



## Trehalose May Become the Sugar used to Diagnose and Resolve Tuberculosis (TB)

New evidence reveals sugar signals increase cytokine production as macrophage receptor mincle (glycoprotein) binds to Trehalose.

Glycoscience Lesson #46

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Massive Glycoscience research is ongoing internationally and today's Report is extremely important and can impact the health of children in developing nations.

A collaborative international Trehalose research paper was published August 23, 2016. This study is from the US, UK, and Denmark.

**The structure of an extended portion of the extracellular domain of mincle (glycoprotein), beyond the minimal C-type carbohydrate-recognition domain, also constrains the way that the binding domains may interact on the surface of macrophages.**

Here is the Abstract and there is a link to the full research paper.

### Abstract

The macrophage receptor mincle binds to trehalose dimycolate on the surface of *Mycobacterium tuberculosis*. Signaling initiated by this interaction leads to cytokine production, which underlies the ability of mycobacteria to evade the immune system and also to function as adjuvants. In previous work, the mechanism for binding of the sugar headgroup of trehalose dimycolate to mincle has been elucidated, but the basis for enhanced binding to glycolipid ligands, in which hydrophobic substituents are attached to the 6-hydroxyl

groups, has been the subject of speculation. In the work reported here, the interaction of trehalose derivatives with bovine mincle has been probed with a series of synthetic mimics of trehalose dimycolate in binding assays, in structural studies by x-ray crystallography, and by site-directed mutagenesis. Binding studies reveal that, rather than reflecting specific structural preference, the apparent affinity of mincle for ligands with hydrophobic substituents correlates with their overall size. Structural and mutagenesis analysis provides evidence for interaction of the hydrophobic substituents with multiple different portions of the surface of mincle and confirms the presence of three Ca<sup>2+</sup>-binding sites. The structure of an extended portion of the extracellular domain of mincle, beyond the minimal C-type carbohydrate-recognition domain, also constrains the way that the binding domains may interact on the surface of macrophages.

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#### Source and References:

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Full Paper  
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