An *MBoC* Favorite: Ca^{2+} entry through store-operated channels in mouse sperm is initiated by egg ZP3 and drives the acrosome reaction

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To fertilize eggs, mammalian sperm must first undergo a form of cellular exocytosis called the acrosome reaction. In 1983, my laboratory reported that nanomolar concentrations of ZP3, one of three zona pellucida glycoproteins from mouse eggs, induced mouse sperm to undergo the acrosome reaction in vitro. Seven years later, this article from Florman's laboratory (O'Toole *et al.*, 2000) revealed that when ZP3 binds to sperm heads, it generates a sustained influx of Ca^{2+} through store depletion–activated channels that function to refill internal Ca^{2+} stores and triggers the acrosome reaction. In the presence of egg ZP3, Ca^{2+} levels in sperm increased nearly 2.5-fold, from ~159 to ~396 nm. This article provided a comprehensive model for the ionic events responsible for ZP3-induced signal transduction in sperm during mammalian fertilization.

REFERENCE

O'Toole A, Arnoult C, Darszon A, Steinhardt R, Florman HM (2000). Ca^{2+} entry through store-operated channels in mouse sperm is initiated by egg ZP3 and drives the acrosome reaction. Mol Biol Cell 11, 1571–1584.

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