

WHETSTINE LABORATORY

Addressing the Problem of Drug-Resistant Cancer

Past/Present Funding Sources:

National Institute of Health
 American Lung Association
 American Cancer Society
 Leukemia & Lymphoma Society
 Alex's Lemonade Stand Foundation
 AstraZeneca



Johnathan Whetstine, PhD

Cancer cells that stop responding to therapy (referred to as drug-resistant cancer) result in patients losing their lives. Understanding how to prevent and/ or treat resistance will influence the next generation of cancer therapies and save lives. In studying how cancer cells become drug-resistant, Johnathan Whetstine, PhD, and his team in the Whetstine Laboratory at the Mass General Center for Cancer Research recently uncovered a protein that generates specific DNA fragments containing genes that cause cancer cells to become resistant to chemotherapy. This allows replicating cancer cells to grow and defend themselves against previously effective treatments (**Figure 1**).

The Whetstine Laboratory's discovery was the first of its kind, and provides a new way to understand how cancer cells change their DNA content and potentially acquire the ability to become treatment resistant (Figure 1). In fact, their discovery identified a new protein to evaluate in tumors and directly relates to cancer cell response to therapy. Most recently, Dr. Whetstine's group used a drug to target the protein and was able to block the extra DNA pieces associated with drug resistance. These findings illustrate the importance of evaluating this process does not occur randomly but can be directed and targeted by proteins within the cell. Dr. Whetstine's group is currently uncovering additional genes and conditions that can generate extra DNA pieces involved in cancer cell drug resistance.

This work holds promise for the development of new strategies to block resistance to chemotherapies and targeted therapies with broad and profound implications for many different types of cancer.

Cancers types our research program is targeting:

Lung Cancer
 Myeloma
 Breast Cancer
 Ovarian Cancer
 Neuroblastoma

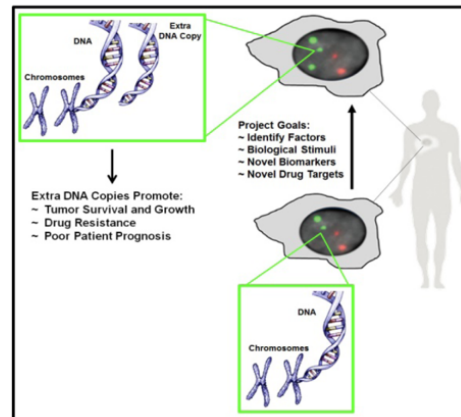
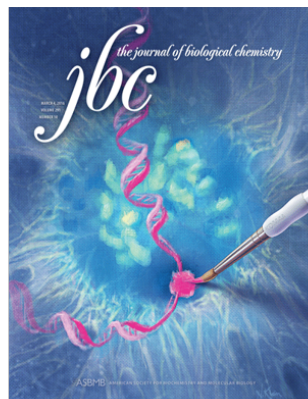
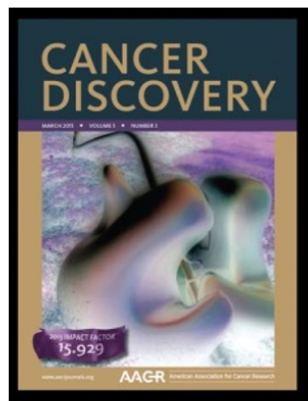


Figure 1. The impact of DNA copy gains and goals related to Dr. Whetstine's projects.

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