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JOURNAL ARTICLE

Glycosidic specificity of fucosyltransferases present in rat epididymal spermatozoa

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We have recently demonstrated multiple fucosyltransferase (FT) activity in rat spermatogenic cells. To complement these findings, here we identify and partially characterize the glycosidic linkage specificity of FTs present in spermatozoa from caput and cauda epididymides. Analysis of the acceptor substrate specificity of the FTs by thin-layer chromatography indicated that both caput and cauda sperm expressed alpha(1-2)-, alpha(1-3)-, alpha(1-4)-FTs as demonstrated by fucose incorporation into phenyl-beta-D-galactoside, 2'-fucosyllactose, and lacto-N-fucopentaose-I, respectively. Spermatozoa from the cauda epididymidis exhibited significant decreases in the levels of alpha(1-2)-, alpha(1-3)-, alpha(1-4)-FTs, and of total soluble FTs in comparison to spermatozoa from the caput epididymidis. The relative ratio of alpha(1-3)-FT to total FT activity appeared to be significantly higher than those of alpha(1-2)- or alpha(1-4)-FTs, in spermatozoa both from caput and cauda epididymides. Using different types of low molecular weight acceptors and the selective inhibition of the FT by N- ethylmaleimide, we have demonstrated that at least alpha(1-2)-FT is different from alpha(1-3)- or alpha(1-4)-FTs. Kinetic studies also showed that alpha(1-2)-FT is different from alpha(1-3)- or alpha(1-4)-FTs as demonstrated by apparent Km and Vmax values. Moreover, alpha(1-3)- and alpha(1-4)-FT activities in cauda sperm were found to be highly sensitive to Mn2+ but showed differential responses to divalent cations. In contrast, both alpha(1-3)- and alpha(1-4)-FTs seemed to be relatively less sensitive to Mg2+. Thus, these results not only demonstrate the presence of multiple FTs in rat epididymal sperm but also differentiate individual FTs with regard to their kinetic properties and sensitivity to both inhibitor and divalent cations.

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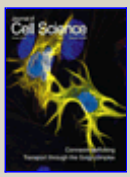

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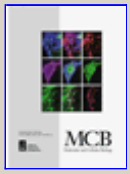

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