STRUCTURAL AND FUNCTIONAL CHARACTERIZATION OF AQUAPORIN 7 AND ITS ROLE IN MALE FERTILITY

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Abstract: Mammalian fertilization depends heavily on the capability of spermatozoa to fertilize an oocyte. The objectives of this study were to determine functional and structural characteristics of Aquaporin 7 (Aqp7) protein across mammals, and determine levels of Aqp7 protein expression in spermatozoa from bulls of varying fertility. To accomplish our objectives, we used web bioinformatics servers, genomics approaches, and computational tools and found six conserved motifs across 4 species. Primary structure analysis suggests that this protein is hydrophobic in nature, due to higher percentages of nonpolar residues, and basic, due to high pI. High aliphatic indexes and low instability indexes infer high thermostability of the protein. The low prediction score of disulfide bonds suggests that the stability of the protein relies mainly on extensive hydrogen bond formation. The 1D and 2D Western blotting techniques revealed that the expression of bovine Aqp7 protein was not significantly different between spermatozoa from high fertility and low fertility bulls. In conclusion, the role of Aqp7 as a biomarker in male fertility could not be clarified, however, the bioinformatics analyses provides inferences for further investigation and hypothesis generation on the function of Aqp7 in male fertility.

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