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Cardiac arrest is a type of arrhythmia that prevents blood flow from getting into the heart, which in turn can cause vital organs and brain function to stop working (National Heart, Lung, and Blood Institute, n.d.). In 2022 alone, there were 356,000 hospital cardiac arrest occurrences where 90% of them were fatal (Newman, n.d.). Additionally, many deaths that occur from cardiac arrest are linked to heart attack and stroke.

Consequently, when the heart constricts blood and restores it again, it can lead to ischemia/reperfusion. Which is the damage that is apparent on organs and tissue after the flow of blood supply. Ischemia/reperfusion can cause injury not only to portions of tissues, but also destruction of the cells. It can also lead to metabolic disorders, and mitochondrial malfunction due to the decay of cells and tissues. Caused by the chaotic restoration of blood flow to organs and tissues.

In addition, irregular heart rhythms cause arrhythmias; however, poor health can exacerbate the risk of a cardiac arrest occurring. For example, heavy alcohol use, physical stress, and too much caffeine can all intensify the risk of cardiac arrest. Moreover, medical conditions that are linked to the heart can cause the development of a heart attack. To illustrate, if one was previously diagnosed with coronary heart disease, heart failure, or issues within the heart structure can induce a cardiac arrest.

Despite that, an article created by Scientific American introduced the topic of how mitochondrial transplants can aid in the restoration of tissue function, neurological function, and decrease the risk of cardiac arrest within rats. After successfully finding good results with mitochondrial transplants on human organs, they decided to test amongst rats. The study found that after the injection of the mitochondria into the rat's blood stream it began to experience increased levels of lactate and glucose as well as revitalizing tissue and neurological function.

In the study, the process of mitochondrial transplantation happens when organelle from an undamaged site is taken, and administered near the damaged tissue or blood vessel. Once infused, the mitochondria travels through the blood stream and into the tissues, hence creating more ATP within the body (Yasinski, 2023). The extra amount of ATP can aid in the process of healing. Likewise, the growth of ATP within the body provides benefits to cardiovascular health, muscle conditions, and recovery with reduced muscle breakdown or fatigue.

To the same degree, intercellular mitochondrial transfer occurs within the cell. In fact, mitochondria change shape and structure when the cell is undergoing stress or is in need of energy. In like manner with mitochondrial transplantation, intercellular mitochondrial transfer assists in restoring damaged tissue and degeneration (Delin, 2021). As well as, mitochondria are naturally transferred when the body is in need of maintaining homeostasis within tissue, reducing tumor progression, and even helping with the regulation of the immune system.

In conclusion, the mitochondria is a powerful organelle that can be used in many ways to aid the future of medicine and healthcare as a whole. As mitochondrial transplants make their way into the scene of medicine as an aid in cardiovascular health, tissue, and organ repair by the introduction of additional ATP. Intercellular mitochondrial transfer occurs naturally within the body as mitochondria transport to areas where tissue is damaged, the body is in need of maintaining homeostasis, or management of the immune system. All in all, mitochondrial function is vital and essential to both our physiological and mental health as it plays a key role in supplying energy and maintaining our physical health.

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