PCK1 encodes phosphoenolpyruvate carboxykinase, which functions during gluconeogenesis to form phosphoenolpyruvate from oxaloacetate.Gluconeogenesis is the process whereby glucose is synthesized from non-carbohydrate precursors, which enables yeast cells to grow on non-sugar carbon sources like ethanol, glycerol, or peptone. The reactions of gluconeogenesis, shown here, mediate conversion of pyruvate to glucose, which is the opposite of glycolysis, the formation of pyruvate from glucose. While these two pathways have several reactions in common, they are not the exact reverse of each other. As the glycolytic enzymes phosphofructokinaseand pyruvate kinaseonly function in the forward direction, the gluconeogenesis pathway replaces those steps with the enzymes pyruvate carboxylaseand phosphoenolpyruvate carboxykinase-generating oxaloacetate as an intermediate from pyruvate to phosphoenolpyruvate-and also the enzyme fructose-1,6-bisphosphatase. Overall, the gluconeogenic reactions convert two molecules of pyruvate to a molecule of glucose, with the expenditure of six high-energy phosphate bonds, four from ATP and two from GTP. Expression of genes encoding several of the gluconeogenic enzymes is subject to glucose repression.Glucose repression of PCK1occurs at very low levels of glucose and is transmitted through multiple signaling pathways. The PCK1 upstream region contains consensus binding sites for Mig1p and the activating HAP complexand also for the derepressing zinc finger protein Cat8p. The response to glucose seems also to be mediated by Ras/cAMP, as it can be triggered by exogenous cAMP. In addition to regulation of transcription, the amount of Pck1p in the cell is regulated by mRNA degradation when glucose-starved cells are replenished with glucose.