

1 **Figure S1.** Proportions of different size of oocytes during isolated samples. Values are represented
2 as the mean \pm SEM (n =3). Bars with different superscripts are statistically different ($P < 0.05$)

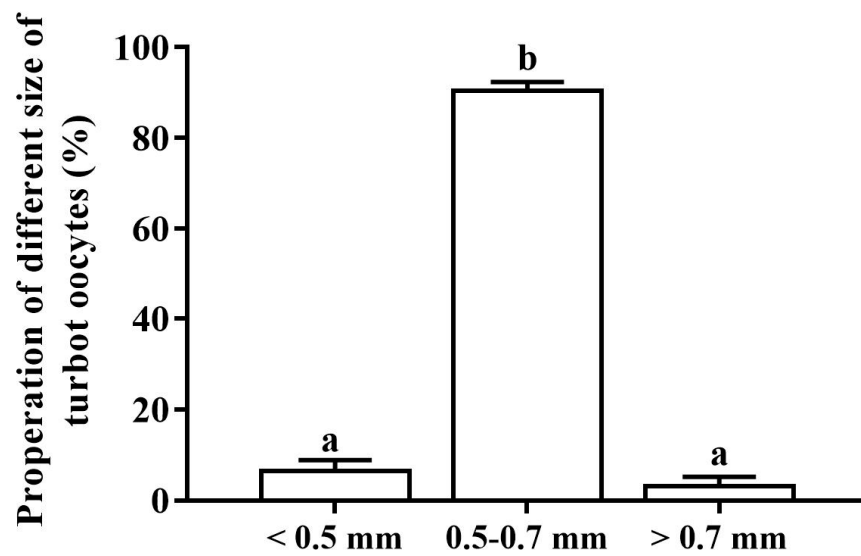
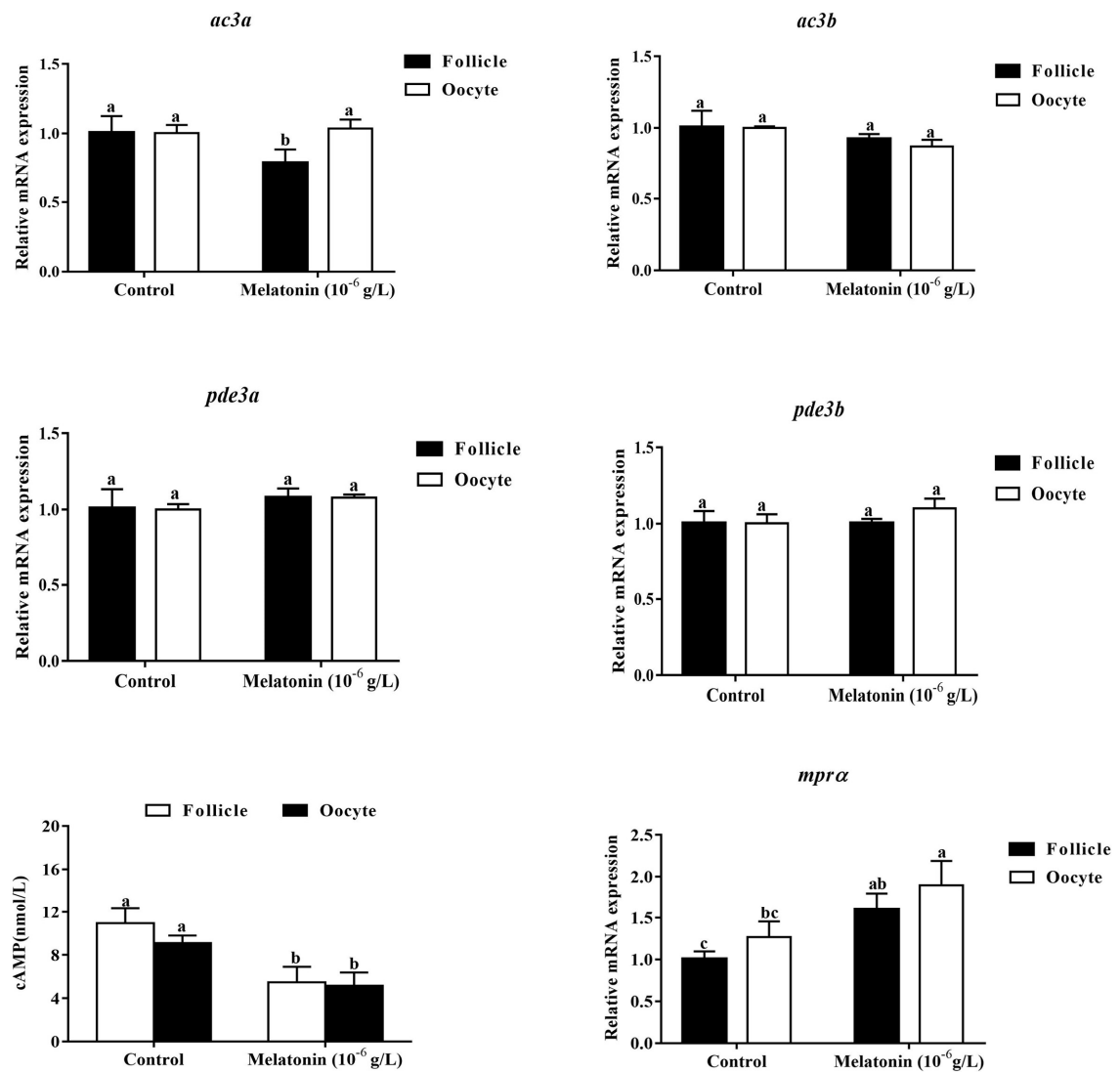
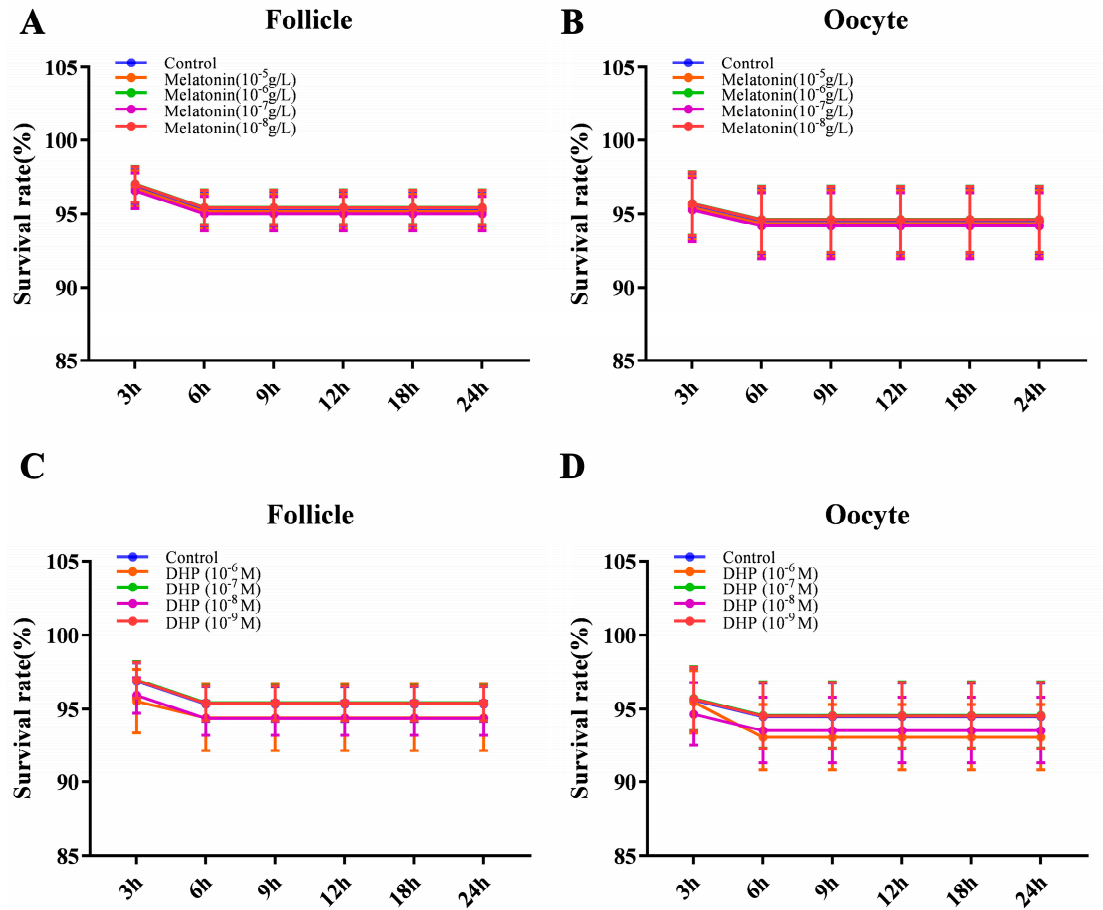


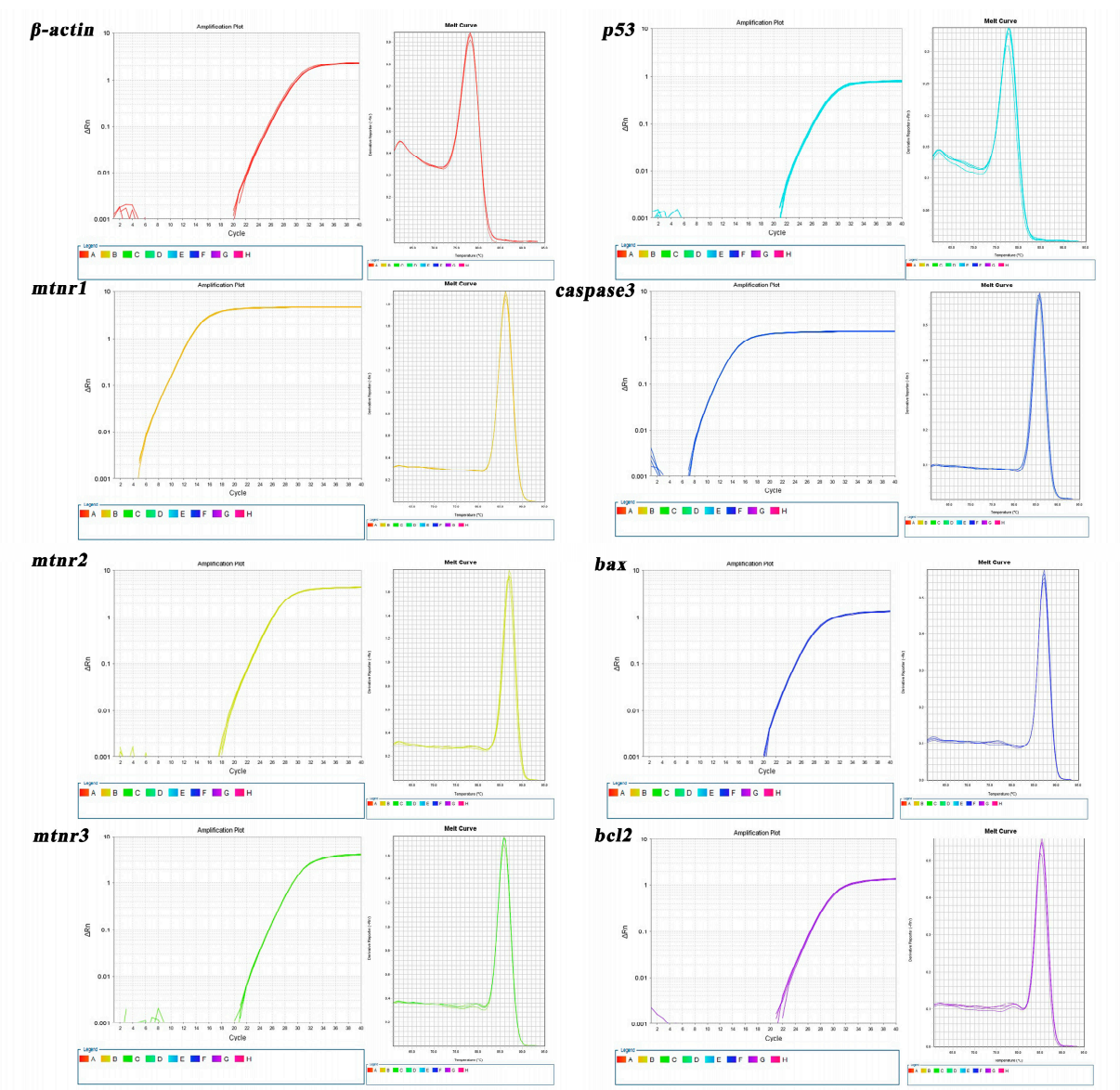
Figure S2. Effect of melatonin on cAMP synthetic (*ac3α*, *ac3β*) and hydrolytic (*pde3α*, *pde3β*) genes expression, cAMP content and maturation-related gene *mPRα* in turbot follicle and oocyte after treatment for 24 hours. Values are represented as the mean ± SEM (n = 9). Bars with different superscripts are statistically different (P < 0.05). *ac3α*: adenylate cyclase 3α; *ac3β*: adenylate cyclase 3β; *pde3α*: phosphodiesterase 3α; *pde3β*: phosphodiesterase 3β; *mPRα*: membrane progesterone receptor α



27 **Figure S3.** Survival rate of turbot oocyte (A, C) and follicle (B, D) culture in *vitro* treatment with
 28 melatonin and DHP. Values are represented as the mean \pm SEM (n = 9).



39 **Figure S4.** The amplification plot and melt curve of all used genes.



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47 **Figure S5.** The melatonin levels in medium after treatment for different times. Values are
48 represented as the mean \pm SEM (n = 9).

