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Review

## Ion Transport in Sperm Signaling

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## Abstract

Ion channels and transporters, key elements in sperm–egg signaling and environmental sensing, are essential for fertilization. External cues and components from the outer envelopes of the egg influence sperm ion permeability and behavior. Combining *in vivo* measurements of membrane potential, intracellular ions, and second messengers with new molecular approaches and reconstitution strategies are revealing how sperm ion channels participate in motility, sperm maturation, and the acrosome reaction. Sperm are tiny differentiated terminal cells unable to synthesize proteins and difficult to characterize electrophysiologically. Spermatogenic cells, the progenitors of sperm, have become useful tools for probing sperm ion channels since they are larger and molecular biology techniques can be applied. These complementary strategies are opening new avenues to determine how sperm ion channels function in gamete signaling.

## Keywords



acrosome reaction; capacitation; fertilization; ion channels; ion transport; sperm; spermatogenic cells



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