



Figure S4 Morphological comparison of the acrosome and maturation phases between *TNAP-Atg7^{-/-}* mice and the control during acrosome biogenesis. **(A)** Afaf immunohistochemistry of the control testes. Upper and lower panels represent the typical acrosome phase and maturation phase, respectively. **(B)** Afaf immunohistochemistry shows abnormal acrosome and maturation phases in *TNAP-Atg7^{-/-}* mice. Irregular or roughly round acrosomes were found, which made it difficult to accurately identify the phases. Blue color represents nuclear staining, and brown color indicates the Afaf staining. **(C)** Quantification of spermatids with abnormal acrosomal structure in the later phases of B. *TNAP-Atg7^{-/-}*, $24.48 \pm 1.37\%$; *Atg7^{Flox/Flox}*, $2.43 \pm 0.19\%$.