Roles of acetyl-CoA carboxylase 1 in cholangiocarcinoma cells

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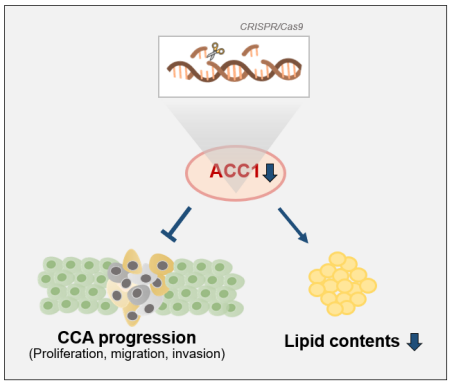
Abstract: Metabolic adaptation is a crucial mechanism to support a cancer cell to survive in an unfavorable environment. Increased glucose consumption, induction of anaerobic glycolysis, and increased lipogenesis have been demonstrated to play significant functions in cancer. In cholangiocarcinoma (CCA), a bile duct cancer that is a major health problem in Thailand, the functional significance of glucose uptake and glycolysis has been revealed, but the information regarding lipogenesis is restricted. Thus, a better understanding of *de novo* lipogenesis in CCA might provide the opportunities for novel treatment development. The current study aimed to demonstrate acetyl-CoA carboxylase 1 (ACC1) functions in CCA. ACC1-deficient cell lines were established by clustered regularly interspaced short palindromic repeats (CRISPR)-associated9 (CRISPR/Cas9) technique and were used for the comparative study. ACC1 expression was demonstrated by Western blot analysis, and ACC1 function was verified by intracellular lipid content measurement. The contributions of ACC1 on CCA cell properties were proven by comparing cell growth, migration, and invasion abilities between ACC1-deficient and parental cells. The results showed ACC1-deficient cells had reduced intracellular lipid content and acquired lesser cell growth, migration, and invasion. The underlying mechanisms related to ACC1 actions are under investigation. Ultimately, the current study might highlight the functional importance of ACC1 and *de novo* fatty acid synthesis in CCA, which may be helpful for CCA drug design in the future.

Graphical abstract:



Keywords: Acetyl-CoA carboxylase 1, Lipids, Cholangiocarcinoma

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