not have in the blood. This will cause the immune system to react in response to the new cells and resulting in kidney failure, blood clotting will cause low blood pressure and death.

**Conclusions**

**Response 8: In one or 2 sentences, state how hematocrit and hemoglobin level change with altitude?**

At high altitude, the concentration of the hemoglobin and hematocrit is high. With the high altitude, there are low oxygen levels that stimulate more red blood cells to be produced. This ultimately causes hemoglobin or hematocrit to allow effectively carrying more oxygen to the muscles.

**Response 9: In one or 2 sentences, state why it is important to match blood type when giving blood transfusion?**

During blood transfusion procedure, blood test is performed. It is the blood test that will make sure that recipient and the donor blood must be compatible. This is important because the antigens attached to the blood cells react with those not present in the blood. To avoid this reaction, blood must be matched.

**Application**

**Response 1: Blood toping (using injected substances to artificially enhance performance) is illegal in many sports. Two substances used are erythropoietin and hypoxia-inducible factors (HIF) one of the actions of HIF is to increase the formation of new blood vessels (angiogenesis). Explain how administering erythropoietin can increase performance and how HIF increases performance through angiogenesis?**

Administering erythropoietin can increase performance because it is the protein that produces new RBCs. Erythropoietin production will be enhanced by increasing the amount of HIF present. Producing new RBCs will stimulate the cells to carry more oxygen to the cells. This would be resulting in more performance and more endurance.

**Response 2: Myoglobin levels are higher in Tibetans and other ethnic groups that live at high altitudes. Explain the benefit of higher myoglobin levels for individuals living at high altitudes.**

The myoglobin protein is a muscle protein which is increased in concentration in the people living at heights. As the height increases the oxygen level is low. This low oxygen levels stimulate production of more red blood cells as the oxygen requirement is increased. More myoglobin to allow effectively carrying more oxygen to the muscles to adjust to the atmosphere.

**Response 3: An Rh-mother is given Rh immune globin during her pregnancy. Rh immune globin prevents the formation of antibodies to Rh antigens. Explain why this is done.**

As we know our immune system reacts against antibodies that are not present in the body. This treatment will prevent the immune system to produce antibodies in response to the newborn Rh-positive cells. If the fetus is Rh-negative it means it has no Rh factor. In case of Rh-positive, it will have Rh factor (Renkonen & Timonen, 1967). If the blood blends with Rh-positive blood the defense system will active in response to produce antibodies.

References

Renkonen, K. O., & Timonen, S. (1967). Factors influencing the immunization of Rh-negative mothers. *Journal of Medical Genetics*, *4*(3), 166.