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Human and Ram Seminal Plasma Both Contain a Calcium-Dependent Regulator Protein

Calsemin

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Biochemical aspects of post-testicular sperm maturation have been studied.

Partial purification of either human or ram seminal plasma yields a heat-stable,

acidic protein which is a Ca²⁺-dependent regulator of 3':5'-cyclic nucleotide

phosphodiesterase. This protein fraction has been provisionally named calsemin.

Human calsemin activates the flagellar plasma membrane Ca²⁺-ATPase of ram

epididymal and ejaculated spermatozoa by 290% and 20%, respectively.

Activation is abolished by trifluoperazine. The addition of calsemin plus Ca²⁺ to isolated ram caudal spermatozoa

results in a three-fold stimulation of flagellar beat activity. These results lead us to propose that only after interaction

between calsemin and the sperm flagellar plasma membrane can the Ca²⁺-ATPase obtain full expression to

maximise Ca²⁺ efflux from the flagellum and thereby cause a stimulation and coordination of sperm flagellar beat

activity. This finding may provide a partial biochemical explanation for the development of mammalian sperm motility.

Key words: Spermatozoa, initiation of motility, Ca²⁺-dependent regulator, Ca²⁺-ATPase, epididymis, seminal plasma

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