

Abstract

The acrosome reaction (AR) of the sperm is a prerequisite for egg fertilization, which takes place in the female reproductive tract. The AR allows sperm to penetrate extracellular egg coats and fuse with the egg. At first, the sperm must undergo the process called capacitation, then AR is initiated and acrosomal content is released. While it is not clear, what initiates the AR, it is probably the egg's extracellular coats – the *zona pellucida* and cumulus cells, secreting progesterone and some other substances, which can initiate the AR. Lately, it was demonstrated, that in the mouse the most sperms undergo the AR in the upper isthmus of the oviduct. Only a few sperms reach the ampulla, but all of them can fertilize eggs. During the AR, the acrosomal content is released into the extracellular space. It was discovered, that the release of acrosomal proteins is not synchronous, soluble components are released faster from the acrosome than are acrosomal matrix proteins. Before the acrosomal release, G-coupled receptors and tyrosine kinase receptors activate phospholipases. Protein kinases are also activated, which results in the opening of Ca^{2+} channels in the acrosome and sperm plasma membrane and the release of Ca^{2+} . The increase of Ca^{2+} leads to actin depolymerization, membrane fusion, and finally, acrosomal exocytosis.

Keywords

acrosome, acrosome reaction, exocytosis, *zona pellucida*, cumulus cells