Abstract

Metabolic control of cell cycle has been study for a long time, but it is not completely known. Mechanisms of metabolic control described for a several decade has been explained on molecular level with using a modern methods. Regulation of cell cycle in consideration of metabolism and nutritional status is going on at the several level of cell replication. The most known is about assembly of bacterial cell divisiome. Changes in nutrient availability induce stress response that use low-molecular substances in signaling pathways leading to changes in the cell cycle. One of the most studied is (p)ppGpp that participates in stringent response and affect sigma factors, directly inhibits the initiation of replication by binding to the DnaG primase and indirectly inhibits the elongation of replication. Current researches has revealed that some enzymes with already known enzymatic function in the major metabolic pathways (glycolysis or TCA) also has a function as sensors that transmit the nutritional change signal directly into the cell dividing process. These signals most often inhibits FtsZ protein or affect its helper proteins and subsequent ring formation. Analogues of these enzymes were found in gram-positive (*Bacillus subtilis*) and gram-negative bacteria (*Escherichia coli, Caulobacter crescentus*). Last but not least, this work is also devoted to non-model microorganisms whose unique forms of sensors are based on the variability of the lifestyle of bacteria.

Keywords: Metabolic control, cell cycle, (p)ppGpp, catabolic repression, DnaG primase, FtsZ, glycolysis, TCA cycle