Accepted Manuscript

Targeting immuno-metabolism to improve anti-cancer therapies

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PII: S0304-3835(17)30699-7

DOI: 10.1016/j.canlet.2017.11.005

Reference: CAN 13595

To appear in: *Cancer Letters*

Received Date: 25 July 2017

Revised Date: 23 October 2017

Accepted Date: 4 November 2017

Please cite this article as: K. Beezhold, C.A. Byersdorfer, Targeting immuno-metabolism to improve anti-cancer therapies, *Cancer Letters* (2017), doi: 10.1016/j.canlet.2017.11.005.

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Abstract

The immunology community has made significant strides in recent years in using the immune system to target and eliminate cancer. Therapies such as hematopoietic stem cell transplantation are standard of care for several malignancies, while treatment with chimeric antigen receptor (CAR) T cells or checkpoint molecule blockade have been revolutionary. However, these approaches are not optimal for all cancers and in some cases, have failed outright. The greatest obstacle to making these therapies more effective may be rooted in one of the most basic concepts of cell biology, metabolism. Research over the last decade has revealed that T cell proliferation and differentiation is intimately linked to robust changes in metabolic activity, delineation of which may provide ways to manipulate the immuno-oncologic responses to our advantage. Here, we provide a basic overview of T cell metabolism, discuss what is known about metabolic regulation of T cells during allogeneic HSCT, point to evidence on the importance of T cell metabolism during CAR T cell and solid tumor therapies, and speculate about the role for compounds that might have dual-action on both immune cells and tumor cells simultaneously.

Keywords:

Adoptive cell transfer; Chimeric antigen receptor; Graft versus host disease; Hematopoietic stem cell transplant; Metabolism; Tumor infiltrating lymphocyte

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