

# Tamara L. Hendrickson

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## **Research Interests**

Indirect tRNA aminoacylation pathways. Evolution of protein translation apparatus.  
Protein:RNA recognition. GPI membrane anchors. Membrane proteins.

## **Education**

**Ph.D. in Bioorganic Chemistry** 1996

California Institute of Technology, Pasadena, CA.

Thesis entitled "Insights into the mechanism of asparagine-linked glycosylation:  
Kinetic studies with substrates and inhibitors"

**B.A in Chemistry (cum laude with department honors)** 1990

Wellesley College, Wellesley, MA.

Thesis entitled "Proton to carbon NOE as a method of conformation determination"

## **Professional experience**

Assistant Professor of Biology,	Johns Hopkins University	2002-present
Assistant Professor of Chemistry	Johns Hopkins University	2000-present
Member, Program in Molecular Biophysics	Johns Hopkins University	2000-present
NIH Postdoctoral Fellow	Scripps Research Institute (Laboratory of Paul Schimmel)	1997-2000
NIH Postdoctoral Fellow	Massachusetts Institute of Technology (Laboratory of Paul Schimmel)	1996-1997
Research Assistant	California Institute of Technology (Laboratory of Barbara Imperiali)	1991-1996
Associate Scientist	Polaroid Corporation	1990-1991

## **Awards and Honors**

Research Corporation Innovation Award	2000
National Institutes of Health Postdoctoral Research Fellow	1997-2000
National Research Training Award-Training Grant	1991-1996
American Institute of Chemistry Outstanding Undergraduate Chemist	1990
Cray Research Fellowship Recipient	1986-1990

## **Professional Activities**

Proposal review for NSF

Manuscript review for Biochemistry, Nucleic Acids Research, Chemical Communications, Chemistry and Biology, Journal of Molecular Biology, Organic Letters, Journal of Organic Chemistry.

Textbook review for New Science Press

## **Publications from Johns Hopkins University research**

### **Indirect tRNA aminoacylation and evolution of protein translation**

Lee, J.; Hendrickson, T. L. "Dissecting anticodon recognition in two co-existing glutamyl-tRNA synthetases," *J. Mol. Biol.*, **2004**, in press.

Skouloubris, S.; Ribas de Pouplana, L.; de Reuse, H.; Labigne, A.; Hendrickson, T. L. "A new aminoacyl-tRNA synthetase that may resolve a missing link in protein evolution," *Proc. Natl. Acad. Sci. USA*, **2003**, *100*, 11297-11302.

### **Invited reviews, commentaries and other publications**

Hendrickson, T. L.; de Crecy-Lagard, V.; Schimmel, P. "Incorporation of non-natural amino acids into proteins," Invited book chapter, *Ann. Rev. Biochem.*, **2004**, *73*, 147-176.

Hendrickson, T. L. "Yielding at Stop Codons: Expanding the Genetic Code," *Chem. Biol.* **2003**, *10*, 475-476.

Hendrickson, T. L.; Schimmel, P.; "Transfer RNA-dependent editing by aminoacyl-tRNA synthetases," Invited book chapter, *Translation Mechanisms*, Kluwer Academic Press, Jacques Lapointe, Ed., **2003**, 34-64.

Hendrickson, T. L. "Recognizing the D-Loop of transfer RNAs," *Proc. Natl. Acad. Sci. USA*, **2001**, *98*, 13473-13475.

### **Publications from postdoctoral research**

Pezo, V.; Metzgar, D.; Hendrickson, T. L.; Waas, W. F.; Hazebrouck, S. Döring, V.; Marlière, P.; Schimmel, P. de Crécy-Lagard, V. "Artificially ambiguous genetic code confers growth yield advantage," *Proc. Natl. Acad. Sci. USA*, **2004**, *101*, 8593-8597.

Hendrickson, T. L.; Nomanbhoy, T. K.; de Crecy-Lagard, V.; Schimmel, P. "Mutational separation of two pathways for editing by a class I tRNA synthetase," *Mol. Cell*, **2002**, *9*, 353-362.

Doring, V.; Mootz, H.; Nangle, L. A.; Hendrickson, T. L.; de Crecy-Lagard, V.; Schimmel, P.; Marliere, P. "Enlarging the amino acid set of *Escherichia coli* by infiltration of the valine-coding pathway," *Science*, **2001**, *292*, 501-504.

• Commentaries on the above publication appeared in *Science* and *Chemistry and Engineering News*, *Current Biology*, the *New York Times*, and on National Public Radio.

Hendrickson, T. L.; Nomanbhoy, T. K.; Schimmel, P., "Errors from selective disruption of the editing center in a tRNA synthetase," *Biochemistry*, **2000**, *39*, 8180-8186.

Nureki, O.; Vassilyev, D. G.; Tateno, M.; Shimada, A.; Nakama, T.; Fukai, S.; Konno, M.; Hendrickson, T. L.; Schimmel, P.; Yokoyama, S. "Proofreading by isoleucyl-tRNA synthetase: Response," Technical comment in *Science*, **1999**, *283*, 459.

Nomanbhoy, T. K.; Hendrickson, T. L., Schimmel, P. "Transfer RNA-dependent translocation of misactivated amino acids to prevent errors in protein synthesis," *Mol. Cell*, **1999**, *4*, 519-528.

Nureki, O.; Vassilyev, D. G.; Tateno, M.; Shimada, A.; Nakama, T.; Fukai, S.; Konno, M.; Hendrickson, T. L.; Schimmel, P.; Yokoyama, S. "Enzyme structure with two catalytic sites for double-sieve selection of substrate," *Science*, **1998**, *280*, 578-582.

• Commentaries on the above publication appeared in *Science* and *Chemistry and Engineering News*.

### **Publications from graduate research**

Imperiali, B.; O'Connor, S. E.; Hendrickson, T. L.; Kellenberger, C. "Chemistry and biology of asparagine-linked glycosylation," *Pure and Applied Chem.* **1999**, *71*, 777-789.

Kellenberger, C.; Hendrickson, T. L.; Imperiali, B. "Structural and functional analysis of peptidyl oligosaccharyl transferase inhibitors," *Biochemistry*, **1997**, *36*, 12554-12559.

Hendrickson, T. L.; Spencer, J. R.; Kato, M.; Imperiali, B. "Design and evaluation of potent inhibitors of asparagine-linked protein glycosylation," *J. Am. Chem. Soc.*, **1996**, *118*, 7636-7637.

Imperiali, B.; Hendrickson, T. L. "Asparagine-linked glycosylation: Specificity and function of oligosaccharyl transferase," *Bioorg. Med. Chem.*, **1995**, *3*, 1565-1578.

Hendrickson, T. L.; Imperiali, B. "Metal ion dependence of Oligosaccharyl Transferase: Implications for catalysis," *Biochemistry*, **1995**, *34*, 9444-9450.

Pathak, R.; Hendrickson, T. L.; Imperiali, B. "Sulfhydryl modification of the yeast Wbp1p inhibits Oligosaccharyl Transferase Activity," *Biochemistry*, **1995**, *34*, 4179-4185.

### **Patents**

Imperiali, B.; Spencer, J. R.; Hendrickson, T. L., "Potent Inhibitors of Oligosaccharyl Transferase," U. S. Patent Application, Serial No. 08/658,486. Filed December 7, 1995.

Hendrickson, T. L. "Chemically-cleavable methods for the detection and isolation of biomolecules," RONIP submitted, September 17, 2001 (Ref. 1717).

### **Invited conference lectures**

*2004 International Conference on Aminoacyl-tRNA Synthetases: Ancient Molecules for Future Biology and Medicine*, Seoul, Korea, July 2004.

"Is a bacterial glutaminyl-tRNA synthetase in our future?"

*Bioorganic Chemistry Gordon Research Conference*, Andover, NH, June 2004

"Dissecting the evolution of aminoacyl-tRNA biosynthesis."

*The tRNA World*, Kloster Banz, Germany, 2003.

"Extant Evidence of Gene Duplication in the Evolution of GlnRS."

*Biophysical Society Annual Meeting*, San Antonio, TX, March 2003.

"Missteps in tRNA Aminoacylation: Proofreading and Repair Mechanisms."

*Bioorganic Chemistry Gordon Research Conference*, Andover, NH, June 2003

Session Chair for "Enzyme Catalysis."

### **Invited industrial lectures**

*Merck Pharmaceuticals*, Rahway, NJ, August 2000.

"Transfer RNA-Dependent Substrate Selection and Rejection by an Aminoacyl-tRNA Synthetase."

### **Invited lectures at colleges and universities**

Amherst College, Boston University-School of Medicine, Hamilton College, Indiana University of Pennsylvania, Juniata College, Moravian College, University of Delaware, University of Maryland – Center of Marine Biotechnology, University of Maryland-College Park, Ursinus College, Wellesley College, Williams College.

### **Active Research Funding**

#### **NSF Small Grant for Exploratory Research**

"Development of a soluble assay for the yeast GPI transamidase."

#### **ACS-Petroleum Research Fund Type G Award**

"GPI Membrane Anchor Formation: Assay Development and Substrate Evaluation."

#### **Research Corporation Innovation Award**

"Applying chemistry to the theories of evolution: Did amino acid reactivity direct the evolution of protein biosynthesis?"

**Teaching responsibilities**

030-441	Spectroscopic Methods for Organic Structure Determination	Fall, 2000-present
030-631	Bioorganic Chemistry I	Fall, 2001-present
030-632	Bioorganic Chemistry II	Spring 2002-present
030-621	Seminars on the Literature of Chemistry	Fall, 2001, 2002
030-621	Seminars on the Literature of Chemistry	Spring, 2002, 2003

**Departmental and University Service**

SAACS Advisor	2001-2003
Chair, Recruiting weekend	2003
Recruiting Committee	2001-2003
Recruiting weekend committee	2002-2003
Coordinated revised placement exam program for department	2003
Biophysical chemistry search committee	2002,2003
Dean's Teaching Fellowship Committee	2003
Department web page Committee	2002
Department brochure committee	2001