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JOURNAL ARTICLE

# A comparative analysis of cAMP-dependent protein kinase regulatory subunits in sea urchin and rat spermatozoa

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8-Azido cAMP photoaffinity labeling of cAMP-dependent protein kinase regulatory subunits (R1 = 49 K;R2 = 55K) was done on spermatozoa from species lacking, and species containing an epididymis. Spermatozoa from sea urchin and trout contained only R1, while rat caudaepididymal spermatozoa contained both R1 and R2 subunits. This was established by the Mr value of the 8-azido cAMP photolabeled moieties, and a biochemical analysis based on the known differences of protein-nucleotide interactions of Type I and II cAMP-dependent protein kinases. Sea urchin and trout sperm R1 subunits were similar to mammalian sperm R1 subunits in co-migration on SDS-polyacrylamide gels and in both saturation and specificity of nucleotide binding. Calcium enhanced photoprobe binding to rat R1 and R2 subunits and to sea urchin R1 subunit without revealing a sea urchin R2 subunit. Likewise, phosphodiesterase incubation of sea urchin and trout spermatozoa prior to photolabeling did not reveal R2 subunits. These data suggest that the cAMP regulation of sperm physiology may require R1 subunit in species both with and without an epididymis. Further taxonomic study is necessary to determine whether evolutionary acquisition of the epididymis and internal fertilization may have created unique environments favoring the addition of sperm R2 regulatory subunits of cAMP-dependent protein kinase.