AN $\alpha_6\beta_1$-INTEGRIN/FOCAL ADHESION KINASE COMPLEX MAY REGULATE SPERMIATION AND SPERMIATION FAILURE

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Spermiation is the final step of spermatogenesis (sperm production) where mature spermatids are released from the somatic Sertoli cells. Spermiation is hormone sensitive; testosterone (T) and FSH withdrawal causes a disruption to the disengagement of spermatids, which are instead retained by Sertoli cells. The mechanisms involved with spermatid release and retention are not understood. We showed previously that an unknown adhesion junction containing β_1-integrin persisted on retained spermatids suggesting that a defect in this adhesion complex at disengagement may underlie spermiation failure. The aim of this study is to identify the α-integrin dimerised with β_1-integrin and investigate the role of phosphorylated FAK, a kinase that is involved with integrin-mediated cell adhesion, during spermiation and spermiation failure. Four adult Sprague-Dawley rats received T and oestradiol implants and FSH antibody for 7 days to suppress testicular T and FSH and induce spermiation failure. Using immunohistochemistry, α_6-integrin (but not α_4-integrin) and FAK-Tyr^{397} were localised on the Sertoli cell plasma membrane adjacent to mature spermatids. This localisation was observed until the point of spermatid release and remained on the Sertoli cell that surrounded retained spermatids after hormone suppression. A similar localisation has been previously observed with β_1-integrin, suggesting that all three form a complex at the site of disengagement. To look at the function of FAK-Tyr^{397}, comparative Western blot analysis is currently being undertaken on seminiferous tubules specific for spermiation from control and treated animals. Preliminary studies suggest that FAK-Tyr^{397} remains phosphorylated during spermiation failure, suggesting that FAK dephosphorylation may be important for the function of spermatid-associated adhesion complexes, as has been demonstrated in other adhesion systems. In conclusion, $\alpha_6\beta_1$-integrin/FAK-containing adhesion complexes are associated with spermatids during spermiation, and the function of such complexes are likely to be perturbed during spermiation failure.

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