Cell volume regulation

Karger - Cell Volume Regulation Modulates NLRP3 Inflammasome Activation

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By utilizing organic osmolytes, intracellular ionic strength can be kept constant and at an optimal level while allowing the cell to independently control intracellular osmolarity. These could be alleviated by lowering culture medium osmolarity. However, it has recently been shown that the PVS actually develops well before the extrusion of the first polar body, and also develops in oocytes maintained in GV arrest that do not form a polar body.

Cell Volume Regulation in Immune Cell Function, Activation and Survival

The first would be if the in vivo environment of early preimplantation embryos had similarly low osmolarity i. Permeability to water is increased by water-channel proteins discussed below. These mechanisms of cell volume regulation are unique to oocytes and early embryos.

6.2: Regulation of Cell Volume

In addition to accumulating glycine, early embryos also need a means of releasing intracellular glycine and other osmolytes , particularly when cell volume increases above the normal level. Perhaps the most clearly indicative of a role in cell volume regulation, glycine and GLYT1 transport were shown to be required for 1-cell embryos to maintain their normal size.

Physiology of cell volume regulation in vertebrates

As shown before see Fig. Several biophysical studies have identified an inwardly rectifying chloride current mediating an efflux of chloride ions which has the electrophysiological signature of ClC-2. This is the predictable outcome based on the lowered intracellular tonicity responsible for the return of volume towards normal.

Cell volume regulation in oocytes and early embryos: connecting physiology to successful culture media

Water crosses membranes freely, so this change in tonicity will have rapid several minutes effects on cell volume.

Osmosis, Water Channels, and the Regulation of Cell Volume

As the chief physiological anion, chloride ions provide the counter ion for many cellular transport systems. Although the mechanisms by which cell volume perturbations are sensed are still far from clear, significant progress has been made with respect to the nature of the sensors, transducers and effectors that convert a change in cell volume into a physiological response.

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