Physiological Responses of HEK-293 Cells to Elevated Sodium Chloride Concentrations

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Native Hawaiian and Pacific Islander populations experience a high incidence of kidney disease, with 921 cases per million annually (Xiang et al., 2020). A key contributing factor is the heavy reliance (80-90%) on imported, ultra-processed foods, which contain elevated salt (NaCl) levels (Francis, 2019; Woods, 2019). To better understand how high sodium levels might affect kidney health, human embryonic kidney (HEK) cells was used to investigate the impact of NaCl concentration on cell viability, proliferation, migration, morphological changes, osmoregulation, and overall cellular function. HEK cells were exposed to varying concentrations of NaCl, and cell viability and proliferation were assessed using a cell count assay, while changes in cellular morphology and migration were observed under a microscope. Additionally, osmotic stress and cell death analysis were performed to examine the cell stress response. The results revealed that increasing NaCl concentrations led to a dose-dependent reduction in cell viability and proliferation, with significant morphological changes indicative of osmotic stress. These findings highlight the importance of NaCl concentration in regulating HEK cell function and provide insight into the cellular impact of high salt intake, contributing to a better understanding of its role in kidney disease among at-risk populations.

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