



Figure S4. Schematic diagram of oocyte development in $Cdk1^{+/SAF}$, $OoCdk1^{+/AF}; Gdf9-Cre$ and $OoCdk1^{+/AF}; Zp3-Cre$ mouse ovaries. In control $Cdk1^{+/SAF}$ mouse ovaries, Cdk1 activity in the oocyte remains suppressed by its inhibitory phosphorylation throughout the follicle growth, which is necessary for maintaining the oocyte meiotic arrest, preservation of ovarian reserve and female fertility (A). When Cdk1AF was expressed in the oocytes of primordial follicles in $OoCdk1^{+/AF}; Gdf9-Cre$ mice, it caused DNA damage and death of dormant oocytes, which leads to premature ovarian failure (POF) in mutant mice (B). When the expression of Cdk1AF was induced in the oocyte of growing follicles in $OoCdk1^{+/AF}; Zp3-Cre$ mouse ovaries, growing oocytes prematurely underwent GVBD and this resulted in oocyte DNA damage and follicle death. Excessive death of growing follicles further increases the recruitment of primordial follicles into growing follicle pool, which altogether lead to POF (C).