

## **Anti-bacterial Treatments Using Peptide-Based Inhibitors of the STAT3-IL10 Pathway**

### **Summary**

Tuberculosis (TB) is an infectious disease that typically affects the lungs. Current therapies include a panel of antibiotics given over a range of 6-9 months. As a result of the expense of treatment, the extended timeframe needed for effective treatment, and the scarcity of medicines in some developing countries, patient compliance with TB treatment is very low and results in multi-drug resistant TB (MDR-TB). There remains a need for a faster, more effective treatment for TB. NCI researchers seek licensing and/or co-development of peptide inhibitors of STAT3 and IL-10 developed to treat bacterial infections such as tuberculosis. See also: NIH inventions E-164-2007 and E-167-2010

### **NIH Reference Number**

E-278-2014

### **Product Type**

- Therapeutics

### **Keywords**

- interleukin, IL-10, tuberculosis, immunotherapy, immunomodulatory, anti-infective
- STAT3

### **Collaboration Opportunity**

This invention is available for licensing and co-development.

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### **Description of Technology**

Tuberculosis (TB) is an infectious disease that typically affects the lungs. Current therapies include a panel of antibiotics given over a range of 6-9 months. As a result of the expense of treatment, the extended timeframe needed for effective treatment, and the scarcity of medicines in some developing countries, patient compliance with TB treatment is very low and results in multi-drug resistant TB (MDR-TB). There remains a need for a faster, more effective treatment for TB.

Short, metabolically stable, cell-penetrating lipopeptide mimics of conserved regions of IL-10 and STAT3 inhibit those proteins' signaling to become a host-directed therapy against TB. Intrapulmonary aerosol delivery of the peptides results in increased bactericidal capacity of the host immune system (e.g., increased nitric oxide, NADPH oxidase, lysozyme activities).

Researchers at the National Cancer Institute's [Cancer and Inflammation Program](#) developed peptide inhibitors of the STAT3-IL10 pathway, and are studying the peptide inhibitors use in treating bacterial infection. The inventors have shown that the inhibitors can reduce the Mycobacterium tuberculosis (Mtb) bacterial load by >90% in mice, without the use of antibiotics in two weeks. The inhibitors modulate the host's lung immune response, enhancing its bactericidal capacity. The inventors would be pleased to enter into collaborations, particularly those that explore efficacy against multi-drug resistant Mtb, and/or combination with traditional antibiotics in hopes of shortening treatment time.

Please click [here](#) to request more information on this technology.

### **Potential Commercial Applications**

- Activation of immune system against immune-privileged infections.
- Anti-tuberculosis treatment, alone or in combination with traditional antibiotics.

### **Competitive Advantages**

- Chronic infections that induce immune-privilege (e.g. via granuloma) may be combatted via these inhibitors, as shown in this mouse model of TB.
- Specific to TB, shorter and more effective treatments against TB are needed. Host-directed therapy, in combination with traditional antibiotics, could meet that need.

### **Inventor(s)**

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### **Development Stage**

- Pre-clinical (in vivo)

### **Patent Status**

- **U.S. Patent Filed:** U.S. Patent Application Number PCT/US2016/012493, Filed 30 Jun 2017

### **Related Technologies**

- [E-164-2007 - Cancer Therapeutic Agents that Bind to STAT Proteins](#)
- [E-167-2010 - Peptide Inhibitors for Viral Infections and as Anti-inflammatory Agents](#)

### **Therapeutic Area**

- Infectious Diseases
- Immune System and Inflammation

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