ESCs have been of interest to many research teams since their derivation from the mouse blastocyst 30 years ago. The main reason for studying ESCs is their ability to differentiate into almost all cell types. This feature is known as “pluripotency”. The pluripotent state in ESCs is maintained by the control of the gene expression. To maintain their undifferentiated state it is necessary to repress the differentiation genes. This process is controlled primarily by pluripotent transcriptional factors, especially by OCT4, SOX2 and NANOG. Silencing of the differentiation genes is also influenced by the chromatin remodelling complexes. The regulation of the gene expression leading to the cell pluripotency also takes place at the post-transcriptional level via miRNA, lncRNA, hnRNPs or proteins which stabilize pluripotent factors and protect them from degradation. The aim of this thesis is to summarize mechanisms by which pluripotency is maintained in ESC.