

MELISSA D. KELLEY

Professor
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EDUCATION

Ph.D. Biochemistry and Molecular Biology, Department of Biochemistry and Molecular Biology, Oklahoma State University, May 2000

Dissertation Title: Growth Promoting Activity and Metabolism of Select Heteroarotinoids in Vitamin A-Deficient Rats.
Advisor: Dr. E.C. Nelson

B.S. Biochemistry, Department of Biochemistry, Kansas State University, May 1994

TEACHING EXPERIENCE

PROFESSOR

Dept. Chemistry, UCA (Aug 2015-present)

ASSOCIATE PROFESSOR

Dept. Chemistry, UCA (Aug 2009-May 2015)

ASSISTANT PROFESSOR

Dept. Chemistry, UCA (Aug 2003-August 2009)

Courses taught at UCA:

Chemistry 1402: General Chemistry for Health Sciences
Chemistry 2450: General Organic and Biochemistry for Health Sciences
Chemistry 3300: Principles of Biochemistry
Chemistry 3350: Metabolic Biochemistry
Chemistry 4321: Biochemistry Laboratory
Chemistry 4350: Biochemistry I
Chemistry 4309: Medicinal Biochemistry
Chemistry 4335: Biochemistry II

VISITING INSTRUCTOR AND POST-DOCTORAL ASSOCIATE

Dept. of Biochemistry and Molecular Biology, OSU (July 2001-June 2003)

Biochemistry 2344: Introduction to Organic and Biochemistry

Responsibilities:

- Lecture
- Wrote and prepared course quizzes and exams
- Prepared course syllabi
- Maintained course, grades, attendance, and web site
- Conducted exam reviews

Average class size: 60-70 students

Collaborating with Instructor of Record in Biochemistry 3653: Survey of Biochemistry

Responsibilities:

- Development of an interactive website for biochemistry students
- Introduction of problem-based learning
- Lecturing and class maintenance

Average class size: 100-160 students and 20 graduate students

Freshmen Research Scholars Program:

Responsibilities instructing students in:

- Experimental planning,
- Developing and testing a hypothesis
- Basic laboratory techniques
- Analyzing data
- Poster presentation of results

Program consists of 80 freshmen majoring in biochemistry

Biochemistry 4990: Special Problems

Responsibilities:

- Worked with approximately 35 freshmen, 10 juniors, and 10 seniors in a research laboratory.
- Freshmen students were taught basic HPLC theory and application.
- Supervised upperclassman on various laboratory projects.

Undergraduate Student Advising:

Responsibilities:

- Aided in co-advisement of approximately 160 departmental undergraduates

Graduate Student Recruiting:

Responsibilities:

- Implement the use of new graduate student recruiting materials
- Recruit quality graduate students into the OSU Biochemistry program

POST-DOCTORAL RESEARCH ASSOCIATE

Dept. of Biochemistry and Molecular Biology, OSU (Sept 2000-June 2003)

Team-taught Biochemistry 2344: Introduction to Organic and Biochemistry, OSU.

Experience teaching numerous undergraduates on laboratory safety and techniques in a

one-on-one or small group setting in a research laboratory. Laboratory techniques included pipetting, solution preparation, reverse-phase HPLC, solid and liquid phase extractions methods.

GRADUATE TEACHING ASSISTANT

Dept. Biochemistry and Molecular Biology, OSU (Sept 1994-May 2000)

Biochemistry 3653 Survey of Biochemistry

Responsibilities:

Course grading

Attendance

Review sessions

Average class size: 100-120 students

Biochemistry 3824: Introduction to Biochemistry Laboratory

Responsibilities:

Laboratory preparation

Assisting students on different laboratory techniques and experiments

Grading laboratory reports

Average class size: 20-25 students

Biochemistry 5824: Introduction to Graduate Biochemistry Laboratory

Responsibilities:

Laboratory preparation

Assisting students on different laboratory techniques and experiments

Grading laboratory reports

Average class size: 20-25 students

Instructed undergraduate students individually in the research laboratory on advanced laboratory techniques and data analysis. Students varied from freshmen to seniors.

Approximately 10-15 students per year.

Advised senior students on laboratory techniques and data collection for the Lou Wentz Research Scholars Program.

FUNDING

Metabolism of the Anti-Cancer Drug 4-HPR (\$1000). UCA Faculty Enhancement Award. Oct. 2004.

Vitamin A Metabolism in Type 2 Diabetes (\$8430). University Research Council. Nov. 2004.

Type 2 Diabetes and Vitamin A Metabolism (\$2500). University Research Council Summer Stipend. Jan. 2005.

Enhancing Biochemistry Education by Attending the Education in the Biomolecular Sciences at the American Society for Biochemistry and Molecular Biology Meetings 2005 (\$1091). University Faculty Development Grant. Jan. 2005.

RUI: Chemical stimulants of vein cutting and trenching behaviors in insect herbivores (\$299,531). National Science Foundation. Jan. 2005. Co-PI with David Dussourd. Funding was denied.

RUI: Trenching and girdling by noctuid and notodontid caterpillars: Using pest behavior to elucidate crop defenses (\$379,012). National Science Foundation. Jan. 2006 Co-PI with David Dussourd. Funding was denied.

Enhancing the Chemistry Curriculum by Attending the National Conference on Undergraduate Research (\$1824). University Faculty Development Grant. Feb 2006.

Trenching and girdling by noctuid and notodontid caterpillars: Using pest behavior to elucidate crop defenses (\$379,012). U.S. Dept. of Agriculture. Jan 2007. Funding was denied.

Effect of Retinoids on Lymphocyte Metalloprotease Mediated Shedding (Co-PI with L. Bridges) (\$6,500). University Research Council. Nov. 2007.

Effect of Retinoids on Lymphocyte Metalloprotease Mediated Shedding (Co-PI with L. Bridges) Research Corporation (\$56,650). Nov. 2007.

Merck/AAAS Undergraduate Science Research Program (\$20,000/ year for three years). Nov. 2007. Funding was denied.

Expansion of Commonly Used Incubation and Freezer Equipment in the College of Natural Sciences and Mathematics at the University of Central Arkansas (Co-PI with J.D. Swanson, K. Naylor, L. Bridges, and B. Hill NIH INBRE (\$24,890). Jan 2008.

Enhancing the Cell Imaging Capabilities in the College of Natural Sciences and Mathematics at the University of Central Arkansas (Co-PI with J.D. Swanson, K. Naylor, L. Bridges, B. Hill, B. Rowley, and D. Starkey) INBRE (\$50,000). Jan 2009.

MRI: Acquisition of UPLC-TQMS and MALDI-TOFMS (CoPI with C. Dorey, N. Carter, K. Felling, D. Perry, and K. Steelman) NSF (\$672,958) Jan. 2009.

Effect of Retinoid Metabolism on ADAM-Integrin Interactions in Human Blood Cell Lines. NIH INBRE (\$17,960) May 2009.

Acquisition of an Analytical Flow Cytometer for Natural Sciences and Teaching (Co-PI with B. Rowley, L. Bridges, S. Runge, and J.D. Swanson). NSF (\$82,452) Dec. 2009.

Understanding Immune Cell Signaling: Effect of Retinoids on ADAM Shedding. NIH INBRE (\$545,681) May 2010.

A Two Way Street: Retinoid Regulation of Immune Cell Adhesion and Proliferation. NIH INBRE (\$308,930) May 2015.

PRESENTATIONS

Chang, A. and **Kelley, M.D.** Isolation and Characterization of All-*trans*-retinoic acid isomers produced by ultraviolet light exposure. National Conference of Undergraduate Research (NCUR), Asheville, NC April 2006.

Kelley, M.D. Making the chemistry connection. Integrating mini-reviews and case studies to teach biochemistry to senior level biology students. 233rd American Chemical Society National Meeting, Chicago, IL April 2007.

Malcolm, E. and **Kelley, M.D.** Separation and Isolation of Metabolites of *N*-(4-hydroxyphenyl) retinamide (4-HPR) after Incubation with Sprague-Dawley Rat Liver Microsomes 233rd American Chemical Society National Meeting, Chicago, IL April 2007.

Grandon, R., Bridges, L.C., and **Kelley, M.D.** Retinoid Metabolism in Human B Lymphocyte (RPMI 8866) Cell Line 235th American Chemical Society National Meeting, New Orleans, LA April 2008.

Brazeal, J. and **Kelley, M.D.** The Influence of Type-II Diabetic Drugs on Retinoid Metabolism 235th American Chemical Society National Meeting, New Orleans, LA April 2008.

Lingo, J.D., **Kelley, M.D.** and Bridges, L.C. Human ADAM7 mRNA is Expressed in B-Cell Lineages 235th American Chemical Society National Meeting, New Orleans, LA April 2008.

Kelley, M.D. From the Science to the Clinical: Integrating Literature Reviews and Case Studies 235th American Chemical Society National Meeting, New Orleans, LA April 2008.

Lingo, J.D., **Kelley, M.D.**, and Bridges, L.C. Human B Cell Adhesion Is Stimulated by Exposure to 9-*Cis* Retinoic Acid. 64th SWRM American Chemical Society, Little Rock, AR October 2008.

Block, M., **Kelley, M.D.**, and Bridges, L.C. Expression Profiling of Retinoic Acid Nuclear Receptors in Human Blood Cell Lineages. 64th SWRM American Chemical Society, Little Rock, AR October 2008.

Grandon, R., Bridges, L.C., and **Kelley, M.D.** Metabolic Profiling of All-*Trans*-Retinoic Acid and 9-*Cis*-Retinoic Acid in Human Blood Cells. 64th SWRM American Chemical Society, Little Rock, AR October 2008.

Kirkpatrick, A., Bridges, L.C, and **Kelley, M.D.** Metabolic profiling of 9-*cis*-retinoic acid in human immune cell lines. 239th American Chemical Society National Meeting, San Francisco, CA March 2010.

Kelley, M.D. Using literature reviews integrated with case studies to promote student-driven learning. 239th American Chemical Society National Meeting, San Francisco, CA March 2010.

Merrel, K.S., **Kelley, M.D.**, and Bridges, L.C. 9-*cis*-Retinoic acid induces integrin-independent adhesion while dampening proliferation in human immune cells. . 239th American Chemical Society National Meeting, San Francisco, CA March 2010.

Kirkpatrick, A., Bridges, L.C, and **Kelley, M.D.** The Influence of PPAR gamma Ligands on Retinoid Metabolism 241st American Chemical Society National Meeting, Anaheim, CA March 2011.

Miller, J, **Kelley, M.D.**, and Bridges, L.C. 9-*cis*-Retinoic acid stimulated B-cell adhesion is attenuated upon corticosteroid exposure. 241st American Chemical Society National Meeting, Anaheim, CA March 2011.

Gambill, J., Phomakay, V., A., and **Kelley, M.D.** Effect of troglitazone on retinoic acid metabolism, cellular adhesion, and proliferation in human K562 cells 243rd American Chemical Society National Meeting, San Diego, CA March 2012.

Hanson, A. and **Kelley, M.D.** The Effect of Troglitazone on Retinoic Acid Metabolism, Cellular Adhesion, and Proliferation in Human K562 Cells. Arkansas INBRE Research Conference, Arkansas INBRE, University of Arkansas, Fayetteville, AR. Oct. 2012

Kelley, M. D., and Hanson, A. M. 9-*cis*-Retinoic Acid and Troglitazone Impact Cellular Adhesion, Proliferation, and Integrin Expression in K562 Cells. SE Regional IDeA Meeting, Little Rock AR. Nov. 2013.

Nowotny, C. and **Kelley, M.D.** The Effect of Retinoid Agonists on Cellular Adhesion in K562 Cells Treated with Troglitazone. 247th American Chemical Society National Meeting, Dallas, TX March 2014.

Kelley, M.D. 9-*cis*-Retinoic Acid and Troglitazone Impacts Cellular Adhesion, Proliferation, and Integrin Expression in K562 Cells. NISBRE/IDeA Symposium, Washington, DC June 2014.

Phomakay, R. and **Kelley, M.D.** The Effect of Retinoid Receptor Agonists on K562 Cellular Adhesion, Proliferation, and $\alpha 5\beta 1$ Integrin Cell Surface Expression. 251st American Chemical Society National Meeting, Denver, CO March 2015.

PUBLICATIONS

Hanson, A.M., Gambill, J. Phomakay, V., Staten, C.T., and **Kelley, M.D.** *9-cis*-Retinoic Acid and Troglitazone Impacts Cellular Adhesion, Proliferation, and Integrin Expression in K562 Cells. *PLoS One*. *9*(3); e93005 1-11. 2014

Bridges, L.C. Lingo, J.D. Grandon, R.A., and **Kelley, M.D.** *All-trans*-Retinoic Acid Induces Integrin-independent B-cell Adhesion to ADAM Disintegrin Domains. *Biochemistry* *47*: 4544, 2008.

Simms-Kelley, M.D., Subramanian, S., Madler, M.M., Patrick, S.D., Klucik, J., Brown, C.W., Liu, S., Lemire, T.D., Benbrook, D.M., Birckbichler, P.J., Berlin, K.D. and Nelson, E.C. Heteroarotinoids Promote Growth in Vitamin A-Deficient Rats. *FASEB J.* *13*: 896, 1999.

Liu, S. Berlin, K.D., **Simms-Kelley, M.D.**, Nelson, E.C. and Benbrook, D.M. Optimization and Synthesis of (E)-4-[2-(3,4-Dihydro-4,4-dimethyl-2H-1-benzopyran-6-yl)-1-propenyl] benzoic Acid-11-[¹⁴C]. *J. Labelled Compounds and Radiopharmaceuticals* *42*: 789, 1999.

Simms-Kelley, M.D., Subramanian, S., Spruce, L.W., Madler, M.M., Patrick, S.D., Grummer, R., Lemire, T.D., Benbrook, D.M., Birckbichler, P.J., Berlin, K.D. and Nelson, E.C. Growth Promoting Activity of Heteroarotinoids in Vitamin A-Deficient Rats. *FASEB J.* *12*: 840, 1998.

Andersson, L.A., Johnson, A.K., **Simms, M.D.** and Willingham, T.R. Comparative Analysis of Catalases: Spectral Evidence Against Heme-Bound Water for the Solution of Enzymes. *FEBS.* *370*: 97, 1995.

ORGANIZATIONS/AWARDS

American Chemical Society

Project Kaleidoscope Faculty for the 21st Century (PKAL F21)

Finalist for UCA Teaching Excellence Award (2011)