



## **TECHNOLOGY**

# ZAP-70 As Biomarker and Immune System Modulator

## **OVERVIEW**

The body's immune system is characterized by its ability to rapidly respond to foreign antigens (part of a bacterial or cancer cell, for example) that were previously encountered. This rapid response is mediated by memory T lymphocytes. When these cells are activated, they produce effector cytokines, such as TNF-alpha and IFN-gamma, which signal the immune system to respond appropriately in defense against the foreign antigen. A tyrosine kinase protein known as ZAP-70 is a key signal transducer expressed by T lymphocytes, and is required for T-cell development and further activation. The UMB inventors demonstrated a striking and specific elevation in ZAP-70 expression in resting memory T cells compared to naive T cells. The research showed that high expression of ZAP-70 is required for the rapid response of memory T cells to foreign antigen. The production of IFN-gamma was reduced when ZAP-70 expression was inhibited by selective siRNA and completely blocked in the presence of the tyrosine kinase inhibitor piceatannol. In addition, it was shown that the relative production of TNF-alpha versus IFN-gamma, which leads to a shift in the type of immune response, is dependent on the level of ZAP-70.

## **APPLICATIONS**

-Biomarker for evaluating functional capacity of resting CD4 T lymphocytes. -Target for manipulation of the immune response to manage cancer, diabetes, arthritis and other autoimmune diseases. -Immunotherapy target to enhance response to vaccines against viruses or cancer.

## **ADVANTAGES**

Since ZAP-70 expression is such a critical early step in modulating the immune response by memory T cells, manipulation of its expression may be exploited for a myriad of clinical uses.

## **STAGE OF DEVELOPMENT**

Both in vitro and in vivo studies have validated the important role played by ZAP-70 in immune system memory.

## **R&D REQUIRED**

Further testing of potential as clinical target and tool.

## **LICENSING POTENTIAL**

UMB seeks partners for licensing, clinical development, and/or sponsored research to advance this technology into the healthcare field.

## **CONTACT INFO**

Office of Technology Transfer  
620 W Lexington St., 4th Floor  
Baltimore, MD 21201  
Email: [ott@umaryland.edu](mailto:ott@umaryland.edu)  
Phone: (410) 706-2380

## Additional Information

### INSTITUTION

University of Maryland, Baltimore

### PATENT STATUS

U.S. Patent No. 8,450,053, issued May 28, 2013

### INVESTIGATOR(S)

Donna Farber  
Francesca Okoye  
Meena Chandok

### ATTACHMENTS

-  [Download document.pdf](#)

### EXTERNAL RESOURCES

- [ZAP-70 in Signaling, Biology, and Disease.](#)

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