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CONSTANTLY INCREASED INTRACRANIAL PRESSURE IN ASTRONAUTS AND ITS RELATIONSHIP WITH COCHLEA SODIUM POTASSIUM PUMP MALFUNCTIONING.

Abstract

Once the vein vector is established towards the opposite direction in space, blood flow will face an extra resistance. In this case, astronaut's heart will not fully be able to pump blood against such resistance. This process starts a retroactive stasis and, in this scenario, the intracranial pressure will remain increased constantly. Intracranial pressure has significant impact on the blood retrieve flow. Indeed, it has been observed that the intracranial pressure remained increased during long term spaceflight missions on the ISS. Changes in cerebral venous pressure and drainage during manned missions, result in corresponding changes in intracranial fluid dynamics.

On regular gravity conditions, the vestibular system structures have found a process of caring potassium in and out without ATP dependency. The exit of potassium ions is also done passively because the concentration of these ions is higher inside hair cells than outside cell body. This entire process results in significant ATP savings for the sensory hair cells located at the vestibular system. The flow of potassium from fibroblasts penetrates the basal cells throughout a network of convergent channels. These channels are composed of connections of proteins called connexins, which form a hydrophilic channel of 2 nm in diameter.

Notably, stasis of blood can lead to a cascade of malfunction in homeostasis activation factors. Such mechanism can create local hypoxia which is dangerous for the cochlea cells. Unregulated intracranial pressure can, ultimately, induce local hypoxia. This work intends to demonstrate how the constant head pressure during space flights leads to an instable ions flow on the cochlea and became one of the causes of astronauts motion sickness.