# ABSTRACT

Early embryonic development is controlled by maternal mRNAs and proteins synthesized during oogenesis. A key period for preimplantation development is the transition from maternal control of development to embryonic control. This process, known as maternal-to-zygotic transition (MZT), requires the coordinated degradation of accumulated maternal mRNAs and proteins and subsequent embryonic genome activation (EGA). Maternal mRNAs are gradually removed from the embryo, but the degradation of maternal proteins is not well understood yet. In mammals, only a few proteins are known whose degradation is necessary for normal course of EGA. The activation of the embryonic genome is closely related to the reorganization of chromatin structure. The initiation of gene expression requires the loosening of chromatin at the gene region and the presence of appropriate transcription factors. Maternal proteins that need to be degraded for the normal course of EGA are involved in regulating chromatin structure and the translocation of necessary factors.

This thesis aims to characterize selected proteins (PIASy, CBX5, TAB1 and H1FOO) and describe the role they play during the transition from maternal to embryonic control of development. While PIASy, CBX5, and H1FOO need to be degraded to loosen the chromatin structure allowing the initiation of embryonic gene expression, the degradation of TAB1 is necessary for the translocation of the transcription factor NF-κB into the nucleus and the initiation of the NF-κB signaling pathway. If these proteins are not degraded at the right time, embryonic development is arrested at the time of EGA.

The work also briefly describes the mechanisms of degradation of maternal proteins and the process of embryonic genome activation. To understand the whole topic of maternal protein degradation during preimplantation development, it is also necessary to briefly summarize preimplantation development itself and the preceding oocyte maturation.



**Key words:** early embryonic development, embryonic genome activation, degradation, maternal proteins