

**The adhering junction dynamics in the testis are regulated by an interplay of  $\beta$ 1-integrin, focal adhesion kinase (FAK) and the focal adhesion complex (FAC)-associated proteins.**

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During spermatogenesis, the movement of developing germ cells from the basal to the adluminal compartment of the seminiferous epithelium is associated with extensive restructuring of actin-based cell-cell adherens junctions (AJs) between Sertoli and germ cells, such as ectoplasmic specialization (ES). Yet, the mechanism(s) that regulates this event is largely unknown. During Sertoli-germ cell AJ assembly *in vitro*, a transient induction of  $\beta$ 1-integrin, vinculin, p-FAK-Tyr<sup>397</sup> and PI3-kinase, but not the non-phosphorylated FAK, paxillin and p130Cas, was detected. P-FAK-Tyr<sup>397</sup> was shown to coimmunoprecipitate with  $\beta$ 1-integrin, vinculin and c-Src both *in vitro* and *in vivo*. Furthermore, studies by immunohistochemistry and immunofluorescent microscopy have shown that p-FAK-Tyr<sup>397</sup> and p-FAK-Tyr<sup>576</sup> were exclusively localized at the site of apical ES, but not basal ES, in the seminiferous epithelium in a stage-specific manner being highest at stages VI-VIII. Also, p-FAK-Tyr<sup>397</sup> co-localized with vinculin but not N-cadherin as demonstrated by fluorescent microscopy. When rats were treated with 1-(2,4-dichlorobenzyl)-indazole-3-carbohydrazide (AF-2364) to perturb the Sertoli-germ cell AJs, an induction of  $\beta$ 1-integrin, vinculin, p-FAK-Tyr<sup>397</sup>, PI3-kinase and p130Cas, but not the non-phosphorylated FAK and paxillin, was also detected in the testis. Such induction of gene expression coincided with the time when spermatids began to deplete from the epithelium, indicating their involvement in AJ disassembly. Thereafter, the levels of vinculin, p-FAK-Tyr<sup>397</sup>, PI 3-kinase and p130Cas in the testis plunged, coinciding with the time when virtually all spermatids were depleted from the epithelium. Taken collectively, these results suggest a bi-functional role of p-FAK, being involved in the events of Sertoli-germ cell AJ assembly and disassembly. In conclusion, the events of AJ dynamics in the testis are regulated by  $\beta$ 1-integrin, activated FAK and the focal adhesion complex-associated proteins.