

## عنوان مقاله:

Regulatory mechanisms of sperm motility initiation in fishes – a review

## محل انتشار:

بیست و یکمین کنگره ملی و نهمین کنگره بین المللی زیست شناسی ایران (سال: 1399)

تعداد صفحات اصل مقاله: 1

## نویسنده:

Sayyed Mohammad Hadi Alavi - School of Biology, College of Science, University of Tehran, Tehran, P. O. Box:

۱۴۱۵۵-۶۶۵۵, Iran

## خلاصه مقاله:

Fish spermatozoon is differentiated into a head, a midpiece and a flagellum. The head does not have the acrosome, and contains nucleus which transferring haploid set of the chromosome into the next generation. Mitochondria, proximal centriole and distal centriole are located in the midpiece. Mitochondria supply energy for the flagellar beating. Both proximal and distal centrioles consist of nine peripheral triplets of microtubules. The distal centriole organizes formation of the sperm motility apparatus called "axoneme" with "۹+۲" microtubules structure. Fish spermatozoa are immotile in the sperm duct due to osmolality or presence of high potassium (K<sup>+</sup>) ions in the seminal plasma. Spermatozoa motility is triggered in hypo-osmotic and hyperosmotic environments in freshwater and marine fishes, respectively. Duration of spermatozoa motility is generally limited to a short period due to adenosine triphosphate (ATP) content. After initiation of motility, percentage of motile spermatozoa, spermatozoa velocity and beating frequency of the flagellum decrease due to rapid depletion of ATP stores. When motility of spermatozoa activated by a change in the environmental osmolality, K<sup>+</sup> and water effluxes occur in freshwater and marine fishes, respectively, which trigger spermatozoa motility signaling. Generally, initiation of axonemal beating is associated with an increase in intracellular calcium (Ca<sup>2+</sup>) ions and pH in spermatozoa of both freshwater and marine fishes, while cyclic adenosine monophosphate (cAMP) remains unchanged. However, it has been shown that axonemal beating is cAMP-dependent in demembranated spermatozoa of salmonid and sturgeon fishes. Extracellular or intracellular stores of Ca<sup>2+</sup> supplies required Ca<sup>2+</sup> concentration for axonemal beating. Several axonemal proteins have been so far identified that are activated by Ca<sup>2+</sup> and cAMP, directly or mediated by protein kinase C and protein kinase A, respectively. The present study reviews differences and similarities in complex regulatory signals controlling spermatozoa motility initiation in fishes, and notes physiological mechanisms that await elucidation.

## کلمات کلیدی:

ATP, Axoneme, cAMP, Ions, pH, Osmolality, Seminal plasma

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1260495>

