Abstract

Fully grown mammalian oocytes collected from stimulated follicles spontaneously resume meiotic maturation *in vitro* and progress towards the metaphase II stage of meiosis. Matured ‘’egg’’ becomes fertilized, accommodates paternal genome, and develops into an early embryo. All these processes are accompanied by temporarily ceased transcription. Following meiotic resumption, oocytes and early embryos rely exclusively on stored maternal transcripts and their effective utilization by spatiotemporally regulated translation. My doctoral thesis uncovers differences in translation patterns under different conditions, *in vitro* and *in vivo* maturation of mouse oocytes and respectively derived early embryos. The thesis is tailored to assisted reproduction technology relevant *in vitro* maturation conditions as well as respectively produced *in vitro* fertilized oocytes. An investigation into molecular processes behind deregulated actively translated transcripts is much needed to identify factors responsible for compromised developmental competency of *in vitro* matured oocytes. Low success rates often deter patients from choosing *in vitro* maturation, however, it may confer an advantage for patients suffering from Polycystic Ovarian Syndrome or may serve as a bypass for those at high risk of developing severe Ovarian Hyper Stimulation Syndrome. These findings could instigate further clinical research into improving *in vitro* maturation technology, not only for the benefit of small groups of patients, but also for future applications in fertility preservation.