

Structural requirements of sulfated polysaccharides for successful sea urchin fertilization

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The sulfated polysaccharide present in the egg gelatinous layer is the species-specific inducer of sperm acrosome reaction, a fundamental event for sperm-egg recognition. They differ among species in the monosaccharide residue, the glycosidic linkage and/or sulfation pattern. To obtain an overall view of the molecular basis of gamete recognition, sperm from some species were put in contact with different sulfated polysaccharides and observed using two approaches: the measure of sperm intracellular calcium concentration and the actin filament that is exposed in sperm during the acrosome reaction.

Sperm from *Echinometra lucunter*, which specific sulfated polysaccharide is a sulfated galactan, composed of glycosidic linkage 1→3 and sulfate in the 0-2 position, recognized the galactan from its own species and also the fucan from *Strongylocentrotus franciscanus*, that has the same sulfation pattern and glycosidic linkage, but is constituted by fucose residues. On the other hand, in the presence of a different sulfated galactan, from the species *Glyptocidaris crenularis*, the reaction did not occur. These data indicate that for *E. lucunter* sperm the sulfation pattern and glycosidic linkage are more important than the sugar residue. The same were observed with sperm from *Lytechinus variegatus*, which reacted with their own sulfated fucan and the one from *S. pallidus*, which differs only in some sulfate positions, for example. Therefore, each species must have its own structural requirements for successful fertilization.