



**Supplemental Figure 1** Immunostaining of cytoskeletal proteins on mouse epididymal sperm. The two images of each panel show the same sperm, with the left showing the signals of the specific protein only and the right combining the phase-contrast (F) image with DNA (D, blue) and protein (P) staining. Only  $\alpha$ -tubulin signals colocalize with the hook rims at the apical hook. Scale bar=5  $\mu$ m. The antibodies are rabbit anti  $\alpha$ -tubulin antibody (ab15246; Abcam, Cambridge, UK), mouse monoclonal anti- $\beta$ -actin antibody (A5411; Sigma, Saint Louis, MI, USA), rabbit anti-cytokeratin 5 antibody (GTX 113219; GeneTex, Irvine, CA, USA) and mouse monoclonal anti-pan cytokeratin antibody (ab80826; Abcam). F-actin was stained with phalloidin-tetramethylrhodamine B isothiocyanate conjugate from Amanita phalloides (77418; Sigma).