BIOGRAPHICAL SKETCH

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NAME: **de Serrano, Vesna S.**

eRA COMMONS USERNAME: n/a

POSITION TITLE**:** Adjunct Associate

Research Professor

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	FIELD OF STUDY
University of Sarajevo, Sarajevo, Bosnia & Herzegovina	BS	Chemistry
University of Notre Dame, Notre Dame, IN	MS	Biochemistry
University of Notre Dame, Notre Dame, IN	PhD	Biochemistry

A. Personal Statement

My present research focuses on the structural aspects of the enzyme dehaloperoxidase (DHP) from the marine organism Amphitrite ornata. This enzyme has developed various oxidation activities as a defense mechanism against its toxic environment. These diverse activities are induced by interactions with different substrates. My goal is to define the structural differences of these substrate complexes to better characterize the binding interactions that ultimately induce different activities in the enzyme.

To achieve this, we are using macromolecular crystallography and neutron diffraction, along with a series of methods to study the activity and product formation. These methods include kinetics using UV-Vis spectrometry and HPLC coupled with mass spectrometry to identify reaction products and quantify product formation.

My main contributions toward understanding the various activities of this enzyme include determining the structures of DHP in complex with cresol substrates, which invoke both peroxidase (electron transfer) and peroxygenase (oxygen transfer) activities. This work has

helped elucidate the interactions of these substrates with the enzyme, as well as the interactions of larger substrates, such as bi- and bis-phenols, that can bind in the enzyme's binding cavity. This research on defining structural differences that lead to changes in the activity of DHP has generated several publications, some of which are listed below.

1. Malewschik, T.; de Serrano, V.; McGuire, A. H.; Ghiladi, R. A.The Multifunctional Globin Dehaloperoxidase Strikes Again:Simultaneous Peroxidase and Peroxygenase Mechanisms in the Oxidation of EPA Pollutants. *Arch. Biochem. Biophys.* 2019, *673*, No. 108079.

2. Yun, D.; de Serrano, V.; Ghiladi, R. A. Oxidation of BisphenolA (BPA) and Related Compounds by the Multifunctional Catalytic Globin Dehaloperoxidase. J. Inorg. Biochem. 2023, 238, No. 112020.

3. Aktar, M. S.; De Serrano, V.; Ghiladi, R.; Franzen, S.Comparative Study of the Binding and Activation of 2,4-Dichlorophenol by Dehaloperoxidase A and B. *J. Inorg. Biochem* 2023, *247* (July), No. 112332.

4. McGuire, A. H.; Carey, L. M.; De Serrano, V.; Dali, S.; Ghiladi, R. A. Peroxidase versus Peroxygenase Activity: Substrate Substituent Effects as Modulators of Enzyme Function in the Multifunctional Catalytic Globin Dehaloperoxidase. *Biochemistry* 2018, *57* (30),4455−4468.

In general, my interests and goals are primarily in structural aspects of protein interactions and activities, geared toward potential drug developments, and toward that goal I have worked with the group of Dr. Edwin Pozharsky at the University of Maryland Medical school in Baltimore on projects involved in studies of crucial proteins from Helicobacter pylori, such as NikR, transcription regulator involved in regulation of nickel uptake, as well as phosphorylation regulation of signal regulated kinase ERK2, as well as with the group of Dr. Carla Matos at the Molecular and Structural Biochemistry at North Carolina State University in research related to Ras GTPase, a small GTP-binding protein, also involved in signaling pathways, which is in its mutated forms most frequently associated with various human cancers. Through that work I have acquired an expertise in X-ray crystallography, which has significantly contributed to my current and long-term research interests.

The extensive list of my publications can be found in MyBibliography:

https://www.ncbi.nlm.nih.gov/myncbi/1IAEG8aOhfeQF/bibliography/public/

B. Positions and Honors

Positions and Employment

2022-present	Adjunct Associate Research Professor, Department of Chemistry, North Carolina State University
2017-2022	Adjunct Assistant Research Professor, Department of Chemistry, North Carolina State University

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