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EDUCATION

- Postdoctoral fellowship, Nutritional Sciences & Biobehavioral Health, The Pennsylvania State University, University Park, PA, USA, 2005.
- Ph.D., Human Biology and Nutritional Science, University of Guelph, December 2004; Ph.D. Research location: Pacific Agri-Food Research Centre, Summerland, BC.
- M.Sc., Human Biology and Nutritional Science, University of Guelph, June 2002.
- B.Sc., Honors, major in Biological Sciences, minor in Nutrition, University of Guelph, April 2000.

HONORS, AWARDS & DISTINCTIONS

1. National Sciences and Engineering Research Council of Canada (NSERC) Postdoctoral Fellowship (PDF) 2005-2007
2. National Sciences and Engineering Research Council of Canada (NSERC) Postgraduate Scholarship (PGS B) 2003-2004
3. Ontario Graduate Scholarship (OGS) 2003 (*awarded and deferred as the award conflicts with NSERC*)
4. Ontario Graduate Scholarship in Science and Technology (OGSST) 2002
5. University of Guelph Graduate Scholarship 2002
6. Ph.D. Entrance Scholarship University of Guelph, 2002
7. Honors Graduate M.Sc. University of Guelph, 2002
8. Ontario Graduate Scholarship in Science and Technology (OGSST) 2001

DISSERTATION/THESIS

Ph.D. Thesis

Analysis of the bioactivity, metabolism, and pharmacokinetics of anthocyanins in humans (2004). Experience: Human feeding trials, bioavailability and pharmacokinetic analysis, extraction, purification, and identification of novel metabolites in blood and urine using HPLC, LC, MS, GC, and NMR.

M.Sc. Thesis

Assessment of the *in vivo* antioxidant potential of wild blueberries in humans (2002). Experience: Clinical trials investigating oxidation (serum, lipids, DNA) and laboratory analysis of phytochemical profile and stability.

B.Sc. Thesis

Studies on the effect of soluble fibers, guar gum and fenugreek, on selected risk factors for cardiovascular disease and diabetes in human subjects (2000). Experience: Human feeding trials, analysis of blood lipids (LDL, HDL, TAG) and glucose.

PUBLICATIONS

Invited/Critical Reviews

1. Kay CD & Holub BJ. Anthocyanins and cancer prevention. In: Nutrition and Cancer Prevention. Marcel Dekker, Inc. Oct, 2005.
2. Mazza G, Cacace JE & Kay CD. Methods of Analysis for Anthocyanins in Plants and Biological Fluids. Journal of AOAC International. 2004;87(1):129-145.
3. Kay CD & Holub BJ. The Postprandial Effects of Dietary Antioxidants in Humans. Current Atherosclerosis Reports. 2003;5:452-458.

Refereed Papers Published in Scientific Journals

4. Kay CD. Aspects of anthocyanin absorption, metabolism, & pharmacokinetics in humans. Nutrition Research Reviews; In Press June 2006 Issue.
5. Kay CD, Mazza G & Holub BJ. Anthocyanins exist in the circulation primarily as metabolites in adult men. Journal of Nutrition. 2005;135:2582-2588.
6. Kay CD, Mazza G, Holub BJ & Wang J. Anthocyanin Metabolites in Human Urine and Serum. British Journal of Nutrition. 2004;91:933-942.

7. Mazza G, Kay CD, Cottrell T & Holub BJ. Absorption of Anthocyanins from Blueberries and Serum Antioxidant Status in Humans. *Journal of Agricultural and Food Chemistry*. 2002;50:7731-7737.
8. Kay CD & Holub BJ. The effect of wild blueberry consumption on postprandial serum antioxidant status in humans. *British Journal of Nutrition*. 2002;88:389-397.

Papers in progress or submitted for publication

9. Kay CD, Kris-Etherton PM & West SG. Clinical nutrition studies: unique applications; In: Berdanier's Handbook of Nutrition and Food Science. CRC press.
10. Kay CD, Kris-Etherton PM & West SG. Clinical Investigations of Effects of Antioxidant Foodstuffs on Vascular Reactivity. *Journal of Current Atherosclerosis Reports*.

Abstracts & Presentations

1. Kay CD. Oxidant and Antioxidant Actions of Polyunsaturated Fatty Acids: Inflammation, Oxidation, and Flow Mediated Dilation, From Bench to Bedside. A Symposium in Honour of The Retirement of Bruce J. Holub, University of Guelph, Guelph, ON, Oct 21, 2005 (Invited speaker)
2. Kay CD, West G & Kris-Etherton P. Oxidative Stress in Diabetics: Source, risk assessment, and possible treatment strategy, 2005 Penn State Diabetes Research Retreat, Penn State Diabetes Center, State College, PA, May 06, 2005 (Poster)
3. Kay CD, Mazza G & Holub BJ. Studies of the Metabolism and Pharmacokinetics of Anthocyanins in Humans, 48th Annual Meeting of the Canadian Federation of Biological Societies (CFBS), University of Guelph, Guelph, ON, June 21 - 24, 2005 (Poster)
4. Kay CD. Horticultural Crop Quality and Human Health, 2005 Annual Meeting of the Canadian Society for Horticultural Sciences (CSHS) and the Canadian Phytopathological Society, Edmonton, Alberta, June 15-18, 2005 (Invited speaker-declined)
5. Kay CD. Flavonoid Metabolism and Health; symposium on the adsorption, distribution, metabolism and measurement of flavonoids and flavonoid metabolites in biological fluids, 229th ACS National Meeting, San Diego, CA, March 13-17, 2005 (Invited speaker - declined).

6. Kay CD, Mazza G & Holub BJ. Clinical Investigations of the Bioavailability and Bioconversion of Anthocyanins in Humans, WorldNutra Fifth International Conference and Exhibition on Nutraceuticals and Functional Foods, San Francisco, CA, November 7-10, 2004 (Invited speaker).
7. Kay CD & Mazza G. Extraction and analysis of anthocyanins in blood and urine, WorldNutra Fourth International Conference and Exhibition on Nutraceuticals and Functional Foods, Las Vegas, NV, September 28-30,1, 2003. (Poster)
8. Kay CD, Mazza G & Holub BJ. Absorption and Bioavailability of Anthocyanins in Human Subjects, WorldNutra Fourth International Conference and Exhibition on Nutraceuticals and Functional Foods, Las Vegas, NV, September 28-30,1, 2003 (Invited speaker).
9. Kay CD, Mazza G, Cottrell T & Holub BJ. Absorption of Anthocyanins in humans correlates with increased serum antioxidant status, 2003 Conference and Annual General Meeting of the Canadian Society for Clinical Nutrition, Vancouver, British Columbia, April 24-26, 2003. Abstract published in the Canadian Journal of Gastroenterology, 2003. (Poster)
10. Kay CD, Mazza G, Cottrell T & Holub BJ. Anthocyanins absorption and serum antioxidant status in humans, IUFoST 12th World Congress of Food Science and Technology, Chicago, Illinois, July 16-20, 2003. (Poster)
11. Kay CD, Cottrell T, Holub BJ & Mazza G. Absorption of Anthocyanins from Blueberries and Serum Antioxidant Status in Middle-Aged Men, Worldnutra International Conference and Exhibition on Nutraceuticals and Functional Foods, San Diego, CA, November 17-20, 2002. (Poster)
12. Mazza G, Cacace JE & Kay CD. Optimization of Solvent Extraction and Analysis of Anthocyanins in Plants and Biological Fluids, Worldnutra International Conference and Exhibition on Nutraceuticals and Functional Foods, San Diego, CA, November 17-20, 2002. (Poster)
13. Kay CD & Holub BJ. Postprandial increases in serum antioxidant status in healthy middle aged men following consumption of wild blueberries, The 45th Annual Meeting of The Canadian Federation of Biological Societies, Montreal, Quebec, June 12-15, 2002. (Poster)
14. Kay CD & Holub BJ. The effect of wild blueberry consumption on postprandial serum antioxidant status in humans, WorldNutra Third Annual Conference and Exhibition on Nutraceuticals and Functional Foods, Portland, Oregon, November 29-December 2, 2001. (Poster)

LECTURES & SEMINARS

1. *Guest lecturer*, Penn State University, Nutrition and Cardiovascular Disease (Nutrition 496W), Department of Nutritional Sciences. Lecture title: Diet, Fatty Acids & CVD, January 13, 2006.
2. *Guest lecturer*, Penn State University, Health: Biobehavioral Perspectives (BBH 502W), Department of Biobehavioral Health. Lecture title: Nutrition Interventions: Obesity, Cholesterol & CVD, November 30, 2005.
3. *Guest lecturer*, Penn State University, Regulation of Nutrient Metabolism (Nutrition 581W), Department of Nutritional Sciences. Lecture title: Integrative Diabetes, November 28, 2005.
4. *Invited Speaker*, Kay CD. The Pennsylvania State University, Biobehavioral Health Fall Colloquium Series, Presentation Title: Diet, Obesity & Disease: Metabolic & Physiological Relationships, Nov 21, 2005.
5. *Guest lecturer*, Penn State University, Introduction to Biobehavioral Health (Honors; BBH 101W), Department of Biobehavioral Health. Lecture title: Practicum: Special Topics in Nutrition, November 18, 2005.
6. *Guest lecturer*, Penn State University, Introduction to Biobehavioral Health (Honors; BBH 101W), Department of Biobehavioral Health. Lecture title: Eating Disorders, November 14, 2005.
7. *Guest lecturer*, Penn State University, Introduction to Biobehavioral Health (Honors; BBH 101W), Department of Biobehavioral Health. Lecture title: Obesity, November 11, 2005.
8. *Guest lecturer*, Penn State University, Introduction to Biobehavioral Health (Honors; BBH 101W), Department of Biobehavioral Health. Lecture title: Nutrition, November 9, 2005.
9. *Guest lecturer*, Penn State University, Regulation of Nutrient Metabolism (Nutrition 581W), Department of Nutritional Sciences. Lecture title: Gastrointestinal Regulation, September 28, 2005.
10. *Guest lecturer*, Penn State University, Regulation of Nutrient Metabolism (Nutrition 581W), Department of Nutritional Sciences. Lecture title: Gastrointestinal Regulation, September 26, 2005.
11. *Guest lecturer*, Penn State University, Regulation of Nutrient Metabolism (Nutrition 581W), Department of Nutritional Sciences. Lecture title: Molecular Endocrinology, September 12, 2005.

12. *Guest lecturer*, Penn State University, Nutrition and Cardiovascular Disease (Nutrition 490W), Department of Nutritional Sciences. Lecture title: Oxidation and Disease, January 31, 2005.
13. *Invited speaker*, Kay CD. Penn State University, Department of Biobehavioral health and nutritional sciences. Presentation title: Anthocyanins, & CVD: Studies of the Biological Activities of an Antioxidant Phytochemical in Humans, June 25, 2004.
14. *Invited speaker*, Functional Foods & Nutraceuticals Symposium, University of Guelph. Presentation title: Antioxidants, Functional Foods and Nutraceuticals, March 22, 2002.
15. *Invited speaker*, Ontario Highbush Blueberry Growers Association Annual Meeting, Ridgetown Agricultural College. Presentation title: Nutraceutical Implications of Blueberries, March 2, 2002.
16. *Guest lecturer*, University of Guelph, Nutraceuticals and Functional Foods, Department of Human Biology and Nutrition. Lecture title: Blueberries, Phytochemicals, and Human Health, October, 2001.
17. *Volunteer Speaker*, Graduate Seminar Series, University of Guelph, Department of Human Biology and Nutrition. Presentation title: Antioxidant properties of anthocyanins, March, 2000.

CURRENTLY FUNDED GRANTS:

- Principle Investigator, General Mills Research & Development Branch, MN; “Effect of whole grain on cardiovascular disease: Oxidative and Inflammatory response”
- Co-Investigator, Pistachio Council; “A dose-response study of the effects of pistachios on cardiovascular disease risk factors: Lipids, lipoproteins, glucose, endothelial health (flow mediated dilation), isoprostanes, total antioxidant capacity, inflammatory cytokines, and adhesion molecules”. \$316,868. Principal Investigator: Penny M. Kris-Etherton.
- Co-Investigator, ROSS Products Division of Abbott Laboratories; “Acute effects of unsaturated fatty acids on oxidation, inflammation, and endothelin in Type-2 diabetes” NIH/GCRC funded secondary analysis. Principal Investigator: Sheila G. West.
- Co-author/Co-investigator, Cattleman’s Association; “Effect of a Blood Cholesterol-Lowering Diet with Lean Beef on Established and Emerging

Cardiovascular Disease (CVD) Risk Factors” Under review. Principal Investigator: Penny Kris-Etherton.

GRANTS UNDER REVIEW:

- Co-author/Co-investigator, GlaxoSmithKline; “Effects of supplemental calcium (calcium carbonate) on insulin sensitivity in subjects with central obesity and metabolic syndrome” Under review. Principal Investigator: Sheila G. West.

GRANTS COMPLETED:

- Co-author/Co-investigator, Heart and Stroke Foundation of Canada, Grant-In-Aid Program 2002/2003; “Interaction between fish oils containing n-3 fatty acids and natural antioxidants in relation to cardiovascular disease (CVD) risk factors in the postprandial state”. \$130,000 over 2yr. Principal Investigator: Dr. BJ Holub.
- Co-author/Co-investigator, Ontario Ministry of Agriculture and Food (OMAF) 2002/2003, Food Research Program, Sub-program: Value Added Foods. “Evaluation of the Biological Activity of Berry Anthocyanins in Human Subjects”. \$35,000/yr. Principal Investigator: Dr. BJ Holub.
- Co-author/Co-investigator, Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) 2001/2002; “Project title ‘Development of Nutraceutical Ingredients from Ontario-Grown Blueberries’”. \$35,000/yr. Principal Investigator: Dr. BJ Holub.

CURRENT COLLABORATIONS:

- Effects of Coca on cardiovascular risk factors for disease; Hershey Medical Center, Hershey, PA.
- Effect of whole grain on cardiovascular disease; General Mills Research & Development Branch, MN.
- Effect of Soy Isoflavones on postprandial lipid metabolism; University of Guelph, Guelph, ON.

RESEARCH/TECHNICAL EXPERIENCE

Postdoctoral Fellow, Human Vascular Interventions Lab & the Metabolic Diet Study Center, Departments of Nutritional Sciences and Biobehavioral Health, Penn State University. Responsibilities: Oxidative analysis including: LDL-oxidation and lipid hydroperoxide assays, cellular activity assays (GSH/GSSG activity), inflammatory markers/enzyme-linked immunosorbent assays (CRP, IL6, IL8, TNF-a); vascular endothelial assessment (flow mediated dilation via vascular ultrasound scoring, endothelin-1 immunoassay); systemic vascular response to stress including

impedance cardiography with EKG (analysis of total peripheral resistance, stroke volume, cardiac output, and other parameters of heart activity); writing of research grant proposals, and training of graduate and undergraduate students.

Director/Supervisor Dr. Sheila West and Dr. Penny Kris-Etherton, January 2005 – Present.

Food Research Associate, Pacific Agri-Food Research Center, Department of Agriculture Canada. Project: Bioactive components in foods. Responsibilities: Phytochemical identification and quantification (HPLC-DAD, HPLC-MS, GC-FID, GC-MS, TLC), development of extraction/processing technologies (adsorption column chromatography, prep-HPLC, prep-TLC, sublimation), supervisor of intern graduate exchange student. Director/Advisor Dr. G. (Joe) Mazza, January 2003 - Jan 2005.

Research Assistant, Human Nutrition Laboratory, Department of Human Biology and Nutrition, University of Guelph. Responsibilities: Design and implementation of human clinical trials, *in vitro* analysis (antioxidant analysis, biomarker analysis, lipid analysis, glucose analysis), writing of grant proposals, research for review documents, and web page design. Advisor Dr. Bruce Holub, 2000-2002.

Selected Relevant Course Work:

Functional Foods & Nutraceuticals (3 courses), Toxicological Nutrition, Nutrition & Human Disease, Micronutrients, Phytochemicals & Health, Herbs spices and medicinal plants, Nutrition and Immune Function, Nutrition, Exercise and Energy Metabolism, Biochemistry, Physiology, Statistics.

Technical Experience

Clinical: Design and implementation of human trials, medical history assessment and subject screening, writing of ethics and protocol proposals, blood and urine analysis, and analysis of risk factors associated with diabetes and cardiovascular disease.

Biochemistry: Phytochemical extraction and purification, *in vitro* analysis, antioxidant assays, enzyme & immunoassays, biomarker analysis, lipid analysis, glucose analysis, enzyme extraction, high performance liquid chromatography, preparative liquid chromatography, adsorption chromatography (C18, polymeric resins), gas chromatography, mass spectrometry.

MANUSCRIPT REVIEWS

- Co-reviewed manuscript for the British Journal of Nutrition. “Absorption and metabolism of red orange juice anthocyanins in rats”. November, 2005

- Primary reviewer for the Journal of Molecular Nutrition and Food Research. “Is there a future for antioxidants in atherogenesis?” May, 2005.
- Co-reviewed manuscript for the Journal of Nutrition. “Resveratrol reduced activity, expression and secretion of pancreatic cholesterol esterase. Comparison with a red wine polyphenolic extract”. November, 2004
- Co-reviewed manuscript for the Journal Lipids. “Habitual fish intake decreases the susceptibility of low-density lipoprotein to ex vivo oxidation” June, 2002.
- Primary reviewer for the Journal of Food Chemistry. “Peroxynitrite: A potential initiator of lipid oxidation in food” March, 2001.

MEDIA/PRESS

- Food in Canada Magazine, Rogers Media Inc. April 2005. Interviewed and quoted in article titled “Antioxidants in foods: new uses and sources” [Author: Deanna Rosolen].
- University of Guelph Alumnus Magazine, Fall 2002. Data (BJN; 2002;88:389-397.) presented in feature article “Let food be your medicine” [Author: Stacey Curry Gunn].

ACADEMIC SERVICE

Graduate Student Committee, Department of Human Biology and Nutritional Sciences (2001).

Nutrition and Nutraceutical Sciences Student Association (2000).

REFERENCES

PhD Supervisor:

Dr. Bruce J. Holub, Ph.D.

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College of Biological Science, University of Guelph,
ANNU Building, Room 342, Guelph, ON, Canada, N1G 2W1.

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Fellowship Supervisor:

Dr. Sheila West, Ph.D.

Assistant Professor, Department of Biobehavioral Health,
College of Health and Human Development, The Pennsylvania State University,
310B Health and Human Development Building East, University Park, PA, 16802

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Fellowship Supervisor:

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Distinguished Professor, Department of Nutritional Sciences,
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Collaborator & Ph.D. Co-Supervisor:

Dr. G. (Joe) Mazza, Ph.D.

Senior Research Scientist, Agriculture and Agri-Food Canada,
Pacific Agri-Food Research Centre, Summerland, BC,
4200 Hwy 97, Canada V0H 1Z0

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Collaborator:

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