Carnitine Transporter CT2 (SLC22A16) is over-expressed in Acute Myeloid Leukemia (AML) and target knockdown reduces growth and viability of AML cells

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Master of Science
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2015

Abstract

AML (acute myeloid leukemia) cells have a unique reliance on mitochondrial metabolism and fatty acid oxidation (FAO). Thus, blocking FAO is a potential therapeutic strategy to target these malignant cells. In the current study, I assessed plasma membrane carnitine transporters as novel therapeutic targets for AML. I examined the expression of the known plasma membrane carnitine transporters, OCTN1, OCTN2, and CT2 in AML cell lines and primary AML samples and compared expression to normal hematopoietic cells. Of the three carnitine transporters, CT2 demonstrated the greatest differential expression between AML and normal cells. Using shRNA, I knocked down CT2 and demonstrated that target knockdown impaired the function of the transporter. In addition, knockdown of CT2 reduced the growth and viability of AML cells with high expression of CT2 (OCI-AML2 and HL60), but not low expression. CT2 knockdown reduced basal oxygen consumption without a concomitant increase in glycolysis.
Mechanistically, CT2 knockdown impaired progression of cell cycle but did not induce apoptosis in cells. Thus, CT2 may be a novel target for a subset of AML.