

University of Massachusetts Medical School

eScholarship@UMMS

---

UMass Center for Clinical and Translational  
Science Research Retreat

2014 UMass Center for Clinical and  
Translational Science Research Retreat

---

May 20th, 12:30 PM

## Inhibition of Protein Tyrosine Phosphatase 1B by Polyphenol Natural Products: Relevant to Diabetes Management

Zhiwei Liu

*University of Massachusetts Dartmouth*

*Et al.*

Let us know how access to this document benefits you.

Follow this and additional works at: [https://escholarship.umassmed.edu/cts\\_retreat](https://escholarship.umassmed.edu/cts_retreat)



Part of the [Biochemistry Commons](#), [Nutritional and Metabolic Diseases Commons](#), [Organic Chemicals Commons](#), and the [Translational Medical Research Commons](#)

---

Liu Z, Guo M. (2014). Inhibition of Protein Tyrosine Phosphatase 1B by Polyphenol Natural Products: Relevant to Diabetes Management. UMass Center for Clinical and Translational Science Research Retreat. Retrieved from [https://escholarship.umassmed.edu/cts\\_retreat/2014/posters/93](https://escholarship.umassmed.edu/cts_retreat/2014/posters/93)

Creative Commons License



This work is licensed under a [Creative Commons Attribution-Noncommercial-Share Alike 3.0 License](#).

This material is brought to you by eScholarship@UMMS. It has been accepted for inclusion in UMass Center for Clinical and Translational Science Research Retreat by an authorized administrator of eScholarship@UMMS. For more information, please contact [Lisa.Palmer@umassmed.edu](mailto:Lisa.Palmer@umassmed.edu).

## **Inhibition of protein tyrosine phosphatase 1B by polyphenol natural products: relevant to diabetes management**

Zhiwei Liu and Maolin Guo (email: [mguo@umassd.edu](mailto:mguo@umassd.edu))

UMass Cranberry Health Research Center; Department of Chemistry and Biochemistry, , University of Massachusetts Dartmouth, MA 02747 (email: [mguo@umassd.edu](mailto:mguo@umassd.edu))

Many biologically active polyphenols have been recognized for their beneficial effects in managing diabetes and their complications. However, the mechanisms behind their functions are poorly understood. As protein-tyrosine phosphatase 1B (PTP1B) has been identified as a target for anti-diabetic agents, the potential inhibitory effects of a dozen structurally diverse polyphenol natural products have been investigated. Among these polyphenols, potent inhibitory activities have been identified for 6 of them with  $IC_{50}$  in micromolar range, while the other polyphenols showed very weak inhibition. A structure-activity relationship (SAR) study and molecular docking results suggest that both a rigid planar 3-ring backbone and appropriate substitutions of hydroxyl groups benefit the inhibitory activity. The mechanism of inhibition of PTP1B was further investigated by Michaelis-Menten kinetics and the inhibition mode for PTP1B was determined along with the inhibition constant.